EXPANDED & REVISED
Second Edition

HERB CONTRAINDICATIONS AND DRUG INTERACTIONS

With Appendices
Addressing Specific
CONDITIONS
And
MEDICINES

Francis Brinker, N.D.

HERB
Contraindications And DRUG Interactions

With Appendices Addressing Specific Conditions And Medicines

Second Edition

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Eclectic Medical Publications
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Combining herbal use with any prescribed medication should only be done after consultation with a physician. Information in this book is not intended to take the place of instructions provided by one's doctor or health care provider.

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Foreword

Recent years have seen an explosion of interest in botanical medicine, among both the general public and the medical profession. The results of clinical studies have proved beyond doubt that—to give but a few examples—garlic and ginkgo have an important role to play in the treatment of cardiovascular disease, and St. John's wort is effective for mild to moderate depression (thus confirming its traditional role as a 'nervine tonic'). There has been a recognition, in short, that herbal medicines have significant pharmacological activity.

With the recognition of benefit, however, comes that of risk, albeit slight. If phytotherapy is to play a meaningful role—as I believe it should—in health care in the twenty-first century, it is essential that physicians, pharmacists, and patients understand when certain herbs should not be used at therapeutic dosage—in pregnancy, in certain disease conditions, or in combination with specific pharmaceutical drugs. This book is intended to address the 'knowledge vacuum' that exists at present.

It must be acknowledged at the outset that some of the contraindications given here would not find ready agreement among all botanical practitioners. For example, choleretic and cholagogue herbs are considered by many phytotherapists (including myself) to be the mainstay of gallstone treatment, since they increase the solubility of cholesterol in bile. Both tradition and clinical practice bear witness to the effectiveness of this approach.

The fact that this manual proscribes such herbs for patients with gallstones is, however, more a reflection of the text's aims and scope than evidence of a lack of agreement on this issue. For the treatment of serious medical problems should be undertaken by qualified practitioners, and should not be the subject of self-medication. Texts addressed to the general public, therefore, or even to professionals whose knowledge of a particular area is scanty, need to err on the side

of extreme caution, even to the point of apparently contradicting the received wisdom in that field.

This being said, some of the contraindications in this book remain controversial, and demonstrate the difficulty of setting guidelines in an area where consensus is hard to achieve. The seesaw of opinion regarding the appropriate use of certain herbs is often impelled by an unquestioning overreliance on research outcomes to the detriment of clinical practice and traditional use. For example, the supposed properties of all preparations of a particular plant may be extrapolated from research on individual plant constituents or specific plant extracts. The resulting distortions reflect both a lack of scientific rigor and a casual disregard of tradition.

Echinacea is a case in point. The host of myths now circulating about this herb—that it is a T-cell activator, or leads to increased TNF-α and is thus contraindicated in AIDS—are based on *in vitro* research on Echinacea polysaccharides, which are not present in alcoholic extracts. Even where the polysaccharides are present in small quantities—as in the expressed juice—they are largely destroyed in the colon by bacterial activity. Research shows that polysaccharide absorption through the gut is about 1%.

For these reasons—and because clinical practice shows, for instance, that Echinacea often benefits patients with autoimmune disease—the contraindications given for Echinacea must be regarded as highly contentious, as Dr. Brinker indicates. The same goes for chaparral and other 'controversial' herbs on which the jury is still out. If these caveats are borne in mind, this book will prove a valuable resource, not only for those unversed in botanical medicine, but also for phytotherapists, whose patients frequently take herbal remedies in combination with prescription drugs.

Colin Nicholls
Editor, British Journal of Phytotherapy
Tunbridge Wells, July 1997

Preface to the Second Edition

The primary concern that motivated identifying the limitations of medicinal applications of plants is the prevention of avoidable adverse effects. The possibility that herbs can be disruptive presumes that the plants have demonstrable activity. The safety and effectiveness of certain plants as medicines has been delineated empirically through the ages and is now being elaborated upon by growing scientific and medical studies on their actions. This allows us to better comprehend the specificity of their applications and to recognize more clearly the parameters of their appropriate use.

The emphasis on development of potent synthetic pharmaceuticals has diminished investigation into the often more subtle traditional herbal remedies. Therefore, much remains unresolved about herbs in the context of modern medicine. As the pharmaceutical and herbal approaches are combined by patients or prescribers in an attempt to improve therapeutic outcome, a potential for risk is sometimes assumed. The lion's share of this risk is due to the often excessive disruption of normal physiological processes brought about by the synthetic medicines.

Most herbal remedies in their traditional applications and in the relatively mild doses in which they are normally employed are, by comparison with prescription drugs, extremely safe for most people to use. However, their activity is sufficient to exacerbate the significant toxic potential that resides in many prescribed pharmaceuticals.

As noted in the Introduction, knowledge about herbal interactions with medicines and patient responses to herbal effects is continually expanding. Renewed interest in herbs as medicinal agents has sparked increased scientific investigations into their potential. Clinical reports have noted new concerns regarding adverse effects of certain herbal remedies, and recent published articles and texts help in formulating a consensus on specific herbal applications and limitations. For these reasons a revised and updated version of this text is

necessary. The recently published American Herbal Products Association's *Botanical Safety Handbook* (ref. 150) is a timely authoritative source employed as a major reference for contraindications in this edition, since it includes a number of previously excluded plants from the Chinese and Ayurvedic traditions that are becoming increasingly popular in America.

Determination and explanations of contraindications and drug interactions are based on different types and degrees of evidence. Identifying risks to prevent unwanted results is sometimes based on preliminary data that can best be described as speculative. Such evidence includes *in vitro* laboratory finding with cell or tissue samples from animals or humans, laboratory tests with various live animal species using different modes of administration, and human studies on healthy individuals. Stonger evidence is obtained through empirical findings reported or recorded as personal experience, as traditional knowledge and as published case reports or clinical trials. The type of evidence used is described as specifically as possible in this text based on the details, or lack thereof, found in reference citations. This is intended to help clarify the degree of relative support for the designations or explanations that are made herein. In these descriptions abbreviations for the various modes of administration in animals and humans are used, i.e., PO (by mouth), SC (subcutaneous), IM (intramuscular), IP (intraperitoneal), and IV (intravenous), since the method of delivery of active agents greatly impacts their influence.

Designations made for certain plants or their extracts are sometimes supported only by research on concentrated chemical components of these plants. This consideration of the activity of extract fractions or isolated constituents does not necessarily establish the validity of the designation for the plant or its medicinal extract, but as a contributing factor to the overall effect of the herb this information deserves attention nonetheless. Ultimately, the significance of the information provided is relative to the context of its documented effects. The *in vitro* effects of an isolated constituent obviously does not furnish the

convincing evidence that clinical observations using the whole plant or its simple extract provides. However, sometimes basic research data is the only detailed information available. Original references have been used in this edition whenever feasible to help the reader determine the quality of the evidence by investigating its source.

Unfortunately, uncertainties occur in the process of assessing the validity of different references when methodologies vary or information is in conflict. In some cases designations of contraindications or drug interactions from authoritative references are included but challenged or qualified by other referenced research findings. As a result of added evidence or developments in knowledge, several changes have been made in designations since the first edition. In this regard most herbal diuretics as a class are no longer believed to contribute significantly to the loss of potassium, and so as a group they do not generally pose a risk for that reason when used together with digitaloid glycosides. In another example involving an increasingly popular herb, the risk of interactions of St. John's wort with other agents due to its impact on neurotransmitter metabolism is now considered to be of concern mainly with pharmaceutical monoamine oxidase inhibitors and serotinin reuptake inhibitors that have significant risks of adverse effects by themselves.

Over twenty more herbs have been included in the body of the text, and dozens more have been added to the appendices. Several additions of general classes of herbs for which cautions are in order have been added to the appendix. Herbs that act as irritants when handled fresh, those whose oxalate content pose an irritant threat and those which aggravate GI inflammation when taken internally, as well as plants that may exacerbate hypothyroidism are included for the first time. Also added is a representative listing of herbal remedies to be avoided in children. Drug interaction categories making their first collective appearance in the appendices include pungent spices that enhance absorption, herbs that interfere with anticoagulant safety or efficacy, and herbs that are incompatible with certain medications for the

gastrointestinal tract. A new appendix addressing vitamin and mineral interactions with drugs has also been added. The numerals designating the major references in each appendix section are now in bold type. Finally, in the reference list a dozen of the major texts used extensively in this book have been highlighted in bold to emphasize their importance. These further elucidations should prove to be beneficial in helping to understand and assure the safe use of herbal remedies.

Francis Brinker, N.D.
March, 1998

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The first printing of *Herb Contraindications and Drug Interactions* was published by Eclectic Institute, Inc., to provide its customers with educational material and guidelines to help insure that the effectiveness of its herbal extracts and products was not compromised by a lack of information on safety issues. The efficacy of herbal products depends not only on high standards of quality but upon their appropriate utilization through recognition of both the conditions and circumstances for which they are intended.

This second edition is being published by Eclectic Medical Publications in an ongoing effort to educate health care professionals and the general public on important features of botanical therapeutics. Eclectic Medical Publications provides a variety of reprinted and original literature for those interested in the medical use of plants from both historical and modern perspectives.

Introduction

The increasing popularity and use of herbs as flavorful beverages, dietary supplements, and botanical medicines has led to a variety of concerns by health care practitioners, regulating agencies and the public. More frequently these days, herbal preparations are utilized in conjunction with limitations in a person's health. Sometimes they are used in addition to conventional pharmaceutical medicines.

In cases which are not being monitored by a knowledgeable prescriber, herbal use can lead to the inappropriate application of a supplement or remedy in individuals with conditions which may be aggravated by the effect of the herbal product. Another possibility is that the herb or herbs may interfere with medications a person may be using. The herb-aggravated condition or herb/drug interference may not even be associated with the original reason for taking the herbs. A person may assume the connection between their intended herb use and other medical problems is incidental, if they consider the connection at all. Even for the trained and knowledgeable prescriber organized information associating herbs with undesirable applications has not been duly emphasized or readily available.

Appropriate advice is essential to prevent the avoidable harm that may result from inadvertent misapplication of medicinally-active herb products. The need for knowledgeable recommendations exists beyond the current major providers of herbal therapies and products such as herbalists and health food store proprietors. As the herbal market expands more into pharmacies, pharmacists familiar with the patient's medications especially need to be informed about possible risks associated with herbal use.

Pharmacists act as the conventional gate-keepers of medical self-help not only by providing prescription and over-the-counter medicines to patients but also by supplying information on their appropriate use. They are the most accessible personnel knowledgeable in medicines.

This knowledge needs to be expanded to include herbs both as potentially beneficial and as disruptive agents.

Physicians also need to be familiar with herbs used by their patients, whether they prescribe them or not. In 1993 fully one third of patients reported utilizing unconventional medical therapy annually, and this number is certain to increase. For doctors who utilize herbal therapeutics in combination with other forms or methods of treatment, this book is even more pertinent. The information on drug interactions may be applied not only to help eliminate therapeutic interference but to aid in reaching a complementary therapeutic balance of activity from both pharmaceutical and botanical agents.

For these reasons a reference book on herb contraindications and drug interactions is essential at this time for all those whose work in the medical field brings them into contact with individuals who receive or desire herbal therapy to maintain or enhance their health.

This book is also useful to anyone who wants to avoid complicating their current condition or treatment by the self-administration of inappropriate herbs. Terminology that is understandable for the general public is highlighted in bold type. Further technical information to describe the nature of the incompatibilities is provided for health care professionals with numerical superscripts to reference the sources of this information in the medical and scientific literature.

The term "herb" as used in this text refers to wood and herbaceous plants, as well as fungi that are taxonomically separate from the plant kingdom. The herbs considered in this book are those which are commonly available without a prescription. The available forms of these products include dried plant parts used to make herbal teas, bottled tablets or encapsulated powdered herbs, commercially-prepared liquid extracts, and concentrated powdered extracts. Only botanical products administered orally, externally, or by inhalation are considered here; injectable items lie outside the scope of this text and American practice. Plants whose significant toxicity and/or illegality prevent their being sold to the general public are not usually considered

in the body of the text. The proper use of markedly toxic plants and those requiring a prescription is dependent on the judgement of licensed physicians who can make the assessments necessary to assure their correct application.

Commonly used plants that are generally safe, but have a potential for side effects when taken in excessive doses, are marked with an asterisk (*). To help assure safe use of these plants it is recommended that a companion text on the toxicology of botanical medicines be consulted. Essential (volatile, aromatic) oils concentrated by distillation from otherwise safe plants are not considered here except for particular common flavoring agents, since these oils are generally so potent as to require special training and considerations for their safe and appropriate use.

The contraindications listed apply to each herb most accurately when the herb is used alone. When a botanical remedy is taken in conjunction with other herbs or agents that modify or counteract its undesirable effect(s), its use may be rendered safer. This remains a matter of clinical judgment for the knowledgeable prescriber. The contraindications given herein apply to the use of a full therapeutic dose of preparations yielding significant amounts of active constituents. The use of flavorful dried herbs to make mild beverage teas or for culinary purposes may be entirely safe in conditions in which their therapeutic use, requiring a larger dose or a more concentrated form, is contraindicated. Some activites of herbs noted here have been identified by studies using large amounts of their extracts, concentrated principles, and/or or injections in animal species. However, in some susceptible individuals, these effects may be pronounced even with normal doses, and therefore, potential problems must be guarded against.

Compared to the amount of crude herb or simple herbal tea, the use of moderately concentrated herbal solid extracts or alcoholic extracts, respectively, requires significantly smaller doses to produce similar effects. For the fluid preparations this is particularly true when

considering the effects of volatile oil or resinous components which are much more soluble in alcohol than in water. The powdered and encapsulated crude herbs would be less active in most cases because the absorption of their components tends to be slower and less complete.

An exception to both of these above generalizations would be the drug interactions with crude herbs having hydrocolloidal carbohydrate components (i.e., gums and mucilages) that are soluble in water but relatively insoluble in alcohol. These poorly-absorbed, water-soluble compounds are even more apt to bind to other drugs and interfere with their absorption if taken in their whole or powdered form (e.g., flax seed or marshmallow root) than as liquid extracts.

Plants are listed alphabetically according to the main common names by which they are known throughout most of America. This is followed by the corresponding scientific name(s) which identifies the plant more accurately. There follows (in the body of the text) a list of English common names, mostly American or British, that apply to that plant in various locales or non-medical settings. Most plants also have common names listed in German and French, many in Spanish, and some in other European, Asian, or native American languages. In the appendices the plants are listed only by their main American common name and the scientific binomial. Though at this time most herbs are known and sold by one of their common names, identification solely by means of a common name is extremely unreliable since several herbs can share the same designation. The scientific name for each plant is uniquely specific and is therefore preferable for correct identification.

Sources of information for this text include not only current scientific laboratory research and pharmacological animal studies but also the discoveries of empirical medicine in this country and abroad from a time when plant remedies were still a major part of conventional practice. This clinically-tested information on herb activities or interactions is based on medical observations of humans. Folk medicine has also helped to identify certain herbal actions that have become a

part of established knowledge. In this way, for example, it was discovered that the use of certain emmenagogues can have an early abortifacient effect. Such observations taken in conjunction with recent findings identifying uterine stimulant activity help to develop parameters to limit their use appropriately.

The contraindications and drug interactions listed in this text are in reference to the crude herb or its simple extracts unless otherwise noted. Exceptions to the reliance on data about whole herbs to designate contraindications and interactions (as opposed to explaining these designations) are a few cases in which commonly employed distilled essential oils have caused documented difficulties. Another exception concerns important plants with potent alkaloidal components affecting nervous system function that are subject to social abuse, i.e., caffeine, ephedrine, and yohimbine, which have been treated here as having effects and interactions equivalent to the isolated alkaloid. In cases in which the activity of a particular major constituent helps to explain the effect of the plant under consideration, pertinent information regarding that isolated compound is duly noted. Such descriptions of constituent activities is intended to delineate the rationale behind particular restrictions. However, the effects of the isolated components do not describe the herbal influence completely, and therefore do not provide a comprehensive explanation of the plant's impact.

When taken with regularity in significant quantities for therapeutic purposes, recreational or food plant products can legitimately be described as herbal medicine. Certain common beverage and fruit and vegetable food items have also been included here, since these plant products can be used for therapeutic purposes. Concentrated or isolated substances from these plants, currently referred to as nutriceuticals, are not separately considered in this text, with the exception of the proteolytic enzyme compounds bromelain and papain. A few vitamins and minerals have been listed under "Drug Interactions" in the body of the text, since they may be prescribed in deficiency syndromes or used

in high doses for therapeutic purposes. Contraindications and drug interactions for most nutrient supplements are not addressed in the body of the text *per se*. However, appendix D does address drug interactions with vitamins and minerals that are employed as dietary supplements or prescriptions, along with listings of plants that are rich in these nutrients.

An attempt has been made to be as inclusive as possible in establishing contraindications to the point of being overly cautious. This is particularly true in regard to herbs considered to be contraindicated in pregnancy. However, this is not to imply that each and every medicinal herb with potential contraindications or drug interactions are included in this text or that all possibly contraindicated conditions are necessarily listed for each herb presented.

The appendices address potential problematic categories of plants based on their common properties or constituents. The listed plants are considered in relation to patient conditions or types of medications with which they should not routinely be employed. In certain circumstances they may be judiciously used in cases under the supervision and upon the advice of a physician or expert herbalist. The appendices include a number of plants that are not listed in the body of the text. These include plants that are either used exclusively as foods, are less commonly available, or have significant toxicity. Precautions may be listed for plants in the appendices that do not appear in the body of the text if the relationship is not as likely problematic or as well documented, or if the pertinent plant part is not certain.

The index includes all of the common and scientific names contained in the entire text to enable locating information on plants not found in the main body of the text or identified by different common names. The index also lists in bold type the conditions having herbal contraindications and medications that may be interfered with as they appear in the body of the text. This allows the information to be readily accessed by those interested in a particular plant, condition, or type of medication in regard to each individual's personal situation.

Though attempting to be as comprehensive as possible in listing potential iatrogenic aggravations for the most commonly used herbs, invariably some items will have been excluded. As the action and interaction of herbs on pathological conditions and other medications continues to be explored and investigated, the breadth and depth of knowledge will continue to develop. Even though current information is incomplete, this is not an appropriate reason to neglect presenting it. Hopefully, this text will at least help to identify limitations in our understanding so that these can be more adequately addressed.

Contraindications And Drug Interactions

Designation of
"Contraindications," "Drug Interactions,"
Side Effects and Types of Evidence

Herbs—Contraindications
and Drug Interactions

Designation of "Contraindications," "Drug Interactions," Side Effects and Types of Evidence

Contraindication typically describes an absolute limitation on the use of a particular medicinal substance. It identifies a medical application as improper or undesirable in a particular context. For medicinal herbs, many of which are also used as culinary flavorings for food or as recreational beverage teas, contraindication is often a relative restriction based upon the size of the dose and/or the extent of its use. Herb contraindications therefore refer to the avoidance of regular therapeutic use of a plant substance in specific conditions or situations.

Small amounts or occasional consumption of herbs may be safe in "contraindicated" conditions that, if taken in large medicinal doses and/or for **prolonged use** (generally, longer than one month), could possibly result in disagreeable effects. Certain herbs may be contraindicated in one form (e.g., alcoholic extract) and safe in another (e.g., aqueous extract), based on distinctive constituent content of the different forms. The contraindication designations as given in this book incorporates under this heading other relative restrictions such as warnings, precautions, or uses "not recommended" by the cited references. The listing of any potentially dangerous application as a contraindication in this book is a conscious attempt to avoid all foreseeable problems by erring, if misjudgments are made, on the side of safety. "First, do no harm."

Knowledgeable physicians or expert herbal practitioners may decide, in the context of their education and experience, to use particular herbs for individuals with conditions listed here as contraindicated for those herbs. The clinical judgments of such experts for specific patients cannot be considered invalid solely on the basis of the general statements being made in this text, since the risk of adverse effects can vary depending upon timing, dosage, and duration of treatment and auxiliary methods or herbs employed. Educated and experienced practitioners astute in the art of prescribing may be able to

overcome certain contraindications or drug interactions by making other therapeutic accommodations or adjustments in treatment. The general public, however, should follow all safety guidelines unless they are otherwise specifically directed by an expert in herbal prescribing whose care they are under.

Homeopathic medicines consisting of minute dilutions of fresh plant extracts do not produce effects equivalent to the undiluted extracts (mother tinctures) or to the plants themselves. Therefore, homeopathic dilutions do not necessarily share the contraindications for those plants.

Drug interaction typically refers to a detrimental effect due to the combining of one therapeutic agent with another. This may be based on interference with either the activity or the kinetics of the drug such as changing its absorption, metabolism, binding, or elimination. The evidence for interactions is sometimes based on single case reports that are not definitive but call for caution and monitoring in future applications. However, not all interactions of herbs with drugs are problematic. In this text documented examples are included in which using an herbal substance with certain pharmaceuticals seem to enhance the efficacy and/or reduce the toxicity of the drug(s).

To reiterate, the drug interactions noted here are intended to help the reader be aware that an herb with its various components may diminish or enhance the effect of another medication. Either effect may be desirable or undesirable depending on the circumstances. The potential interaction may require dosage adjustments of the herb or drug. In some cases the temporary or complete elimination of one or the other may be necessary to avoid serious consequences. At the very least these listings suggest close monitoring for the possible interactions.

Side effects are a concern when certain herbs are taken in excessive amounts or for prolonged periods. An asterisk (*) in front of a herb's scientific name denotes that toxic effects have been identified following over-consumption of that herb or its major active components. Consideration of potential adverse effects and toxic doses requires a separate treatment of these issues. This type of information is available

in other sources such as *The Toxicology of Botanical Medicines*, Revised 2nd Edition. (See reference no. 2.)

The **types of evidence** that are used to identify herb contraindications and drug interactions and the sources of data that help clarify the rationale behind them varies in amount and degree. Laboratory *in vitro* findings are only suggestive at best, and studies on animals and healthy humans provide only supportive evidence. Clinical trials with ill and/or medicated patients and empirical observations such as case reports are most valuable. Whether the herbs themselves or their various extracts or components are being considered is important and duly noted. To demonstrate the basis for designations and explanations made in this text, the means used to determine the effects of the herbal agents and modes of administering these agents are described.

The following terms are used throughout the text to describe the different means of determination.

in vitro–laboratory finding with cell or tissue samples from animals or humans

in animals (types listed)–laboratory tests using live animals and various modes of administering the herb or herbal component(s)

speculative–using indirect evidence such as extrapolation of empirical effects or *in vitro* research, animal studies, or case reports to infer probable or potential effects in humans

empirical–traditional knowledge or belief based on experience from extensive use

human case reports–published individual responses to using herbs

human studies–published research done on healthy individuals

human clinical studies–published research from therapeutic trials on patients being treated for a condition

Abbreviations for the various modes of administration are used as follows:

IM (intramuscular)–injected into a large skeletal muscle

IP (intraperitoneal)–injected into the peritoneal cavity

IV (intravenous)–injected into a vein

PO (*per os*)–by mouth; orally or through a feeding tube

SC (subcutaneous)–injected under the skin

Herbs— Contraindications and Drug Interactions

ACACIA

Acacia senegal gummy exudate
(gum arabic, Cape gum, Egyptian thorn, gum mimosa, gummi arabicum)

Drug Interactions

1) gelatinized by solutions of ferric (not ferrous) salts of **iron** [5,9]
2) insoluble in ethyl **alcohol** of greater than 50% concentration [5,9]
3) reduces rate of absorption of **oral drugs** [4]

AGAR

Gelidium spp. thallus
(agarweed)

Contraindications

1) **bowel obstruction** due to bulk-forming laxative effect (empirical) [150]

ALFALFA

Medicago sativa plant
(buffalo herb, lucerne, purple medic)

Contraindications

1) due to the uterine stimulant action of the constituent stachydrine in the variety *Medicago sativa* var. *italica* (*in vitro* or in animals) [74] its excessive internal use should be avoided in **pregnancy** (speculative)
2) systemic **lupus erythematosus** due to potential exacerbation of the condition by chronic

consumption of alfalfa tablets with the component L-canavanine (PO in human case reports)[269,270,326]

Drug Interactions

1) increase rate of metabolism of **xenobiotics** in the liver by increasing the activity of hepatic microsomal mixed-function oxidase reactions (PO in mice)[103]
2) **warfarin** activity could be reduced due to extremely high vitamin K content (empirical)[104]

ALOE

Aloe vera gel (not the dried sap)
(burn plant)

Contraindications

1) **externally** on **surgical wounds** healing by **second intention** due to slower healing time (topically in human clinical study)[266]

Drug Interactions

1) improves the hypoglycemic effect of **glibenclamide** when it is given to diabetes patients (PO in human clinical trial)[122] due to its antihyperglycemic activity (PO in human clinical trial)[126]
2) improves anti-inflammatory effect of **hydrocortisone** acetate when used as a vehicle for external application (topically on mice)[212]

ALOES

**Aloe* spp. dried leaf sap (not the gel)
(cape aloe,; Ger barbados aloe, curacao aloe,; bombay aloe; Sp.: acibar)

Contraindications

1) profuse **menstruation**[1] or **bleeding between periods** [1,2,148] due to increase in blood flow to the uterus[5] (empirical)
2) **pregnancy** [1,2,4,5,24] due to emmenogogue[5,6,74] and abortifacient effects (empirical)[4,74] and the content of potentially mutagenic and genotoxic anthraquinones (*in vitro*)[6]
3) **nursing mothers** [24] due to its purging effect on the suckling child (speculative)[4,5,6] and passage into milk of potentially genotoxic aloe-emodin[6]
4) **stomach inflammation** or **intestinal inflammation** with irritation and/or congestion [1,2,5,24,150] including diseases such as **ulcerative colitis**, **Crohn's disease**,[6,150] **colitis**, and **irritable bowel** syndrome[150] due to irritating effect of anthranoid aloins[2,6] (empirical)
5) inflamed **hemorrhoids** [1,2,5,24] due to possible induction of stenosis, thrombosis, and prolapse (empirical)[6]
6) **children** younger than 12 due to depletion of water and electrolytes (empirical)[6,150]
7) **extended use** for more that 8 - 10 days due to loss of peristalsis from intestinal smooth muscle (empirical) and mesenteric plexi nerve damage [6,150]
8) **intestinal obstruction** due to stimulation of peristalsis by the anthroquinones (empirical)[4,6,150]
9) **kidney disorders** [24,150] since excessive doses can cause nephritis (empirical)[2,150]
10) **appendicitis** and **abdominal pain** of unknown origin[150] due to intestinal stimulation[6] that increases the risk of rupturing an inflamed appendix or intestinal lesion (empirical)

Drug Interactions

1) overuse or misuse can cause potassium loss leading to increased toxicity of **cardiac glycosides**

(empirical)[4,6] such as those in ***Adonis, Convallaria, Urginea,***[2,6] ***Helleborus, Strophanthus,*** and ***Digitalis*** [2]
2) reduced absorption of **oral drugs** due to a decrease in bowel transit time (speculative)[6]
3) aggravates potassium loss caused by **diuretics** due to laxative effect (empirical)[6]

ANGELICA

Angelica archangelica plant, seeds, and root
(European angelica, garden angelica, root of the Holy Ghost; Ger.: engelwurzel, heiligenwurzel; Fr.: angelique)

Contraindications

1) **pregnancy**[150] due to its emmenagogue effect (empirical)[74,150]
2) root in **peptic ulcers** (empirical)[6] due to its stimulation of gastric acid secretion[4]
3) plant/root in **ultraviolet light** or **solarium therapy** due to photosensitizing furanocoumarins[4,6] (empirical)

ANISE

Pimpinella anisum fruit
(aniseed, common anise; Ger., Sp. & Fr.: anis; Sp:aniz)

Contraindications

1) **allergic hypersensitivity** due to potential for occasional reaction (empirical)[6]

ARNICA

**Arnica montana* flowers
(leopardsbane, wolfsbane, common arnica, mountain arnica, mountain tobacco; Ger.: arnika; Fr.: arnica des montagnes)

Contraindications

1) tincture **full strength externally** [7] on **hypersensitive skin**[2,5,6] or on **broken skin**[2,5,146,150] due

to contact dermatitis from sesquiterpene lactones[6] or the irritant volatile oil components thymol, thymol methylether and β-terpineol contained in the tincture[3] (empirical)

2) **prolonged use externally** can lead to allergic dermititis (empirical)[150] from the sesqiterpene lactones such as helenalin acetate (topically on guinea pigs)[229,230]

3) **internal use** unless under the supervision of a qualified expert (empirical)[150] due to the toxic effects on the liver and kidneys and the hepato-enteric irritation (IV and PO in animals)[228]

4) **pregnancy** (speculative)[2,150] due to its uterine stimulant action (*in vitro* or in animals)[74] and due to its toxic potential[2]

ARTICHOKE

Cynara scolymus leaf
(globe artichoke, garden artichoke; Ger.: artischocke; Fr.: artichaut)

Contraindications

1) **allergic hypersensitivity** to artichoke or other Asteracea (empirical)[6]

2) **bile duct obstruction** due to its cholagogue effect (empirical)[6]

ASAFETIDA

Ferula assa-foetida root
(devil's dung, food of the gods)

Contraindications

1) **pregnancy**[150] due to its abortifacient effect (empirical)[74] and the emmenogogue effect of its gum-resin (empirical)[5,150]

2) acute **inflammation** (empirical)[1,5,148] due to its gastric stimulatory properties (empirical)[5]

3) **infant colic** (empirical)[150] due to its gastric stimulant effect (empirical)[5]
4) **peptic ulcers** (speculative)[150] due to its gastric stimulant effect (empirical)[5]

ASHWAGANDHA

Withania somnifera root
(winter cherry; Ind.:avarada, turangi-gandha)

Contraindications

1) **pregnancy** due to its abortifacient effect (empirical)[150]

Drug Interactions

1) may potentiate the effects of **barbiturates**[150] so its use in combination with sedatives and anxiolytics should be avoided

ASPARAGUS

Asparagus officinalis rhizome
(sparrow grass; Ger.: spargelkraut; Fr.: asperge)

Contraindications

1) **kidney inflammation** (empirical)[6] due to its irritation to the urinary tract (empirical)[5]

BALM

Melissa officinalis leaves and flowers
(lemon balm, balm mint, bee balm, blue balm, garden balm, sweet balm, cure-all, dropsy plant; Ger. & Fr.: melisse; Sp.: toronjil)

Contraindications

1) **pregnancy**[3] due to its emmenagogue effect (empirical)[7,74] as well as its antithyrotropic and antigonadotropic activity (*in vitro*; animal studies)[163]
2) **low thyroid** activity due to its antithyrotropic effects (*in vitro*)[163]

Drug Interactions

1) hydroalcoholic extract increases hypnotic effect of **pentobarbital** (IP in mice)[58] and the volatile oil enhances **hexobarbital** narcosis due to its sedative activity (PO in rats)[59]

BALSAM OF TOLU

Myroxylon balsamum bark exudate
(tolu balsam, balsam tree; Ger.: tolubalsambaum; Fr.: arbre de baume de tolu)

Contraindications

1) **inflammation** or **feverish conditions** (empirical)[1] of an active, acute nature due to its stimulant effect on the mucus membranes (empirical)[5]

BARBERRY

**Berberis vulgaris* root bark
(European barberry, jaundice berry, pepperidge, pepperidge bush, sowberry; Ger.: berberitze, sauerdorn; Fr.: epine vinette; Sp.: berbero)

Contraindications

1) **pregnancy**[2,150] due to the uterine stimulant action from its alkaloids berberine,[74,150] palmatine, jatorrhizine, and columbamine (*in vitro* or in animal studies)[74]

BASIL

Ocimum basilicum plant
(common basil, sweet basil, St. Josephwort; Ger.: basilikum, kleine burgmunze; Fr.: basilic; Sp.: albahaca; It.: bassilico; Hol.: vol mynte)

Contraindications

1) **pregnancy**[6,150] due to its emmenagogue and abortifacient effects (empirical)[74] and the mutagenic action of its essential oil component estragole (in animals)[6]

2) **nursing mothers** due to the mutagenic effect of its volatile component estragole[6,150] (speculative)
3) **prolonged use** (speculative) due to the potentially carcinogenic effect of estragole (in animals)[6,150]
4) **infants** or toddlers (speculative) due to the potentially toxic component estragole[150]

BAYBERRY

Myrica cerifera bark
(wax myrtle, candleberry, tallow shrub, vegetable tallow, waxberry)

Contraindications

1) during severe **inflammation** (empirical)[148] of an acute nature for mucosa such as in the gastrointestinal tract due to its local stimulant properties (empirical)[5]

BEARBERRY

Arctostaphylos uva-ursi leaves
(uva ursi, bear's grape, arberry, mealberry, mountain box, mountain cranberry, red bearberry, sandberry, upland cranberry, rockberry; Am. Ind.: kinnikinnick, sagsckhomi, kanya'ni, kwica, sk!ewat, s'qaya'dats; Ger.: barentraube, mehlberre, mossberre, wilder buchsbaum, worlfstraube; Hol.: beerendruif; Fr.: arbusier, bousserole, raisin d'ours; Sp.: gayuba, coralillo; It.: uva d'orso; Dan.: melbarrisblade; Nor.: melbaerblad; Sw.: mjolonrisblad; Pol.: macnicy; Rus.: toloknianka)

Contraindications

1) **pregnancy**[24] due to its oxytocic action (empirical)[24,158]
2) **prolonged use** unless consulting with a physician[6,150] especially **in children** due to possible liver impairment (speculative)[24] from metabolite or its inhibiting B-lymphocyte cell maturation (*in vitro*)[231]

3) **kidney disorders** (empirical)[24,150] possibly due to the urinary excretion of its tannin metabolites[5] (speculative)
4) **digestive irritation**[150] since its excessive use can lead to stomach distress (empirical)[7] due to its tannin content[232]

Drug Interactions

1) **urinary acidifiers** inhibit conversion of the component arbutin to active hydroquinone, probably rendering bearberry less effective (speculative)[4,6,150,233]

BETEL NUT

**Areca catechu* seed
(areca nut; Ger.: betelnusspalme; Fr.: arequier)

Contraindications

1) **pregnancy** (speculative)[2] due to the teratogenic and fetotoxic effects of its aqueous extract (in mice)[73]
2) **asthma** due to bronchoconstrictive effects (PO in human case reports) due to its cholinergic alkaloid arecoline[345]

Drug Interactions

1) antiparkinsonian effects of **phenothiazines** such as **flupenthixol** and **fluphenazine** and anticholinergic effects of **procyclidine** are reduced (human case reports) due to cholinergic alkaloid arecoline in nuts[345]

BIRCH

Betula pendula = *Betula alba* leaves
(European birch, white birch, canoe birch, paper birch; Ger.: hange-birke, birke; Fr.: bouleau blanc, bouleau ecorce; Sp.: corteza de abedul; Dan.: birk; Rus.: beresa)

Contraindications

1) **edema** from **heart failure** or **kidney insufficiency** probably due to inadequate excretion of salt from its diuretic effect (speculative)[6]

BITTER MELON

Momordica charantia fruit and its juice
(bitter gourd, bitter apple, wild cucumber, African cucumber, balsam pear, margose, cundeamor, Sp.: sorosi, pepino montero; Ch.: kuguazi, k'u-kua, chin-li-chih, lai-p'u-t'ao; Pak.: karela)

Contraindications

1) **pregnancy** due to the emmenogogue and abortifacient effects of its juice (empirical)[74]

Drug Interactions

1) **insulin** dosage in diabetic patients may need adjusting due to the hypoglycemic effect (PO in human clinical trials)[34,35]
2) additive hypoglycemic effects occur when taken with **chlorpropamide** (PO in human case report)[360]

BITTER ORANGE

Citrus aurantium ssp. *amara* peel
(Seville orange, sour orange; Ger.: pomeranzenbaum; Fr.: bigaradier, oranger amer)

Contraindications

1) **stomach ulcers** or **intestinal ulcers** [6] due to its tonic effect on the GI tract (empirical)[5]
2) in **children**[150] excessive doses can produce toxic effects (empirical)[2,150]
3) **ultraviolet light** or **solarium therapy** due to its photosensitizing effects (empirical)[150]

BLACK COHOSH

**Cimicifuga racemosa* roots/rhizome
(macrotys, black snakeroot, bugbane, bugwort, rattleroot rattlewort, rattleweed, richweed, squawroot; Ger.: Amerikanisches wanzenkraut, schwarze schlangenwurzel; Fr.: actee a grappes, herbe au punaise)

Contraindications

1) **pregnancy** during the first trimester[2] due to its emmenagogue effect (empirical)[5,7,74,150]
2) in **nursing mothers**[150] due to its potential toxicity in large doses (empirical)[2]

BLACK PEPPER

Piper nigrum fruit
(pepper)

Contraindications

1) **pregnancy**[2] due to its abortifacient effect in large doses (empirical)[74]

Drug Interactions

1) increased bioavailability of **sparteine** when administerered together with the component piperine due to increased rate of absorption and/or reduced metabolic breakdown (PO in rats)[204]
2) **phenytoin** was absorbed more rapidly and more completely and eliminated more slowly when taken with the component piperine (PO in human study)[205]
3) **propanolol** was more rapidly and more completely absorbed combined with piperine, while **theophylline** was more completely absorbed, and both reached significantly greater maximum concentrations when taken with the component piperine (PO in human study)[206]

BLACK POPLAR

Populus nigra buds
(Ger.: schwarzpappel; Fr.: peuplier noir)

Contraindications

1) **externally** in **allergic hypersensitivity** to poplar, propolis, Peruvian balsam, or salicylates due to occasional skin reactions (empirical)[6]

BLACK RADISH

Raphanus sativus var. *niger* root
(Ger.: schwarzer rettich; Fr.: radis noir)

Contraindications

1) **bile stones** [6] due to its cholagogue effect (empirical)[7]

BLACK WALNUT

Juglans nigra leaves and hull

Contraindications

1) **prolonged use** due to to mutagenic properties of its component juglone as shown in animals[150]

BLADDERWRACK

Fucus vesiculosus thallus
(seawrack, common seawrack, cut weed, sea kelp, kelpware, black tang; Ger.: tang; Fr.: varech vesiculeux)

Contraindications

1) **excess thyroid** activity may be aggravated by its high iodine content (empirical)[4,6]
2) **partial thyroid removal** or **Hashimoto's thyroiditis** due to inducing myxedema by increasing interthyroidal concentrations of iodide which blocks thyroxin formation (empirical)[39]

3) in **pregnancy** and for **nursing mothers** due to high iodine content that can disrupt iodine utilization by the thyroid (empirical)[150]

4) **prolonged use** due to high iodine content that can disrupt thyroid function (empirical)[150]

Drug Interactions

1) **lithium** carbonate potentiates the hypothyroid action of large amounts of iodides (empirical)[344]

BLAZING STAR

**Aletris farinosa* root

(star grass, ague grass, bitter grass, colic root, mealy starwort, star root)

Contraindications

1) **pregnancy** when using large amounts (speculative)[2] due to variable effects on animal uteri of either stimulation or depression (*in vitro*; IV in rabbits and cats)[234]

Drug Interactions

1) antagonizes **pitocin**[150] in contracting uterine muscle when applied before or after pitocin (*in vitro*)[234]

BLESSED THISTLE

Cnicus benedictus plant

(St. Benedict thistle, holy thistle, spotted thistle, cardin; Ger.: kardo-benediktenkraut; Fr.: chardon bevit; Sp.: cardo santo)

Contraindications

1) **allergic hypersensitivity** to this plant or other Asteracea (empirical)[6]

BLOODROOT

**Sanguinaria canadensis* rhizome
(Indian paint, Indian plant, Indian red paint, pauson, red paint root, red puccoon, red root, tetterwort; Ger.: kanadische blutwurzel; Fr.: sanguinaire)

Contraindications

1) **pregnancy**[2,150] due to its emmenogogue effect (empirical)[7] and the uterine stimulant action of its alkaloids berberine, protopine, and chelerythrine (*in vitro* or in animals)[74]

BLUE COHOSH

**Caulophyllum thalictroides* root
(beechdrops, blueberry, blue ginseng, papoose root, squaw root, yellow ginseng)

Contraindications

1) **pregnancy** prior to the ninth month due to its emmenagogue and abortifacient effects (empirical)[6,7,10,74,150] and the uterine stimulant activity of its saponin (*in vitro*; *in situ* IV in rats; *in vivo* SC in rats)[6,74,177]

BOLDO

Peumus boldus leaves
(boldu; Sp.: boldoa, molina)

Contraindications

1) **bile duct obstruction**[4,6,150] due to its cholegogue (empirical)[6] and choleretic activity (in rats;[241] empirical[4])
2) serious **liver disorders**[4,6,150] though its South American use is widespread for bile and liver trouble (empirical)[150]
3) use with **gallstones** only after consultation with a physician or a qualified practitioner (speculative)[4,150]

though its use in South America is widespread gallstone problems (empirical)[150]

BONESET

Eupatorium perfoliatum plant
(agueweed, crosswort, feverwort, Indian sage, sweating plant, teasel, thoroughwort, vegetable antimony, wood boneset; Ger.: durchwachsener wasserhanf; Fr.: herbe a la fievre)

Contraindications

1) **allergic hypersensitivity** can result in contact dermatitis due to the sesquiterpene lactone constituents that are found in Asteraceae, especially in other members of the *Eupatorium* genus (empirical)[6,10]
2) **pregnancy** due to abortifacient effect of high nitrate content (PO in cattle)[6]

BORAGE

**Borago officinalis* plant
[Borage seed oil is safe, since it does not contain toxic pyrrolizidine alkaloids.[6,150]]
(burrage, bugloss, common bugloss; Ger.: boretsch; Fr.: bourrache; Sp.: borraja; It.: borraggine, borrana)

Contraindications

1) **internal use**[150] or **prolonged use** due to presence of pyrrolizidine alkaloids that are known hepatotoxins and potential carcinogens (speculative)[6,150]
2) **nursing mothers** and **pregnancy** due to the presence of hepatotoxic and mutagenic pyrrolizidine alkaloids (speculative)[150]
3) topically on abraded or **broken skin** due to potential for absorption of toxic amounts of pyrrolizidine alkaloids (speculative)[150]

4) in persons with a history of **liver disease** due to hepatotoxicity from the alkaloids (speculative)[150]

BROMELAIN

Ananas comosus extract from fruit, stem
(ananase, pineapple extract)

Drug Interactions

1) potentiates **antibiotics** by improving response to these medicines in treating a variety of infections (PO in human clinical trial)[208]
2) improves efficacy of certain **cancer chemotherapy** agents such as **5-fluorouracil** and **vincristine** probably due to its fibrinolytic and anti-tumor effects (*in vitro*; PO in human clinical trials)[209]

BUCHU

**Barosma betulina* = *Agathosma betulina* leaves
(bookoo, bucku, short buchu; Ger.: bucco)

Contraindications

1) acute **genito-urinary tract inflammation**[1,2,148] and especially **kidney inflammation**[150] due to the leaves and their extracts containing the glycoside diosmin and essential oil components diosphenol and pulegone that cause mucosal irritation (empirical)[2,4]
2) **pregnancy** (speculative)[24,150] probably due to the high content of the mucosal irritant and uterine stimulant volatile component pulegone[2] found in the spurious species *Barosma cremulata* (called oval buchu) that is often used as a substitute[70,71]

BUCKBEAN

Menyanthes trifoliata leaves
(bogbean, bean trefoil, bog myrtle, brook bean, marsh clover, marsh trefoil, moon-flower, trefoil, water shamrock)

Contraindications

1) **diarrhea, dysentery,** and **colitis** (empirical)[150] due to its cathartic effect[5,7]

BUCKTHORN

**Rhamnus catharticus* fruit
(common buckthorn, purging buckthorn, waythorn; Ger.: kreuzdorn, purgierdorn; Fr.: nerprun; Sp.: espino cerval)

Contraindications

1) **intestinal obstruction** due to increased peristalsis from the anthroquinones (empirical)[4,6,150]
2) **pregnancy**[4,150] due to high doses of anthroquinones that may reflexly stimulate endometrial activity and cause abortion (speculative)[6] and the content of potentially mutagenic and genotoxic anthraquinones (*in vitro*)[6]
3) **nursing mothers**[4,150] since anthroquinones are partly excreted in the milk and may cause laxative effect in infants (speculative)[6] and passage into milk of potentially genotoxic emodin and aloe-emodin components[6]
4) **intestinal inflammatory diseases**[6,150] such as **appendicitis, colitis, irritable bowel**[150] **ulcerative colitis** or **Crohn's disease**[6,150] due to the irritation to the mucosa (empirical)[6]
5) **children** under age 12 due to loss of water and electrolytes (empirical)[6,150]
6) **extended use** for more than 8-10 days due to loss of water and electrolytes and possible dependency from diminished peristalsis (empirical)[6,150]
7) **abdominal pain** of unknown origin[6,150] due to possible rupture from contraction of inflamed viscus such as the appendix (empirical)

Drug Interactions

1) overuse or misuse can cause potassium loss leading to increased toxicity of **cardiac glycosides**

(empirical)[4,6,150] such as those in ***Adonis, Convallaria, Urginea*** [2,6] ***Helleborus, Strophanthus,*** and ***Digitalis***[2]
2) potassium loss may result in hypokalemia when taken together with **diuretics** (empirical)[6]
3) reduced absorption of **oral drugs** due to a decrease in bowel transit time (speculative)[6]

BUGLEWEED

Lycopus virginicus, Lycopus europaeus leaves
(sweet bugle, water bugle, water hoarhound, gypsy weed, Paul's betony, green ashangee, archangle, wolf's foot; Ger.: wolfstrapp; Fr.: lycope, patte de loup)

Contraindications

1) **low thyroid** activity or **nontoxic goiter** (speculative)[6,150] due to its antithyrotropic effects (*in vitro*; animal studies)[3,163]
2) **pregnancy** due to its antigonadotropic and antithyrotropic activity (speculative)[6]
3) **nursing mothers** due to its antiprolactin activity (speculative)[6]

Drug Interactions

1) can interfere with **thyroid hormones** [6,150] since it blocks conversion of thyroxin to T_3 in the liver and interfers with thyroxin production by inhibiting thyroid stimulating hormone (*in vitro;* PO and IP in rats)[163,235]
2) interferes with **iodine** metabolism by the thyroid (speculative)[6,150]

BURDOCK

Arctium lappa root
(bardana, burr seed, clotbur, cocklebur, grass burdock, hardock, hareburr, hurrburr, turkey burrseed; Ger.: kletterwurzel, grosse klette; Fr.: bardane grande; Sp.: lampazo)

Contraindications

1) excessive internal use should be avoided in **pregnancy** (speculative)[2] due to its oxytocic effect (empirical)[10] and uterine stimulant action (*in vitro* or in animals)[74]

Drug Interactions

1) **insulin** dosage may need adjusting due to hypoglycemic effect (in rats)[10,89,90,127]

BUTTERBUR

**Petasites hybridus* = *Petasites officina*lis rhizome (butterfly dock; Ger.: grossblattriger huflattich, rote pestwurz; Fr.: petasite)

Contraindications

1) **pregnancy** due to its emmenogogue effect (empirical)[74] and its content of hepatotoxic/genotoxic/carcinogenic pyrrolizidine alkaloids[6]

2) **nursing mothers** due to its content of toxic pyrrolizidine alkaloids (speculative)[6]

BUTTERCUP

**Ranunculus* spp. plant (crowfoot, gold cup)

Contraindications

1) **pregnancy** (speculative)[2] due to the uterine stimulant action of its component seratonin (*in vitro* or in animals)[74]

2) **internal use** especially when fresh due to its acrid, irritant properties[5]

CALAMUS

**Acorus calamus* roots/rhizome (sweet flag, grass myrtle, myrtle flag, sweet grass, sweet myrtle, sweet rush; Ger.: kalmus; Fr.: acore

vrai, acorus odorant; Sp.: calamo aromatico; It.: acoro aromatico)

Contraindications

1) **pregnancy**[2,150] due to its emmenagogue effect (empirical)[7,74] and the genotoxic activity of asarone found in European and Asian varieties[150]

CALENDULA

Calendula officinalis flowers

(garden marigold, holigold, marigold, Mary bud, goldbloom, pot marigold; Ger.: goldblume, ringelblume; Fr.: souci des jardins, souci des champs, fleurs de tous les mois; Sp.: mejorana, claveton, flaminquillo; It.: fior d'ogni)

Contraindications

1) early **pregnancy**[3] due to its emmenagogue and abortifacient effects (empirical)[74]

Drug Interactions

1) the saponoside components increase **hexobarbital** sleeping time (in rats)[56] associated with the sedative effect of hydroalcoholic extracts (in rats, guinea pigs and cats)[55]

CALIFORNIA POPPY

Eschscholtzia californica plant

(yellow poppy, goldpoppy; Am. Ind.: cululuk [Costanoan]; Ger.: Kalifornischer goldmohn; Sp.: copa de oro, amapola amarilla, amapola de California)

Contraindications

1) **pregnancy** (speculative) due to uterine stimulant effect shown by alkaloid constituent cryptopine (*in vitro*)[6]

Drug Interactions

1) infusion and tincture enhanced the hypnotic effect induced by **pentobarbital** (IP in mice)[66,67] probably due to alkaloids protopine, cryptopine, and allocryptopine enhancing binding of GABA to receptors in brain (*in vitro*)[346]
2) may potentiate **monoamine oxidase inhibitors** (speculative)[150,327] due to inhibition of MAO-B by hydroalcoholic extracts of the plant (*in vitro*)[203]

CAMPHOR TREE

**Cinnamomum camphora* bark
(laurel camphor, camphor laurel; Ger.: kampferbaum; Fr.: camphrier; Sp.: alcanfor)

Contraindications

1) **pregnancy**[2] due to its emmenagogue effect and the uterine stimulant activity (empirical)[74] and fetocidal effects when isolated camphor is used[2]
2) on **damaged skin**[6] due to the rubefacient effect of its monoterpene camphor (empirical)[2]
3) use of camphor near the **nose of infants** or small **children**[6,150] since its inhalation and absorption in small doses can result in CNS overstimulation and seizures (empirical)[2]
4) **prolonged use**[150] due to potential CNS toxicity (empirical) from being stored in fat[2]

Drug Interactions

1) spirit of camphor precipitates in **water**[5]

CASCARA SAGRADA

**Rhamnus purshiana* aged bark
(California buckthorn, sacred bark, chittim bark; Ger.: Amerikanischer faulbaum)

Contraindications

1) chronic **intestinal inflammatory diseases**[2,6,24,150] such as **appendicitis**, **colitis**, **irritable bowel**,[150]

intestinal ulcers[2,24] **ulcerative colitis** or **Crohn's disease**[6,150] due to the irritation and inflammation of the bowel caused by the anthroquinone cascarosides (empirical)[2,6]

2) **nursing mothers** due to the excretion of anthroquinones in breast milk[3,4,6,150] that may cause catharsis in infants (speculative)[6] and passage into milk of potentially genotoxic components emodin and aloe-emodin[6]

3) **menstruation** (empirical)[3] due to possible stimulation of endometrial activity (speculative)[6]

4) acute **diarrhea** due to the increased hydration of the stools caused by cascarosides (empirical)[3]

5) generally **debilitated subjects**[3] due to loss of water and electrolytes (empirical)[6]

6) **intestinal obstruction** due to stimulation of peristalsis by the anthroquinones (empirical)[3,4,6,150]

7) **abdominal pain** of unknown origin[3,6,150] due to possible rupture from contraction of inflamed viscus such as the appendix (empirical)

8) **children** under 12 years of age due to loss of water and electrolytes (empirical)[6,150]

9) **extended use** for more than 8-10 days due to possible damage to intestinal muscle and loss of electrolytes (empirical)[6,150]

10) **pregnancy**[4,24,150] due to possible stimulation of the endometrium which may provoke abortion (speculative) and the content of potentially mutagenic and genotoxic anthraquinones (*in vitro*)[6]

11) **recent bark** aged less than 1 year due to its anthrone content leading to gastrointestinal upset (empirical)[6,7,150]

Drug Interactions

1) overuse or misuse can cause potassium loss leading to increased toxicity of **cardiac glycosides** (empirical)[4,6] such as those in ***Adonis, Convallaria, Urginea,***[2,6] ***Helleborus, Strophanthus,*** and ***Digitalis***[2]

2) reduced absorption of **oral drugs** due to a decrease in bowel transit time (speculative)[6]
3) aggravates potassium loss caused by **diuretics** (empirical)[6]

CASSIA CINNAMON

Cinnamomum aromaticum = *Cinnamomum cassia* bark
(cassia, cassia bark; Ger.: Chinesischer zimtbaum; Fr.: cannellier de Chine)

Contraindications

1) **pregnancy**[6,150] due to its emmenagogue and abortifacient effects (empirical),[74] especially its essential oil[150].
2) **allergic hypersensitivity**[6,150] to cinnamon or Peruvian balsam (empirical)[6] due to cinnamaldehyde content[150]

Drug Interactions

1) reduced absorption of **tetracycline** taken with the powdered bark occurs due to adsorption by the bark powder (*in vitro*)[45]

CASTOR BEAN

Ricinus communis oil
(Mexico seed, oil plant, palma Christi, castor-oil plant; Ger.: wunderbaum; Ind.: eranda)

Contraindications

1) **intestinal obstruction** or **abdominal pain** of unkown origin[4,6,150] due to its gastric irritant[4] and purgative effects (empirical)[5,7]
2) **extended use**[6,150] beyond 8-10 days[150] due to potential for serious electolyte loss (empirical)[6]
3) **pregnancy**[150] due to the emmenagogue and abortifacient effects of its oil (empirical)[74] though it is sometimes used in late pregnancy to induce labor[150]

Drug Interactions

1) electrolyte loss from frequent use may potentiate **cardiac glycosides** (empirical)[6] such as those in ***Adonis***, ***Convallaria***, ***Urginea***,[2,6] ***Helleborus***, ***Strophanthus***, and ***Digitalis***[2]
2) should not be given with potentially toxic oil-soluble **anthelmintics**[150] such as *Dryopteris filix-mas* due to enhanced absorption[2] though it has been recommended for use following this herb,[5] while use with the toxic oil of *Chenopodium ambrosioides* reportedly reduces both the toxicity and the efficacy[3]

CATNIP

Nepeta cataria leaves and flowers
(catmint, catnep, catrup, catswort, field balm; Ger.: echtes katzenkraut, katzenminze; Fr.: cataire)

Contraindications

1) **pregnancy**[150] due to its emmenagogue[74,150] and abortifacient effects (empirical)[74]

Drug Interactions

1) **hexobarbital** sleeping time is increased by catnip oil and the component nepetalic acid (IP in mice)[124]

CAYENNE

**Capsicum frutescens* fruit
(Africa pepper, bird pepper, chili pepper, cockspur pepper, goat's pepper, pod pepper, red pepper, Spanish pepper, Zanzibar pepper; Ger.: cayennepfeffer: Fr.: piment de cayenne)

Contraindications

1) due to bronchoconstriction with initial systemic capsaicin exposure (IV in animals)[176] acute **asthma** episodes may be aggravated by single use (speculative)[343]

2) **inhalation** due to the immediate bronchoconstriction caused by capsaicin (human study)[172]
3) **externally** over **damaged skin**[6,150] or near the **eyes**[150] due to local irritant properties (empirical)[6]
4) **externally on hypersensitive skin** due to possible, though rare, allergic reactions (empirical)[6]
5) **stomach ulcers** or **stomach inflammation** (empirical)[24] because the fruit powder or extract increases gastric acid production[313,314,315] and can cause mucosal exfoliation and hemorrhage (PO in human studies)[173,174,175] possibly associated with the fibrinolytic activity of *Capsicum* (PO in human studies)[287,288] or the inhibition of platelet aggregation by capsaicin (*in vitro*)[289]
6) chronic **irritable bowel**[24] due to neural irritant and intestinal contractile properties of capsaicin(*in vitro*, animal, and human studies)[176]

Drug Interactions

1) **theophylline** absorption is enhanced when administered before or concurrently with capsicum fruit (PO in rabbits)[142]
2) **hexobarbital** sleeping time and plasma concentration were increase with acute use of *Capsicum* extract but were decreased with its chronic use (IP in rats)[207]
3) powdered chili reduced gastric mucosal damage when taken half an hour before **aspirin** (PO in human study)[211]
4) **ACE inhibitors** can predispose to coughing when capsaicin cream is applied (topical in human case report)[345]

CEDARWOOD

Juniperus virginiana, *Juniperus ashei* heartwood (Virginia cedarwood, eastern red cedar, red juniper; Texas cedarwood, Ashe juniper)

Drug Interactions

1) inhalation of fragrance of red cedar chips reduces effects of **hexobarbital** (in mice and rats),[378,379,380] **pentobarbital** (in mice),[379] and **dicoumarol** (in rats) due to induction by volatile oil components cedrol and cedrene of microsomal enzymes[380] including ethyl morphine N-demethylase, aniline hydroxylase,[378] sulfanilamide acetylase, neoprontosil azoreductase, heptachlor epoxidase and zoxazolamine hydroxylase (*in vitro*)[380]

CELANDINE

**Chelidonium majus* root and plant
(great celandine, garden celandine, tetterwort, greater celandine; Ger.: schollkraut; Fr.: chelidoine)

Contraindications

1) **pregnancy** (speculative)[2,150] due to the uterine stimulant activity of its extract (in rats)[74,178] and its alkaloids chelidonine, protopine, and chelerythrine that act as uterine stimulants (*in vitro*; IV in cats or mice)[74,179,180]
2) not to be used by **children** (speculative)[150] due to potential toxicity (empirical)[2]

CELERY

Apium graveolens seeds
(garden celery; Ger.: kuchen-sellerie, sellerie; Fr.: ache des marais, celeri)

Contraindications

1) acute **kidney inflammation** (empirical)[1,4,24] due to irritation caused by excretion of its monoterpene and phthalide volatiles oil components that are excreted in the urine[4]
2) **pregnancy**[3,7,24] due to the emmenogogue[7] and abortifacient effects (empirical) and uterine stimulant activity by the seeds and their volatile oil (*in vitro* or in animals)[74]

3) **ultraviolet light** or **solarium therapy** due to phototoxic furanocoumarins (empirical)[4,6]

CHAMOMILE, GERMAN

Matricaria recutita = *Matricaria chamomilla* plant or flowers

(wild chamomile, camomile, Hungarian chamomile, pin heads: kamillen, echte kamille, kleine kamille, feldkamille; Fr.: fleur de camomile, camomille allemande, matricaire; Sp.: manzanilla; It.: camomilla)

Contraindications

1) due to the emmenagogue effect of the whole plant (empirical),[74] but not of the flowers,[150] internal consumption of the plant should be avoided in excessive doses in early **pregnancy** (speculative)[2]
2) infusion of the flowers near the **eyes** [6,150] due to possible irritation (empirical)[149]
3) rare cases of **allergic hypersensitivity** skin reactions to the flowers have been reported (empirical)[4]

Drug Interactions

1) a liquid extract of flowers helps prevent ulcer formation induced by ethyl **alcohol**, while the volatile oil component bisabolol inhibits ulcer formation caused by **indomethacin** (PO in rats)[264]

CHAMOMILE, ROMAN

Chamaemelum nobile = *Anthemis nobilis* flowers and plant

(garden chamomile, English chamomile, sweet chamomile, camomile, ground apple, low chamomile, whig plant; Ger.: Romische kamille, grote kamille; Fr.: fleur de camomille romaine; Sp.: manzanilla)

Contraindications

1) **pregnancy** due to the emmenogogue and abortifacient effects of the flower[150] and of the plant and its volatile oil (empirical)[74]
2) mild **allergic hypersensitivity** since skin reactions occur in up to 20% tested (topically in human study)[64]

CHAPARRAL

**Larrea tridentata, Larrea divaricata* leaves (creosote bush, greasewood; Am. Ind.: shoegoi [Pima], ya-temp [Shoshone], geroop [Paiute], kovanau [Yaqui]; Sp.: gobernadora, hediondilla, tasajo, jarillo, guamis)

Contraindications

1) history of **liver disease** (speculative)[16,150] such as **hepatitis** and **cirrhosis**[150] due to its possible hepatotoxic effect in large doses (human case reports)[3,6,16]
2) **allergic hypersensitivity** to the plant or its resin (human case reports)[85,86]
3) pre-existing **kidney disease** (speculative)[150] due to the development of acquired cystic renal disease with long-term consumption of the tea (PO in human case report)[261] and the component NDGA (PO in rats),[329] as well as vacuolation of kidney tubular epithelium with chronic NDGA consumption (PO in rats)[330]
4) **catecholamine elevation** in the circulation may be enhanced (speculative) due to the potent inhibition of catechol-O-methyl transferase by the chaparral component NDGA (*in vitro*)[323]
5) due to the component NDGA's inhibition of RNA, protein, and lipid synthesis by mammary glands following prolactin stimulation (*in vitro*)[325] chaparral consumption should probably be avoided by **nursing mothers** (speculative)

CHASTE TREE

Vitex agnus-castus berries
(hemp tree; Ger.: keuschbaum; Fr.: agneau chaste, gatillier)

Contraindications

1) **pregnancy** [3,150] due to its emmenagogue effect (empirical)[74,150] though it has been used to help prevent miscarriage in the first trimester when due to progesterone insufficiency (empirical) [150]

Drug Interactions

1) may interfer with the efficacy of **birth control pills** due to its hormone-regulating activity (speculative)[150]

CHICORY

Cichorium intybus root
(wild chicory, succory, wild succory; Ger.: wegwarte, cichorie; Fr.: chicoree; Hol.: suikerey; Sp.: achicoria amarga; It.: cicoria; Rus.: zikorifa)

Contraindications

1) due to its emmenagogue and abortifacient effects (empirical)[74] its excessive internal use in **pregnancy** should be avoided (speculative)[2]
2) **allergic hypersensitivity** to chicory and other Asteraceae (empirical)[6]
3) patients with **gallstones** should first consult a physician (speculative)[6] due to its cholagogue effect (empirical)[7]

CINCHONA

**Cinchona* spp. bark
(Peruvian bark, Jesuits' bark; Ger.: fieberrinde, Chinarinde; Fr.: quina, quinquina)

Contraindications

1) **pregnancy** [1,2,6,7,150] due to its abortifacient effect (empirical)[74] and uterine stimulant activity[7,74] from the oxytocic effects of its alkaloids quinine and quinidine[2,10,74] and due to its teratogenic activity causing visual and auditory defects[2] and the fetotoxic and fetocidal effects of its alkaloids[10]
2) in **cinchonism**[5] where preexisting toxicity symptoms (headache, nausea, disturbed vision, tinnitus, delirium, abdominal pain, and diarrhea) are present from excessive dose[2,6,150] or **prolonged use** (empirical)[2,6]
3) **allergic hypersensitivity** (empirical)[6] since one third of patients are reactive to it[2]
4) acute **inflammation** with **feverish conditions** or **plethora** with flushed, congested face (empirical)[5]
5) **nervous irritation, vascular irritation,** or active **hemorrhage** (empirical)[5]
6) **nursing mothers** since its alkaoids quinine and quinidine are excreted in breast milk (empirical)[2]
7) **stomach ulcers** or **intestinal ulcers**[6,150] or **amebic dysentery** (empirical)[1] due to its grastrointestinal irritant effect[5]

Drug Interactions

1) potentiation of **coumarin derivatives** (empirical)[6,150] possibly due to rare events of platelet reduction[150]

CINNAMON

**Cinnamomum verum* = *Cinnamomum zeylanicum* bark
(Ceylon cinnamon, Seychelles cinnamon; Ger.: zimt, zimtrinde, echter kanel; Fr.:cannellier de Ceylan; cannelle)

Contraindications

1) **pregnancy** [2,4,6,150] due to the emmenagogue effect of its volatile oil (empirical)[74]

2) **allergic hypersensitivity** to cinnamon[4,6] or to Peru balsam (empirical)[4,6] probably due to the cinnamein content[10]
3) **stomach ulcers** or **intestinal ulcers** (empirical)[6] due to its stomachic effect[5]
4) **prolonged use** (speculative)[150] due to potential toxicity from tissue irritation[2]

COCOA

Theobroma cacao seed
(cacao, chocolate tree)

Contraindications

1) **allergic hypersensitivity** may result in migraine and/or skin reactions (empirical)[6]
2) **heart disorders** (speculative) due to arrhythmic and cardiac stimulant effects of theobromine and caffeine (empirical)[8,10]

Drug Interactions

1) excessive consumption of chocolate should be avoided with the **monoamine oxidase inhibitor phenelzine** since it may cause hypertensive reactions (speculative)[184]
2) **oral contraceptives, cimetidine,**[8,345] **furafylline, verapamil, disulfiram, fluconazole, mexiletine, phenylpropanolamine**, several **quinolone antibiotics** including **enoxacin, pipemidic acid, ciprofloxacin**, and **norfloxacin**, and especially **idrocilamide** and **methoxsalen** inhibit the metabolism and/or clearance of caffeine, thereby increasing its stimulating effects (PO in human studies)[345]

COFFEE

**Coffea arabica* seeds
(mocha, java, cafe, espresso)

Contraindications

1) acute **kidney inflammation** (empirical) [1,8] due to the diuretic effect of caffeine [2,5,8]
2) high-grade **inflammation** (empirical) [5,148] possibly due to caffeine's CNS stimulant effects on the nervous, circulatory, digestive and genito-urinary systems insomnia [2,8]
3) **pregnancy** (speculative) [150] due to coffee leading to iron-deficiency anemia in pregnant women and their babies [345] and caffeine in doses of more than 600 mg may have abortifacient [2] and teratogenic effects [2,8,10]
4) excess **stomach acid** [2] and **stomach ulcers** (empirical) [150] or **duodenal ulcers** due to reactivation from increased gastric acid secretion by caffeine [8]
5) **heart disorders** including **cardiovascular disease** (speculative) due to acute and/or excessive caffeine consumption increasing heart rate and causing arrhythmias (empirical) [8,10] and heavy, prolonged use of coffee possibly increasing the risk of myocardial infarction [10]
6) **psychological disorders** (speculative) since caffeine can aggravate depression or induce anxiety neurosis [8]
7) **glaucoma** (speculative) since it temporarily increases intraocular pressure [150]
8) **prolonged use** (speculative) [150] may lead to caffeine-associated adverse reactions such as insomnia, restlessness, anxiety, irritability, stomach pain and similar effects (empirical) [8] and to increased risk of hypertension, certain cancers, calcium and magnesium loss, and cholesterol elevation [150]
9) since caffeine appears in breast milk at half the concentration as in the mothers plasma [8] and reduces the level of iron in breast milk [345] it is best avoided by **nursing mothers** (speculative)

Drug Interactions

1) possible reduced absorption of a variety of **oral drugs** taken simultaneously (speculative)[6] due to formation of precipitates (*in vitro*)[345]

2) **iron** absorption is inhibited[8] which can lead to iron deficiency anemia (PO in human study)[345]

3) increased thermogenesis (PO in mice, PO in human study)[18,305] and weight loss due to a reduction of body fat as well as side effects of agitation, tremors, and insomnia when caffeine is combined with **ephedrine** (PO in mice, PO in human clinical study)[18,19]

4) excessive consumption of caffeine should be avoided with **monoamine oxidase inhibitors** such as **isocarboxazid, phenelzine,** and **tranylcypromine** since it may cause hypertensive reactions (empirical)[184] and enhanced stimulation by caffeine can occur[345]

5) caffeine inhibits the hemodynamic effects of **adenosine** (human studies) and should be avoided for 12 hours before using the drug[345]

6) **clozapine** effects are altered when taken less than 40 minutes after caffeinated drinks (human case report)[345]

7) sedative effects of **benzodiazepines** including **diazepam, clonazepam** and **triazolam,** or **zopiclone** or the **barbiturate pentobarbital** are reduced by caffeine (PO in human studies)[345]

8) blood pressure of those taking the **beta-blockers propranolol** and **metoprolol** was somewhat increased by consuming caffeine (PO in human study)[345]

9) severely increased blood pressure and mania can result by combining caffeine sources with **phenylpropanolamine** (PO in human studies and case report)[345]

10) serum levels of **lithium** are decreased by caffeine (human studies)[345]

11) absorption and bioavailability of **aspirin** is increased by caffeine (PO in human studies)[345]
12) **oral contraceptives, cimetidine,**[8,345] **furafylline, verapamil, disulfiram, fluconazole, mexiletine, phenylpropanolamine,** several **quinolone antibiotics** including **enoxacin, pipemidic acid, ciprofloxacin,** and **norfloxacin,** and especially **idrocilamide** and **methoxsalen** inhibit the metabolism and/or clearance of caffeine, thereby increasing its stimulating effects (PO in human studies)[345]
13) **phenytoin** increases the metabolism and loss of caffeine from the body (human clinical study)[345]

COLA

Cola nitida, Cola acuminata seed
(cola nut, bissy nut; Ger.: kola; Fr.: kolatier)

Contraindications

1) **stomach ulcers** or **duodenal ulcers** (empirical)[6,150] due to gastric stimulant effect of caffeine[2,8]
2) **heart disorders** (speculative) due to acute and/or excessive caffeine consumption increasing heart rate and causing arrhythmias (empirical)[8]
3) **high blood pressure** (speculative) since caffeine increases the secretion of epinephrine and norepinephrine[150]
4) **prolonged use** (speculative)[150] may lead to caffeine-associated adverse reactions such as insomnia, restlessness, anxiety, irritability, stomach pain and similar effects (empirical)[8]
5) **pregnancy** (speculative) since caffeine crosses the placenta and has been weakly associated with fetal loss, low birth weight and premature deliveries in humans,[8] as well as causing known birth defects in animals[8,10]

6) since caffeine appears in breast milk at half the concentration as in the mothers plasma[8] it is best avoided by **nursing mothers** (speculative)

Drug Interactions

1) effect enhanced by **psychoanaleptic drugs** and other **caffeine**-containing beverages (empirical)[6]
2) increased thermogenesis (PO in mice, PO in human study)[18,305] and weight loss due to a reduction of body fat as well as agitation, tremors, and insomnia when caffeine is combined with sources of **ephedrine** (PO in mice, PO in human clinical study)[18,19]
3) excessive consumption of caffeine should be avoided **with monoamine oxidase inhibitors** such as **isocarboxazid**, **phenelzine**, and **tranylcypromine** since it may cause hypertensive reactions (empirical)[184] and enhanced stimulation by caffeine can occur[345]
4) caffeine inhibits the hemodynamic effects of **adenosine** (human studies) and should be avoided for 12 hours before using[345]
5) **clozapine** effects are altered when taken less than 40 minutes after caffeinated drinks (human case report)[345]
6) sedative effects of **benzodiazepines** including **diazepam**, **clonazepam** and **triazolam**, or **zopiclone** or the **barbiturate pentobarbital** are reduced by caffeine (PO in human studies)[345]
7) blood pressure of those taking the **beta-blockers propranolol** and **metoprolol** was somewhat increased by consuming caffeine (PO in human study)[345]
8) severely increased blood pressure and mania can result by combining caffeine sources with **phenylpropanolamine** (PO in human studies and case report)[345]

9) serum levels of **lithium** are decreased by caffeine (human studies)[345]
10) absorption and bioavailability of **aspirin** is increased by caffeine (PO in human studies)[345]
11) **oral contraceptives, cimetidine,**[8,345] **furafylline, verapamil, disulfiram, fluconazole, mexiletine, phenylpropanolamine,** several **quinolone antibiotics** including **enoxacin, pipemidic acid, ciprofloxacin,** and **norfloxacin,** and especially **idrocilamide** and **methoxsalen** inhibit the metabolism and/or clearance of caffeine, thereby increasing its stimulating effects (PO in human studies)[345]
12) **phenytoin** increases the metabolism and loss of caffeine from the body (human clinical study)[345]

COLTSFOOT

****Tussilago farfara* leaves or flowers**
(British tobacco, bullsfoot, coughwort, flower velure, foal's-foot, horsefoot, horsehoof; Ger.: huflattich, brandlattich, pferdefut; Fr.: pas d'ane, tussilage; Sp.: una de caballo)

Contraindications

1) **pregnancy**[4,6,150] due to its abortifacient effect[74] and content of hepatotoxic pyrrolizidine alkaloids[4,6] which may have produced neonatal fatality from veno-occlusive disease when a mother daily consumed a tea reportedly made from the leaves but which contained the uncharacteristic alkaloid senecionine but no characteristic senkirkine (human case report)[144]
2) **nursing mothers** due to its content of hepatotoxic pyrrolizidine alkaloids (speculative)[4,6,150]
3) **prolonged use** longer than 4-6 weeks per year due to content of hepatotoxic pyrrolizidine alkaloids (speculative),[4,150] especially the potentially carcinogenic senkirkine contained in the flowers (IP and PO in rats)[239,335]

4) in persons with a history of **liver disease** due to potential hepatotoxicity from the alkaloids (speculative)[150]

COMFREY

**Symphytum officinale* root/leaves
(knitbone, knitback, blackwort, bruisewort, gum plant, healing herb, salsify, slippery root, wallwort; Ger.: beinwell, wallwurz; Fr.: consoude grande, oreille d'ane; Sp.: consuelda mayor; It.: consolida maggiore, simfit, zinzinnici; Tur.: sinfit)

Contraindications

1) **internal use** due to development of hepatic veno-occlusive disease (human case reports)[150,236,237] and the carcinogenic activity of the roots, leaves, and a pyrrolizidine alkaloid from the roots (IP and PO in rats)[4,150,238,239]
2) **externally** on abraded or **broken skin** [4,6,150] to avoid excessive percutaneous absorption of toxic pyrrolizidine alkaloids[4,6,150] which is typically low on intact skin (in rats)[37]
3) any use during **pregnancy** (speculative) due to fetal hepatotoxicity resulting from transferral from mother of toxic pyrrolizidine alkaloids similar to those in comfrey[38,150]
4) any use by **nursing mothers** (speculative) due to infant hepatotoxicity resulting from transferral from mother of toxic pyrrolizidine alkaloids similar to those in comfrey[38,150]
5) any use by persons with a history of **liver disease** due to hepatotoxicity from the alkaloids (speculative)[150]
6) **prolonged use externally** for greater than 4-6 weeks due to potential toxicity from absorption on pyrrolizidine alkaloids (speculative)[150]

COTTON

Gossypium herbaceum, *Gossypium hirsutum* fresh root bark
(Sp.: algodon)

Contraindications

1) **pregnancy**[2,150] due to its oxytocic,[10] emmenogogue, and abortifacient effects (empirical)[5,6,7,74,75,150]
2) **genito-urinary tract inflammation**[5,150] due to its stimulant diuretic effect (empirical)[5]

CRUCIFER

Brassica spp. heads or leaves
(broccoli; cabbage; Brussels sprouts; cauliflower ; kale; collard; Chinese cabbage; turnip)

Drug Interactions

1) anticoagulant effect of **warfarin** may be inhibited or rendered ineffective by regular consumption of broccoli, brussels sprouts, or green, leafy vegetables that are high in vitamin K (PO in human case reports)[32,33,303,304]
2) drugs such as **warfarin** (PO in humans),[97] **hexobarbital**, **7-ethoxycoumarin** (PO in rats),[98] **phenacetin** (PO in rats, humans),[98,99] **antipyrine**(PO in humans),[99] **oxazepam** and **acetaminophen** (PO in humans)[100] are metabolized more rapidly in the intestines and/or liver when taken with regular consumption of cabbage and/or Brussels sprouts[97-103] due to the mixed function oxidase enzyme-inducing effects of R-goitrin(*in vitro*)[101] and/or various indoles(*in vitro*)[98,102]
3) interferes with **iodine** metabolism by the thyroid gland based on the relative thiocyanate, isothiocyanate, and oxazolidinethione content of the various crucifers (*in vitro*, PO in rats)[164,240]

CUBEB

**Piper cubeba* unripe fruit
(Java pepper, tailed cubebs, tailed pepper)

Contraindications

1) acute **inflammation** [1,5] of mucosal surfaces, especially **kidney inflammation**[150] and other **urinary tract inflammation** (empirical),[5] due to the local irritating effect of its volatile hydrocarbon cadinene[2,5,6]

DAN SHEN

Salvia miltiorrhiza roots
(red-rooted sage, salvia root; Ch: tan-shen, tzu tan-ken, hung ken, sh'ih shen, pin-ma ts'ao)

Drug Interactions

1) **warfarin** effects are enhanced due to anticoagulation with extended use (PO in human case report)[202] probably due to its inhibition of platelet aggregation by inhibiting platelet cAMP phosphodiesterase (*in vitro*)[271]

DANDELION

Taraxacum officinale = *Taraxacum dens-leonis* roots
(blowball, cankerwort, lion's tooth, prient's crown, puffball, swine snout, white endive, wild endive; Ger.: lowenzahn; Fr.: dent de lion, pissenlit; Sp.: diente de leon)

Contraindications

1) acute **stomach inflammation** or **irritable bowel** (empirical)[1,5,148] due to stomachic effect of stimulating gastric hyperacidity[4,5]
2) **digestive weakness**[5,148] due to possibly causing dyspepsia, flatulence, pain, and diarrhea (empirical),[5] though it has traditionally been used to treat dyspepsia with constipation (empirical)[7]

3) **bile duct obstruction** or **biliary inflammation** (empirical)[4,6,24,150] due to the cholagogue effect[4,6,7] and the choleretic effect of its alcoholic extract (in rats)[241]
4) **gallstones** unless consulting a physician (speculative) due to its cholagogue activity,[4] though the fresh root has traditionally been used to treat gallstones (empirical)[7]
5) acute **gall bladder inflammation**[150] with pus (empirical)[4,6,24] due to its cholagogue effect[4,6]
6) **intestinal obstruction** (empirical[4,6,24,150] due to its laxative effect[5]
7) **allergic hypersensitivity** to other Asteraceae such as chamomile, yarrow, and/or arnica (empirical)[6]

Drug Interactions

1) **lithium** toxicity may be worsened (speculative) due to sodium depletion[327] caused by enhanced sodium excretion from the diuretic effect of the roots and leaves (PO in rats)[328]

DEVIL'S CLAW

Harpagophytum procumbens roots and tubers
(grapple plant; Ger.: teufelskralle, trampelklette; Fr.: griffe du diable)

Contraindications

1) **stomach inflammation,**[24] **stomach ulcers,**[4,6,24,150] and **duodenal ulcers** (empirical)[4,6,150] due to its bitter iridoid substances (harpagoside, procumbide) stimulating stomach acid secretion[4]
2) **gallstones** unless consulting a physcian (speculative) due to its choleretic effect[4]

DILL

Anethum graveolens fruit
(dilly, garden dill; Fr.: aneth odorant)

Contraindications

1) due to its emmenagogue effect (empirical)[74] it should be avoided in large amounts in early **pregnancy**

DULSE

Rhodymenia palmetta thallus

Contraindications

1) **excess thyroid** activity and **prolonged use** due to high iodine content[150]

DYER'S WEED

Genista tinctoria plant

(dyer's broom, dyer's greenweed, dyer's whin, furze, green broom, greenweed, waxen woad, woad waxen, wood waxen; Ger.: farberginster; Fr.: genet de teinturies

Contraindications

1) **high blood pressure** (empirical)[4,6,7] due to its vasoconstrictive activity[7]

ECHINACEA

Echinacea purpurea, *Echinacea angustifolia*, *Echinacea pallida* roots and *Echinacea purpurea* herb juice

(purple coneflower, coneflower, combflower, Sampson root, black Sampson; Ger.: sonnenhut, igelkopfwurzel)

Contraindications

1) "in principle," **progressive conditions** such as **multiple sclerosis**[4,6,17] and **collagenosis** (speculative)[4,17] possibly due to stimulation of fibroblasts by *E. purpurea* herb juice (*in vitro*)[82]
2) progressive conditions such as **leukosis**[4,17] and **auto-immune disorders** (speculative)[4] probably due to non-specific stimulation of the immune response by arabinogalactan-containing polymers filtered from

hydroalcoholic extracts of the roots of *E. purpurea*, *E. angustifolia*, and *E. pallida* (*in vitro*)[83]
3) progressive conditions such as **AIDS** and **HIV infection** (speculative)[4] in spite of the enhanced natural killer cell function and antibody-dependent cellular cytotoxicity on isolated peripheral blood mononuclear cells by *E. purpurea* herb extract (*in vitro*),[185] but probably due to polymeric arabinogalactan compounds removed by ultrafiltration from hydroalcoholic extracts of roots from *E. purpurea*, *E. angustifolia*, and *E. pallida* that induce secretion by macrophages of α-interferon (*in vitro*) and tumor necrosis factor-α (*in vitro* and in mice),[83] cytokines which are generally elevated in the serum of patients with AIDS and seem to contribute to the disease process by depressing CD4 cells and increasing HIV replication, respectively[135]
4) progressive conditions such as **tuberculosis** (speculative)[4,6,17] probably since aqueous extracts of the roots of *E. purpurea*, *E. angustifolia*, and *E. pallida* contain arabinogalactan constituents[392] that may be similar to arabinogalactans found in *Mycobacteria* cell walls associated with cell-mediated suppression of lymphocyte responses in tuberculosis (*in vitro*)[87]
5) **prolonged use** for more than 6-8 weeks (speculative)[4,6,150] though use of *E. purpurea* herb juice for ten weeks was totally without adverse effects in 60 patients (PO in human clinical study)[391] and an aqueous *E. purpurea* extract was taken four times daily for twelve weeks with no adverse effects either physically or in leucocyte counts for 23 subjects (PO in human study)[393]

Drug Interactions

1) the recurrence rate of vaginal candida infections treated with **econazole nitrate** cream locally was greatly reduced when the herb juice was used in

addition (Topical, SC, IM, or PO in human clinical study)[391]

ELECAMPANE

Inula helenium root

(elfdock, elfwort, horse elder, horseheal, scabwort; Ger.: echter alant; Fr.: aunee officinale; Sp.: ala)

Contraindications

1) **allergic hypersensitivity** resulting in contact dermatitis to its sesquiterpene lactone alantolactone or similar cross-reactive substances (empirical)[4]

EUCALYPTUS

**Eucalyptus* spp. leaves

(blue gum; Ger.: schonmutz, blauer gommibaum, eukalyptus; Fr.: gommier bleu; It.: eucalytpo; Tur.: setma ag, kafur ag)

Contraindications

1) **low blood pressure** (empirical)[1] due to hypotensive effect in large doses[2]

2) acute desquamative **kidney inflammation** (empirical[2,148] due to irritation from urinary excretion of its volatile component eucalyptol[2]

3) **stomach inflammation, intestinal inflammation**, or **biliary inflammation** due to irritation of the mucosa by its volatile constituents[4,6,150] and the choleretic effect of cineole (PO in rats)[242]

4) serious **liver disorders** (empirical)[4,6] due to the choleretic effect of cineole (PO in rats)[241] and the hepatic metabolism of volatile constituents[4,6]

5) oral use or inhalation of essential oil by **children** under age 2 (empirical)[6] or use on their face or around their nose[150] due to potential toxicity[2]

Drug Interactions

1) consumption of the leaves or inhalation of essential oil induces hepatic microsomal mixed-

function oxidase enzyme induction (in rats)[6,28,36] which can increase the rate of metabolism and clearance of drugs such as **pentobarbital, aminopyrine,** and **amphetamine** (*in vitro*; inhaled in rats and in human study), thereby reducing the length of time they are effective[28]
2) microsomal mixed-function oxidase induction can increase the toxicity of plants containing **pyrrolizidine alkaloids** such as *Senecio longilobus* and *Senecio jacobaea* (PO in rats)[36]

FENNEL

Foeniculum vulgare fruit
(large fennel, sweet fennel, Florence fennel, wild fennel; Ger.: fenchel; Fr.: fenouille, aneth fenouil; Sp.: hinojo)

Contraindications

1) **pregnancy** due to the emmenagogue effect (empirical),[2,4,14,74] especially for concentrated forms such as the essential oil,[6] and the phytoestrogen activity of its volatile oil components anethole, dianethole, photanethole[14]
2) essential oil for infants or small **children**[6] (speculative) due to its potential toxicity[2]
3) **prolonged use** unless a physician is consulted due (speculative) to the procarcinogenic estrgole content of the essential oil[150]
4) **allergic hypersensitivity** based on previous exposure resulting in skin or lung reactions in isolated cases (empirical)[6]

FENUGREEK

Trigonella foenum-graecum seed
(bird's foot, Greek hayseed; Ger.: bockshornklee; Fr.: fenugrec; Sp.: fenogreco; Ind.: mayti)

Contraindications

1) due to its emmenagogue and abortifacient effects (empirical) and its uterine stimulant action (*in vitro* or in animals)[74] excesive use should be avoided in **pregnancy**[2]

Drug Interactions

1) mucilage coats GI mucosa and retards absorption of **oral drugs** (speculative)[4]
2) **insulin** dosage may need adjusting due to hypoglycemic activity of its alkaloid trigonelline (PO in rats),[128] the defatted fraction (PO in dogs),[129] and the powdered seeds (PO in human clinical study)[130]

FEVERFEW

Tanacetum parthenium = *Chrysanthemum parthenium* plant
(featherfew, febrifuge plant; Ger.: mutterkraut; Fr.: camomille grande)

Contraindications

1) early **pregnancy**[3] due to its emmenagogue effect (empirical)[74]

FIGWORT

Scrophularia nodosa plant and root
(carpenter's square, heal-all, kernelwort, knotty-rooted figwort, scrofula plant, square stalk; Fr.: scrofulaire noueuse)

Contraindications

1) **ventricular tachycardia**[150] due to its content of cardiac glycosides[10]

FLAX

Linum usitatissimum = *Linum humile* seeds
(linseed, lint bells, common flax, linen flax; Ger.: winterlien, leinsamen, flachssamen; Fr.: grain de lin; Sp.: lino; It.: lino usuale; Tur.: keten; Ar.: bazen; Ind.: tesi-mosina, alashi, sufulsi; Ch.: hu-ma-esze)

Contraindications

1) open **wounds** or **abraded surfaces** (empirical) [481] possibly to prevent adherence and retention of seeds in wounds when used as a poultice
2) **intestinal obstruction** (empirical) [4,6,150,344] to avoid impaction of bowels
3) **inadequate fluid intake** may result in alimentary obstruction [344]
4) early **pregnancy** due to emmenagoue effect (empirical) [74]

Drug Interactions

1) possible reduced absorption of **oral drugs** (speculative) [4,6,150,344] due to adsorption to its mucilage [4,150]

FO TI

Polygonum multiflorum root
(Chinese knotweed; Ch: ho shou wu)

Contraindications

1) **diarrhea** due to its irritant properties [150]

FRAGRANT SUMACH

Rhus aromatica root bark
(sweet sumach)

Contraindications

1) **inflammation** (empirical) [1,5] of such organs as the intestines, kidneys, uterus, and lungs due to irritating effect of its volatiles oil locally and during excretion [5]

FRANGULA

**Rhamnus frangula* bark
(alder buckthorn, alder dogwood, arrow-wood, black alder dogwood, black alder tree, black dogwood, European black alder, European buckthorn, Persian berries; Ger.: faulbaumrinde, gelbholzrinde,

zweckenbaumrinde; Fr.: bourdaine, ecorce defrangule, ecorce d'aune noir)

Contraindications

1) **intestinal obstruction** due to the stimulation of peristalsis by its anthronoid glucofrangulins[4,6,150]
2) **intestinal inflammatory diseases** (empirical)[6,24] such as **appendicitis**, **colitis**, **irritable bowel**[150] **ulcerative colitis** or **Crohn's disease**[6,150] due to irritation from the anthroquinones[6]
3) **pregnancy**[4,24,150] due to possible endometrial stimulation resulting in abortion (speculative)[6] and the content of potentially mutagenic and genotoxic anthraquinones (*in vitro*)[6]
4) **nursing mothers**[4,150] due to passage of anthroquinones into breast milk that may cause catharsis in infants (speculative)[6] and passage into milk of potentially genotoxic components emodin and aloe-emodin[6]
5) **children** under 12 years of age due to the water and electrolyte loss (empirical)[6,150]
6) **extended use** for more than 8-10 days due to loss of electrolytes and possible dependency from damage to the intestinal smooth muscle (empirical)[6,150]
7) **recent bark** aged less than 1 year due to its anthrone content that leads to gastrointestinal cramps and emesis (empirical)[6,7,150]
8) **ulcers**[24] or **abdominal pain** of unknown origin[6,150] due to possible rupture from contraction of inflamed viscus such as the appendix (empirical)

Drug Interactions

1) overuse or misuse can cause potassium loss leading to increased toxicity of **cardiac glycosides** (empirical)[4,6,150] such as those in ***Adonis***, ***Convallaria***, ***Urginea***,[2,6] ***Helleborus***, ***Strophanthus***, and ***Digitalis***[2]
2) reduced absorption of **oral drugs** due to a decrease in bowel transit time (speculative)[6]

3) aggravates potassium loss caused by **diuretics** (empirical)[6]

FRINGE TREE

Chionanthus virginicus bark
(gray beard tree, old man's beard, poison ash, snowflower, white fringe)

Contraindications

1) **bile duct obstruction** [24] or bile duct impaction due to its cholagogue activity (empirical)[1]

GARLIC

**Allium sativum* bulbs
(clove garlic; Ger.: knoblauch; Fr.: ail commun)

Contraindications

1) acute or chronic **stomach inflammation** (empirical)[1] or marked irritation or inflammation[148] of other mucosal surfaces since the concentrated garlic volatile disulfide components can cause gastroenteritis (empirical)[2]
2) due to emmenogogue effect (empirical) and its uterine stimulant action (*in vitro* or animal studies)[74] excessive use should be avoided in early **pregnancy**[2]
3) **low thyroid** function (speculative) when high levels of purified constituents are used on a regular basis since this may cause a reduced iodine uptake by the thyroid[2]
4) heavy consumption prior to **surgery** (PO in human case report)[131] due to increased clotting time and spontaneous hemorrhage after excessive consumption (PO in human case reports)[131,132] resulting from increased fibrinolytic activity[286] and diminished human platelet aggregation after oral consumption of garlic oil[279,280] caused by the garlic components allicin, ajoene, trisulfides, and adenosine (*in vitro*)[281,282,283,284,285]

Drug Interactions

1) **insulin** dose may require adjusting due to hypoglycemic effects of garlic (PO in rats)[133] and its constituent allicin (PO in rabbits)[134]

2) anticoagulant activity of **warfarin** is enhanced (PO in human case reports)[345] due to increased fibrinolytic activity[286] and diminished human platelet aggregation (PO in human studies)[279,280] caused by the garlic components allicin, ajoene, trisulfides, and adenosine (*in vitro*)[281,282,283,284,285]

GENTIAN

**Gentiana lutea* roots

(yellow gentian, bitter root, bitterwort, pale gentian; Ger.:gelber enzian, enzianwurzel, bitterwurz, fieberwurzel; Fr.: racine de gentiane; Sp.: genciana)

Contraindications

1) **stomach irritability**[1,148,150] or **stomach inflammation** (empirical)[2,5,148,150] due to tincture possibly increasing acid secretion by stomach (human case study)[243]

2) **stomach ulcers** or **duodenal ulcers** (empirical)[4,6,150] due to stimulation of acid secretion[4] by its tincture (human case study)[243]

GINGER

Zingiber officinale rhizome

(black ginger, race ginger; Ger.: ingwer; Fr.: gingembre; Sp.: jenjibre)

Contraindications

1) **pregnancy**[150] due to its emmenagogue[344] and abortifacient effects (empirical)[74] when taken in large amounts[2]

2) **gallstones** unless a physician is consulted beforehand (speculative)[4,150] due to its cholagogue effect (PO in rats; empirical)[3,4]

Drug Interactions

1) side effect of vomiting induced by cytotoxic **cyclophosphamide** can be prevented by prior admininstration of acetone extract of ginger or its component 6-gingerol (PO in suncus)[210]
2) increases absorption of **oral drugs** (empirical)[332] such as extract with **sulphaguanidine** in small intestine (in rats)[344]

GINKGO

Ginkgo biloba leaves
(maidenhair tree; Ger.: elefantenohr, facherblattbaum, Japanbaum; Fr.: noyer du Japon, arbre aux quarante ecus; Jap.: ginkyo; Ch.: yin-hsing, ya chio, pei kuo, kung sun shu)

Contraindications

1) **allergic hypersensitivity** of the skin or gastrointesitinal tract to ginkgo or its preparations which are rare[344]

Drug Interactions

1) may potentiate **monoamine oxidase inhibitors** (speculative)[150] possibly though unlikely due to inhibition by high concentrations of the concentrated extract of the uptake of serotonin (*in vitro*)[192] and dopamine (*in vitro*),[193] even though low concentrations (achievable with therapeutic doses) increase serotonin uptake by synaptosomes (*in vitro*, PO in mice) and do not affect dopamine uptake (*in vitro*)[192]
2) extract may induce spontaneous bleeding when combined with chronic use of **aspirin** (human case report)[194] due to increased bleeding potential reported after chronic (2-year) use (human case report)[195] possibly associated with reduced platelet aggregation from inhibition of platelet activating factor by ginkgolide components (*in vitro*, PO in human study)[196]

3) extract sufficiently potentiates **papaverine** intracavernosal injection for impotence when ineffective for 20% of subjects and acts as an effective replacement in an additional 50% of patients with arterial erectile dysfunction (human clinical study)[197]

GINSENG

Panax ginseng root
(Chinese ginseng; Fr.: panax de chine)

Contraindications

1) **high blood pressure** due to stimulant effects when used in large doses and/or for prolonged periods (empirical, human case report)[150,361]

Drug Interactions

1) concurrent use of the **monoamine oxidase inhibitor phenelzine** seem to have resulted in manic-like symptoms (speculative human case reports)[26,27]
2) consumption of **caffeine** sources together with long term use (13 weeks) of large amounts (3 grams daily on average) of ginseng may lead to hypertension in one person out of six (PO in human study)[108]
3) **insulin** dosage may need adjusting due to ginseng's hypoglycemic effects in diabetic patients (PO in human clinical study)[109]
4) anticoagulant activity of **warfarin** may be reduced due to use of ginseng (speculative human case report)[110]

GOLDENROD

Solidago virgaurea plant
(European goldenrod; Ger.: goldrute, goldwundkraut; Fr.: solidage, verge d'or)

Contraindications

1) chronic **kidney disease** unless consulting a physician or expert practitioner (speculative)[4,6,150]
2) **edema** from **heart failure** or **kidney insufficiency** (speculative) though good results have been obtained in edema or renal origin,[4] presumably since its diuretic effect is believed to cause mostly water, but little salt, to be excreted[6]

GOLDENSEAL

**Hydrastis canadensis* roots/rhizome
(eye balm, eye root, ground raspberry, Indian plant, jaundice root, orangeroot, tumeric root, yellow puccoon, yellowroot; Ger.: goldsiegel, kanadische gelbwurzel)

Contraindications

1) **pregnancy**[1,2,3,24,150] due to uterine stimulant action of its alkaloids berberine, hydrastine, canadine, and hydrastinine (*in vitro* or in animals)[74]
2) locally for purulent **ear discharge**[148] due to the possibility of a ruptured ear drum (speculative)

GOTU KOLA

Centella asiatica = *Hydrocotyle asiatica* plant
(water pennywort, thick-leaved pennywort, Indian pennywort; Ger.: asiatischer wassernabel)

Contraindications

1) due to its emmenogogue effect (empirical)[74] excessive internal use should be avoided in early **pregnancy** (speculative)[2]

GRAPEFRUIT

Citrus paradisi fruit

Drug Interactions

1) juice consumed concurrently increases bioavailability up to three-fold of some **calcium**

antagonists such as **amlodipine** [x 1.2], **nifedipine** [x 1.3-1.4], **verapamil** [x 1.4], **nitrendipine** [x 1.4-2], **nisoldipine** [x 2], **felodipine** [x 2.8], and **nimodipine** (PO in human studies) due mostly to inhibition of metabolism by cytochrome P450 3A enzymes (*in vitro*) in the gastrointestinal tract by furanocoumarins and flavonoids such as naringin[320,345] resulting , for example, in lowered blood pressure when used with **nifedipine** (PO in human case report)[321]

2) juice increases bioavailability of certain **oral drugs** including **coumarin**, and **benzodiazepines** including **midazolam** and **triazolam**,[320] as well as **ethinylestradiol**,[345] **terfenadine**, and **cyclosporin** (PO in human studies) due mostly to inhibition of metabolism by cytochrome P450 3A enzymes (*in vitro*) in the gastrointestinal tract by furanocoumarins and flavonoids such as naringin[320,345]

GUAR GUM

Cyamopsis tetragonolobus seeds
(Indian cluster bean, guaran)

Contraindications

1) **bowel obstruction** due to the laxative effect of the bulk-forming fiber (empirical)[150]

2) taken with **inadequate fluid** (less than 250 ml or 8 oz.) due to potential for esophageal or bowel obstruction (empirical)[150]

Drug Interactions

1) **insulin** requirements for diabetics is reduced since the gum delays glucose absorption (PO in rats, PO in humans)[41,183]

2) absorption of **oral drugs**[150] such as **acetaminophen** (PO in humans)[42] and **nitrofurantoin** (PO in humans)[43] is slowed and for **penicillin** absorption is reduced (PO in humans)[44] due

to slower gastric emptying[42] and the viscosity of the gum[43]

3) absorption of a single dose of **digoxin** is slowed and its urinary excretion is somewhat reduced by guar gum (PO in human study)[44] though steady-state serum levels are unaffected (PO in human study)[345]

GUARANA

Paullinia cupana seeds
(Brazilian cocoa, zoom)

Contraindications

1) **kidney disorders** (speculative) due to the diuretic effect of caffeine[8]

2) **duodenal ulcers** (speculative) due to reactivation of the ulcers from increased gastric acid secretion after large doses of caffeine[8]

3) **heart disorders** (speculative) due to excessive caffeine consumption increasing heart rate and causing or exacerbating arrhythmias (empirical)[8]

4) **psychological disorders** (speculative) since caffeine can aggravate depression or induce anxiety neurosis in large doses[8,327]

5) **prolonged use** (speculative)[150] since this may lead to caffeine-associated adverse reactions such as insomnia, restlessness, anxiety, irritability, stomach pain and similar effects[8]

6) **pregnancy** (speculative) since caffeine crosses the placenta and has been weakly associated with fetal loss, low birth weight and premature deliveries in humans,[8] as well as causing known birth defects in animals[8,10]

7) since caffeine appears in breast milk at half the concentration as in the mothers plasma[8] it is best avoided by **nursing mothers** (speculative)

Drug Interactions

1) excessive consumption of caffeine should be avoided **with monoamine oxidase inhibitors** such as **isocarboxazid**, **phenelzine**, and **tranylcypromine** since it may cause hypertensive reactions (empirical)[184]

2) increased thermogenesis (PO in mice, PO in human study)[18,305] and weight loss due to a reduction of body fat as well as side effects of agitation, tremors, and insomnia when caffeine is combined with **ephedrine** (PO in mice, PO in human clinical study)[18,19]

3) caffeine inhibits the hemodynamic effects of **adenosine** (human studies) and should be avoided 12 hours before using[345]

4) **clozapine** effects are altered when taken less than 40 minutes after caffeinated drinks (human case report)[345]

5) sedative effects of **benzodiazepines** including **diazepam**, **clonazepam** and **triazolam**, or **zopiclone** or the **barbiturate pentobarbital** are reduced by caffeine (PO in human studies)[345]

6) blood pressure of those taking the **beta-blockers propranolol** and **metoprolol** was somewhat increased by consuming caffeine (PO in human study)[345]

7) severely increased blood pressure and mania can result by combining caffeine sources with **phenylpropanolamine** (PO in human studies and case report)[345]

8) serum levels of **lithium** are decreased by caffeine (human studies)[345]

9) absorption and bioavailability of **aspirin** is increased by caffeine (PO in human studies)[345]

10) **oral contraceptives, cimetidine,**[8,345] **furafylline, verapamil, disulfiram, fluconazole, mexiletine, phenylpropanolamine,** several **quinolone antibiotics** including **enoxacin, pipemidic acid,**

ciprofloxacin, and **norfloxacin,** and especially **idrocilamide** and **methoxsalen** inhibit the metabolism and/or clearance of caffeine, thereby increasing its stimulating effects (PO in human studies)[345]

11) **phenytoin** increases the metabolism and loss of caffeine from the body (human clinical study)[345]

GURMAR

Gymnema sylvestre leaves

(Periploca of the woods; Ger.: waldschlinge; Ind.: meshanhringi, meshavalli, medashrangi, sarpadarushtrika [Sanskrit], meshasingi, merasingi [Hindi], kalikordori [Marathi], kogilam, sirukurinja, sarkaraikolli [Tamil], podapatri [Telugu])

Drug Interactions

1) **insulin** requirements are reduced in insulin-dependent diabetics by a water-soluble acidic fraction of the ethanol extract (PO in human clinical study)[357] due to increasing the number of islets of Langerhans and the number of beta cells (PO in rats)[358]

2) hypoglycemic effects of **glibenclamide** and **tolbutamide** were enhanced in non-insulin-dependent diabetics by a water-soluble acidic fraction of the ethanol extract (PO in human clinical study)[359] due to increasing the number of islets of Langerhans and the number of beta cells (PO in rats)[358]

HAWTHORN

Crataegus spp. leaves/flowers/fruit

(May tree, quickset, thorn-apple tree, whitethorn; Ger.: weissdorn; Fr.: aubepine, epine blanche)

Drug Interactions

1) enhances the activity of the cardiotonics such as **digitalis, *Convallaria majalis*, and g-strophanthin** (in guinea pigs;[155,156] empirical[149,150]), the cardiotonic herb ***Adonis vernalis*** (in guinea pigs[155]) and the

cardiac glycosides digitoxin(*in vitro*[157]) **and digoxin** (*in vitro*;[157] perlingual in human clinical trial[181]) due to its polymeric procyanidins while reducing the toxicity of the three glycosides mentioned[157] by its coronary vasodilating and anti-arrhythmic effects[3,4]

HEMP AGRIMONY

**Eupatorium cannabinum* plant

(waterhemp, thoroughwort, sweet mandlin, water mandlin, water mandlin, sweet-smelling trefoil, Dutch agrimony, Dutch eupatorium; Ger.: gemeiner wasserdost, wasserhanf, kunigundendraut, leberkraut, hirschklee, alpenkraut, donnerkraut, dostenkraut, drachenkraut; Fr.: chanvrin, eupatoire commune, herbe de Sainte Cunegonde, origan de marais)

Contraindications

1) due to its emmenogogue and abortifacient effects (empirical)[74] and its content of hepatotoxic pyrrolizidine alkaloids it should be avoided in **pregnancy**[6]

2) **nursing mothers** due to its content of toxic pyrrolizidine alkaloids (speculative)[6]

HIBISCUS

Hibiscus rosa-sinensis flowers

(rose of China, Chinese hibiscus)

Contraindications

1) due to its emmenogogue effect (empirical)[74] its excessive internal use should be avoided in early **pregnancy** (speculative)[2]

HOPS

Humulus lupulus strobiles

(Ger.: hopfen, hopfenzapfen, hopfendrusen; Fr.: lupulin, houblon)

Contraindications

1) **depression** (empirical)[150,327] due to its sedative effects (IP in mice; empirical)[7,57]

Drug Interactions

1) sedative activity of extract increases the sleeping time induced by **pentobarbital** (IP in mice)[57]

HOREHOUND

Marrubium vulgare plant
(hoarhound, white horehound; Ger.: weisser andorn; Fr.: marrube blanc)

Contraindications

1) **pregnancy**[150] due to the emmenagogue and abortifacient effects (empirical)[149,150] and uterine stimulant action (*in vitro* or in animals)[74]

HORSE CHESTNUT

**Aesculus hippocastanum* bark
(buckeye, Spanish chestnut; Ger.: rosskastanie; Fr.: marronier d'inde)

Contraindications

1) **bleeding disorders** (speculative)[24] due to antithrombin activity of its hydroxycoumarin component aesculin causing increased bleeding time[2]

Drug Interactions

1) not to be taken with **aspirin** or **anticoagulants** (speculative)[24] due to antithrombin activity of aesculin[2]

HORSE RADISH

Armoracia rusticana = *Cochlearia armoracia* fresh root
(Ger.: meerrettich; Fr.: grand raifort, raifort sauvage)

Contraindications

1) **stomach ulcers** or **intestinal ulcers** (empirical) [6] due to its stimulant effect on the mucosa [5]
2) **kidney inflammation** (empirical) [6] due to its strong diuretic effect [5]
3) **children** under age 4 due to potential gastrointestinal disturbances (speculative) [6]
4) **pregnancy** due to the potential abortifacient effect if the tincture is taken regularly in large amounts (empirical) [5]

HORSETAIL

**Equisetum* spp. plant
(shave grass, scouring rush, bottle brush, paddock pipes, dutch rushes, pewterwort; Ger.: schachtelhalm, zinnkraut; Fr.: prele des champs; Sp.: cola de caballo)

Contraindications

1) **heart disorders** and **kidney disorders** (speculative) [150] possibly due to the increased excretion of potassium accompanying its diuretic effect (PO in mice) [12]
2) for **children** due to high inorganic silica content of powdered herb and toxicity reported from chewing the stems (empirical) [150]
3) **prolonged use** in powdered form due to high inorganic silica content [150] and due to thiaminase activity of plants (*in vitro*; PO in horses) [182]

Drug Interactions

1) **digitalis** and its **cardiac glycosides** may become more toxic due to the loss of potassium [2] associated with its diuretic effect (PO in mice) [12]
2) causes breakdown of **thiamine** (*in vitro*; PO in horses) [150,182]

HYSSOP

Hyssopus officinalis plant
(Ger.: ysop; Fr.: hysope)

Contraindications

1) **pregnancy**[150] due to its emmenagogue[7,74,150] and abortifacient effects (empirical)[74]

ICELAND MOSS

Cetraria islandica thallus
(eryngo-leaved liverwort)

Contraindications

1) **stomach ulcers** and **duodenal ulcers**[150] due to bitter stomachic effects[149] with irritation from the powder or alcoholic extract forms (empirical)[150]

IPECAC

**Cephalis ipecacuanha* root/rhizome
(ipecacuanha)

Contraindications

1) irritant or **corrosives poisoning**[1,150] prohibit its use as an emetic due to re-exposure of esophageal tissue to destructive corrosives (empirical)
2) **petroleum distillate poisoning** such as paint thinner[150] due to potential for aspirational pneumonitis (empirical)
3) **strychnine poisoning**[150] due to possibly inducing convulsions (empirical)[2]
4) **pregnancy**[2,150] since its alkaloid component emetine is a uterine stimulant (*in vitro* or in animals)[74]
5) organic **heart disease**[1,2,150] due to its depressive effect on the heart (empirical)[2]
6) **prolonged use**[150] due to disruption of emetic reflex (empirical)
7) **children** under one year of age[150] due to potential toxicity (empirical)

JAMAICA DOGWOOD

*Piscidia erythrina bark

Contraindications

1) in **children** and **elderly** (empirical[148] due to potent neuro-muscular depressant effect of the fluid extract (in dogs, empirical)[2,3] caused by rotenoids and isoflavones (*in vitro*, in fish)[3]

JAVA BRUCEA

Brucea javanica fruit
(kusam seeds; Ch.:ya-tan-tzu)

Drug Interactions

1) aqueous extract used in treatment of malaria antagonizes the antiplasmodial activity of **chloroquine** diphosphate (*in vitro*)[337]

JOE-PYE WEED

**Eupatorium purpureum* root
(gravel root, queen of the meadow, kidney root, purple boneset, trumpet weed; Ger.:roter wasserhanf)

Contraindications

1) **internal use**[150] or **prolonged use** (speculative) due to its hepatotoxic pyrrolizidine alkaloid content[6]
2) in **pregnancy** due to abortifacient effect (PO in cattle)[6]
3) **nursing mothers** (speculative) due to toxic pyrrolizidine alkaloid content[6,150]
4) topically on abraded or **broken skin** due to potential for absorption of toxic amounts of pyrrolizidine alkaloids (speculative)[150]
5) in persons with a history of **liver disease** due to hepatotoxicity from the alkaloids (speculative)[150]

JUNIPER

**Juniperus communis* berries
(common juniper; Am. Ind.: wah-pee, mah-hav-wa; Ger.: germeiner wacholder, wacholderbeeren; Fr.: genevrier commun, genevieve, baies de genievre; Sp.: enebro; It.: ginepro)

Contraindications

1) **kidney inflammation** (empirical)[1,4,6,7,24,147,148,150] and **kidney infection**[6] due to irritation of the kidneys[2,6,24] by volatile oil components including pinenes and cadinene with frequent use or taken in large doses[2,6]
2) **pregnancy**[2,4,6,7,24,147,150] due to its emmenogogue effect (empirical)[2,24,74] and the abortifacient effect of its volatile oil[74] from urinary tract irritation leading to reflex uterine stimulation[4]
3) **prolonged use** for over 4 weeks due to potential for renal damage (empirical)[6,150]

KAVA

**Piper methysticum* root
(kava kava, intoxicating long pepper, ava pepper shrub; Ger.: rauschpfeffer)

Contraindications

1) **pregnancy** (speculative)[6,150] possibly due to loss of uterine tone caused by pyrones (*in vitro*)[22]
2) **nursing mothers**[6,150] due to possible passage of pyrones into milk (speculative)
3) **endogenous depression** (speculative)[6] due to the sedative activity of kava resin and the pyrones dihydrokawain and dihydromethysticin (PO in mice and rats)[22,245]
4) operating a **motor vehicle** following excessive use is proscribed[244] due to impaired driving ability from consuming large amounts (empirical)[6,244]
5) **prolonged use** for more than 3 months without consulting a physician[6] to avoid developing a consumption habit and its resulting dermatosis that occurs after several months to a year of regular use (empirical)[22]

Drug Interactions

1) CNS **depressants** may be enhanced by the extract[6] such as the benzodiazepine **alprazolam** (human case

report),[137] even though kave resin components failed to bind to benzodiazepine sites (*in vitro*; IP in mice),[152,322] and the barbiturate **pentobarbital** (in mice)[22] due to the kava pyrones in the extract indirectly increasing the affinity of GABA-receptor binding sites (*in vitro*)[152] and due to the general sedative and muscle-relaxant activity of kava resin (PO in mice and rats)[245] and aqueous fractions of kava (IP in mice)[246,247]

2) hypnotic effect of ethyl **alcohol** is enhanced by kava lipid-soluble extract (PO in mice)[23]

3) reduces the efficacy of **levadopa** in the treatment of Parkinson's disease seemingly due to its dopamine antagonism (human case report)[316]

KELP

Nereocystis luetkeana thallus

Contraindications

1) **excess thyroid** activity or **prolonged use** due to high iodine content[150]

KHELLA

**Ammi visnaga* fruit

(toothpick ammi; Ger.: bischofskraut, zahnstocher-ammei; Fr.: herbe au cure-dents)

Contraindications

1) early **pregnancy**[3] due to its emmenagogue effect (empirical) and the uterine stimulant activity of its constituent khellin (*in vitro* or in animals)[74]

Drug Interactions

1) the ethanol-soluble component visnadin decreases the toxicity of the cardiac glycoside **digitoxin** (PO in mice)[141] due to its coronary vasodilator activity (*in vitro*)[138,139,140] and anti-arrhythmic effects (PO in mice)[141]

KNOT GRASS

Polygonum aviculare plant
(knotweed, beggarweed, bird knotgrass, birdweed, cow grass, common knotweed, crawlgrass, doorweed, ninety-knot, pigweed; Ger.: vogelknoterich, wegtritt; Fr.: renouee des oiseaux, centinode; Sp.: sanguinaria mayor, centinodia)

Contraindications

1) due to its abortifacient effect (empirical)[74]
excessive use should be avoided in **pregnancy**[2]

LAVENDER

Lavandula officinalis = *Lavandula vera* = *Lavandula angustifolia* flowers
(Ger.: echter lavendel; Fr.: lavande commun;
Sp.: espliego; It.: lavanda, spigo, nardo)

Contraindications

1) due to its emmenagogue effect (empirical)[158] its excessive internal use should be avoided in early **pregnancy** (speculative)[2]

LEPTANDRA

**Veronicastrum virginicum* = *Veronica virginica* root
(black root, Culver's root, Beaumont root, Bowman's root, Culver's physic, hini, oxadoddy, physic root, purple leptandra, tall speedwell, tall veronica, whorlywort)

Contraindications

1)**gallstones**, **hardened stones**, or **bile duct obstruction** (empirical)[1] due to its cholagogue effect[5]
2) internal **hemorrhoids** or during **menstruation** (empirical)[1] due to its cathartic effect[5]
3) threatened **miscarriage** (empirical)[1] due to its abortifacient activity when fresh[2,5]
4) **pregnancy**[1,2,150] due to its teratogenic effect[1] and abortifacient activity when fresh (empirical)[2,5]

LICORICE

**Glycyrrhiza glabra* root/rhizome
(sweet licorice, sweet wood, sweetwort, liquorice; Ger.: lakritze, sussholz; Fr.: bois doux, reglisse; Sp.: orozuz, regaliz; It.: liquirizia)

Contraindications

1) severe **kidney insufficiency**[6,150,344] or **high blood pressure** due to hypertension caused by its overuse (PO in human case reports)[215,275,344] and the sodium and fluid retention caused by its saponin glycyrrhizin, also called glycyrrhizic acid[4,6,150]
2) **low blood potassium**[4,150] or **cardiac disease**[4,344] due to decreased serum potassium associated with over-consumption of licorice (PO in human case reports and human study)[215,216,275,276,277,364] and the action of its metabolite 3-monoglucuronyl-glycyrrhetinic acid, a potent inhibitor of 11β-hydroxysteroid dehydrogenase, preventing hydrocortisone breakdown and thereby inducing a mineralcorticoid effect (*in vitro*)[278]
3) **prolonged use**[150] for more than 4-6 weeks due to resulting hypertension, hypokalemia, and edema (empirical)[4,6] from disruption of renin-angiotensin-aldosterone axis[276,277]
4) **pregnancy**[2,4,6] especially when difficult,[344] due to its emmenogogue effect (empircal),[74] interference in steroid metabolism,[21,217] and phytoestrogen components[218,219]
5) **liver cirrhosis**[4,6,150,344] or **bile stasis disorders**[4,6,150] due to its choleretic effects[4] and **chronic hepatitis** (empirical)[6] even though some success is claimed in treating chronic hepatitis B with glycyrrhizin[344]
6) **ex-alcoholics** due to seemingly greater sensitivity to licorice's adverse effects,[344] especially myopathy due to potassium loss[364]

7) **overweight** individuals due to their higher risk of hypertension, diabetic, and cardiovascular problems[344]
8) **diabetes** (speculative)[150] since insulin-treated diabetics appear to be predisposed to hypokalemia and sodium retention[344]

Drug Interactions

1) potentiates the toxicity of **cardiac glycosides** (empirical)[4,6,150] such as those in **digitalis**[2,4,24] due to a reduction of potassium in the blood[4,6,150,215,216,364]
2) additive increase of potassium loss with stimulant **laxatives**[150] and hypotensive **diuretics** (PO in human case reports)[364] such as **thiazides**[4,150] though licorice should also not be used simultaneously with the diuretics **spironolactone** or **amiloride** (speculative)[4] due to the incompatible effects on sodium and potassium excretion
3) licorice component glycyrrhizin or its aglycone glycyrrhetinic acid potentiate **corticoid** treatment[21,150,344] including its antibody-lowering effect (in adrenalectomized rats)[214] since glycyrrhizin interfers with 5β-reductase breakdown of corticosteroids (*in vitro*) thus prolonging their biological half-life[21]
4) the glycyrrhizin aglycone glycyrrhetinic acid, also called glycyrrhetic acid, potentiates the local effects of **hydrocortisone** (topically in human studies)[213,344] due to inhibition of the catalytic enzyme 11β-hydroxysteroid dehydrogenase (PO in human case study)[365] and its activity in human skin (*in vitro*)[213]
5) deglycyrrhizinated licorice reduces ulcer formation from **aspirin** (PO in rats)[220] and gives greater protection from aspirin-induced gastric mucosal damage when used with **cimetidine** than when either is used alone (PO in rats)[221]
6) **insulin** may be synergistic with glycyrhhizin in causing hypokalemia and sodium retention (speculative)[344]

LIFE ROOT

**Senecio aureus* plant

(ragwort, cocash weed, coughweed, golden ragwort, grundy swallow, squaw weed)

Contraindications

1) **pregnancy**[2] due to its emmenagogue (empirical),[7] oxytocic (empirical),[10] and teratogenic effects[2] and content of hepatotoxic pyrrolizidine alkaloids[38] senecionine,[24,333] florosenine, otosenine, and floridanine[334]

2) **nursing mothers** (speculative) due to excretion of hepatotoxic pyrrolizidine alkaloids into milk[38]

LOBELIA

**Lobelia inflata* plant or seeds

(Indian tobacco, emetic herb, emetic weed, gagroot, vomitroot, vomitwort, wild tobacco)

Contraindications

1) **nervous prostration, shock,** or **paralysis** (empirical)[147] due to the blocking effect on postganglionic receptors by the alkaloid lobeline (*in vitro*)[248]

2) dyspnea from chronic **heart disease**[24] such as an **enlarged heart** or **fatty heart, fluid around heart,** enfeebled heart with **valvular incompetence**, asthma of **cardiac decompensation**, cardiac **sinus arrhythmia** or **bundle branch block** (empirical)[1] due to interference of the heart's rhythm by lobeline (IV in dogs),[249] especially in toxic amounts,[2] and the coronary vasoconstiction resulting from the release of vasopressin induced by lobeline (IP in rats)[250]

3) **pneumonia** or **fluid around lungs** as pleural effusion (empirical),[1] possibly due to lobeline causing hyperpnea (intra-arterial injection in pigs),[251] the respiratory stimulant effect being followed by a decrease in lung ventilation (SC in rabbits)[252]

4) **high blood pressure** (empirical)[1] due to a possible systemic increase of blood pressure in carnivores (IV in dogs and cats)[249,253] and the release of vasopressin induced by the component lobeline (IP in rats),[250] though blood pressure was reduced by lobeline in herbivores (IV in guinea pigs and rabbits)[253]
5) **low vitality** (empirical)[1] or in large doses as an emetic to **children** or the **elderly**[148] due to the potentially toxic effect, especially in an emetic dose, of its alkaloid lobeline (SC in dogs; empirical)[2,251]
6) **pregnancy**[24] possibly due to its toxic potential[2] or because it relaxes the uterine os and perineal musculature (empirical)[5]
7) **tobacco sensitivity**[24] due to the similarity of lobeline to nicotine in binding to cerebral receptor sites and in CNS effects (*in vitro*; SC in rats)[255,256]

LONG PEPPER

Piper longum fruit
(Indian long pepper, jaborandi pepper)

Drug Interactions

1) increased bioavailability of **vasicine** when taken with powdered fruit and **sparteine** when taken with the major alkaloidal component piperine due to enhanced absorption and/or diminished metabolic breakdown (PO in rats)[204]
2) **phenytoin** was absorbed more rapidly and more completely and eliminated more slowly when taken with the component piperine (PO in human study)[205]
3) **propanolol** was more rapidly and more completely absorbed combined with piperine, while **theophylline** was more completely absorbed, and both reached significantly greater maximum concentrations when taken with the component piperine (PO in human study)[206]

LOQUAT

**Eriobotrya japonica* leaves
(Ch.:pi pa ye)

Contraindications

1) **prolonged use** due to cyanogenic glycoside content (speculative)[150]

LOVAGE

Levisticum officinale = *Ligusticum levisticum* root
(European lovage, lavose, sea parsley; Ger.: liebstockel; Fr.: liveche)

Contraindications

1) acute **kidney inflammation** or **urinary tract inflammation** and **kidney insufficiency** (empirical)[6,7,150] due to its potential for causing kidney damage in excessive doses[7]
2) **pregnancy** due to its emmenagogue effect (empirical)[7,150]
3) due to potential for photosensitivity with prolonged use[6,150] **ultraviolet light** and **solarium therapy** should be avoided (speculative)

MA HUANG

**Ephedra sinica* = *Ephedra vulgaris* plant
(Chinese ephedra)

Contraindications

1) **pregnancy**[2,20,150] due to the uterine stimulant action associated with the alkaloids **ephedrine** and **pseudoephedrine** (*in vitro* or animal studies[74] and pharmacologic effects on fetus (speculative)
2) **anorexia** (speculative)[2,150] due to the appetite suppressive effects of its alkaloids with regular use (PO in mice and rats)[29,150]
3) **insomnia** due to its adrenergic stimulant effects (empirical)[2]

4) **suicidal tendencies** due to the anxiety, tenseness, and apprehension caused by the sympathomimetic activity of ephedrine (empirical)[2]
5) organic **heart disease** due to its adrenergic cardiac stimulant and arrhythmic effects (speculative)[2,20]
6) **high blood pressure** (empirical) due to the peripheral vasoconstrictive effects of its adrenergic ephedrine and pseudoephedrine components[2,20]
7) **diabetes** (empirical)[20,30] due to the hyperglycemic effect of ephedrine in acute use and after 4 weeks of regular use, though tolerance to this action developed after 3 months (PO in human study),[30] and due to its peripheral vasoconstrictive effects[20]
8) **excess thyroid** activity (empirical)20,29 due to the immediate increase in metabolic rate from its alkaloids (PO in mice)29 and the increased T_3 to T_4 ratio after four weeks of use of ephedrine (PO in human study)30
9) **prostatic enlargement** with urinary retention (empirical)[13,20] due to the alpha-adrenergic activity of the alkaloids that causes contraction of the bladder neck and prostate musculature[13]
10) **stimulant sensitivity** due to its central nervous system stimulation (empirical)[20]
11) **stomach ulcers** (empirical)[20] due to possible reduction of gastric secretion of protective mucus (speculative)
12) **nursing mothers** [20,150] due to possible sympathomimetic effects on sensitive infants (speculative)
13) **bulimia**[150] due to risks associated with inadequate nutrient intake (speculative)
14) **glaucoma**[150] due to reduced fluid drainage from eye (empirical)
15) **prolonged use**[150] due to potential for toxicity2 and abuse (empirical)[150]
16) **children** under age 18[150] due to potential for abuse as stimulant (empirical)

Drug Interactions

1) increased thermogenesis and weight loss due to a reduction of body fat when ephedrine component is combined with **methyl xanthines** including **theophylline** [18,19] and **caffeine** (PO in mice, PO in human clinical study) [18,19,20,305] as well as excessive nervous stimulation (human case reports) [19,345]
2) ephedrine can induce toxicity with **monoamine oxidase inhibitors** (PO in human study and human case reports) [20,46,47,48,150,345] including **tranylcypromine, selegiline, phenelzine,** and **moclobemide** (human case reports) [345] due to dangerous elevations in blood pressure (PO in human study, PO in human case report) [46, 48] from increased vasoconstriction and release of noradrenaline by ephedrine (human case report [48] and should be avoided for 2 weeks after stopping monoamine oxidase inhibitors (PO in human case report) [47]
3) ephedrine increases the clearance and thereby reduces the effect of **dexamethasone** [345]
4) ephedrine and pseudoephedrine are excreted more rapidly with **urinary acidifiers** such as **ammonium chloride** and more slowly with **urinary alkalinizers** such as **sodium bicarbonate** (human studies) due to effects on reabsorption from kidney tubules [345]
5) indirect sympathomimetic effects of ephedrine such as mydriasis and hypertension are antagonized by **reserpine** (IV, IM and intraocular in human case reports) [345]
6) **amitriptyline** blocks hypertensive effects of ephedrine (IV in human case report) [345]

MADAGASCAR PERIWINKLE

**Vinca rosea* = *Catharanthus roseus* plant or root

Contraindications

1) **pregnancy** [150] due to its abortifacient (empirical) [74,150] and teratogenic effects [2]

MADDER

Rubia tinctorum root
(Ger.: farberrote, krapp; Fr.: garance)

Contraindications

1) **pregnancy** due to its genotoxic[6] and emmenagogue effects (empirical)[7]
2) **nursing mothers** (speculative) due to its genotoxic effect[6]

MALE FERN

**Dryopteris filix-mas* rhizome
(aspidium, bear's paw root, knotty brake, sweet brake, marginal shield-fern; Ger.: farnkraut; Fr.: fongere)

Contraindications

1) **pregnancy**[2,150] due to its abortifacient effect (empirical)[74]
2) **anemia** or in **elderly** or **debilitated subjects** due to the impairment in respiration and circulation it may cause (empirical)[2]
3) **stomach ulcers** and **intestinal ulcers** due to the mucosal irritants filmaron and filicic acid in the oleoresin (empirical)[2]
4) **heart disorders** due to its cardiac depressive effects (empirical)[2]
5) **kidney insufficiency** or **liver disorders** due to the albuminuria and bilirubinuria it has been known to cause (empirical)[2]
6) **nursing mothers** due to potential toxicity to infant (speculative)[150]
7) **internal use** (speculative) unless directed otherwise by a qualified expert[150] due to its potential toxicity[2]

MANNA-ASH

Fraxinus ormus stem exudate

(flowering ash, flake manna; Ger.: manna-esche; Fr.: frene a la manne, orne a manne)

Contraindications

1) **intestinal obstruction** due to its laxative effect (empirical)[6]

MARJORAM

Origanum marjorana = Majorana hortensis plant

(sweet marjoram, knotted marjoram, garden marjoram; Ger.: majoran, gartenmajoran; Fr.: marjolaine, origan marjolaine)

Contraindications

1) due to its emmenagogue effect (empirical)[158] excessive internal use should be avoided in early **pregnancy** (speculative)[2]

MARSHMALLOW

Althaea officinalis root

(mortification root, sweet weed, wymote; Ger.: eibischwurzel, malve; apothekerstockmalve, witte malve; Fr.: guimauve; Sp.: malvavisco; It.: malvacioni, bismalva, buonvischio; Tur.: hitmi, kitmi, gul hatem)

Drug Interactions

1) absorption of **oral drugs** taken simultaneously may be delayed (speculative)[6]

MARSH TEA

**Ledum palustre* plant

(marsh cistus, moth herb, James' tea, Labrador tea, swamp tea, wild rosemary; Ger.: sumpfporst; Fr.: romarin sauvage)

Contraindications

1) **pregnancy** due to its abortifacient effect, probably secondary to potent irritation by essential oil of the urinary tract,[6] and its uterine stimulant action (*in vitro* or in animals)[74]

MASTERWORT

Heracleum lanatum plant
(cow parsnip, cow cabbage, hogweed, madnep, woolly parsnip, youthwort)

Contraindications

1) due to its emmenagogue effect (empirical)[158] excessive internal use should be avoided in early **pregnancy** (speculative)[2]

MATE

Ilex paraguayensis leaves
(Paraguay tea; Sp.: yerba mate)

Contraindications

1) **kidney disorders** (speculative) due to the diuretic effect of caffeine[8]
2) **duodenal ulcers** (speculative) due to reactivation of the ulcers from increased gastric acid secretion after large doses of caffeine[8]
3) **heart disorders** (speculative) due to excessive caffeine consumption increasing heart rate and causing or exacerbating arrhythmias (empirical)[8]
4) **psychological disorders** (speculative) since caffeine can aggravate depression or induce anxiety neurosis in large doses[8]
5) **prolonged use**[150] since this may lead to caffeine-associated adverse reactions such as insomnia, restlessness, anxiety, irritability, stomach pain and similar effects[8]
6) **pregnancy** (speculative) since caffeine crosses the placenta and has been weakly associated with fetal loss, low birth weight and premature deliveries in

humans,[8] as well as causing known birth defects in animals[8,10]

7) since caffeine appears in breast milk at half the concentration as in the mothers plasma[8] it is best avoided by **nursing mothers** (speculative)

Drug Interactions

1) excessive consumption of caffeine should be avoided with **monoamine oxidase inhibitors** such as **isocarboxazid**, **phenelzine**, and **tranylcypromine** since it may cause hypertensive reactions (empirical)[184]

2) increased thermogenesis (PO in mice, PO in human study)[18,305] and weight loss due to a reduction of body fat as well as side effects of agitation, tremors, and insomnia when caffeine is combined with **ephedrine** (PO in mice, PO in human clinical study)[18,19]

3) caffeine inhibits the hemodynamic effects of **adenosine** (human studies) and should be avoided 12 hours before using[345]

4) **clozapine** effects are altered when taken less than 40 minutes after caffeinated drinks (human case report)[345]

5) sedative effects of **benzodiazepines** including **diazepam, clonazepam** and **triazolam,** or **zopiclone** or the **barbiturate pentobarbital** are reduced by caffeine (PO in human studies)[345]

6) blood pressure of those taking the **beta-blockers propranolol** and **metoprolol** was somewhat increased by consuming caffeine (PO in human study)[345]

7) severely increased blood pressure and mania can result by combining caffeine sources with **phenylpropanolamine** (PO in human studies and case report)[345]

8) serum levels of **lithium** are decreased by caffeine (human studies)[345]

9) absorption and bioavailability of **aspirin** is increased by caffeine (PO in human studies)[345]
10) **oral contraceptives, cimetidine,**[8,345] **furafylline, verapamil, disulfiram, fluconazole, mexiletine, phenylpropanolamine,** several **quinolone antibiotics** including **enoxacin, pipemidic acid, ciprofloxacin,** and **norfloxacin,** and especially **idrocilamide** and **methoxsalen** inhibit the metabolism and/or clearance of caffeine, thereby increasing its stimulating effects (PO in human studies)[345]
11) **phenytoin** increases the metabolism and loss of caffeine from the body (human clinical study)[345]

MAYAPPLE

**Podophyllum peltatum* root/rhizome
(American mandrake, duck's foot, ground lemon, hog apple, Indian apple, raccoon berry, wild lemon, wild mandrake; Ger.: entenfuss; Fr.: podophylle americain)

Contraindications

1) **gallstones** (empirical)[1] due to the cholagogue effect of its podophyllin resin on bile secretion (empirical)[5]
2) **intestinal obstruction** (empirical)[1] due to its profuse cathartic action[2,5] (empirical)
3) **debilitated subjects**[1] and in those with **pinched features** and tissues or **contracted skin** and tongue due to its potent depleting effect[5]
4) **pregnancy** due to the teratogenic[1,2,6,7,10] and fetocidal effects of its podophyllotoxin and the peltatin components (empirical)[2] including the topical use of the resin (empirical)[8]
5) topical use of the resin near the **eyes,**[8,24] in subjects with **diabetes,** or others with poor circulation, on **moles, birthmarks,** or **inflamed** or **irritated warts** since permanent damage can result due to the escharotic effects (empirical)[8]

6) over **large areas** because of toxicity from absorption (empirical)[8]

Drug Interactions

1) common table **salt** increases its purgative power (empirical)[2,5]

2) **lobelia, ipecac, leptandra, hyoscyamus** or **belladonna** render its cathartic effect milder (empirical)[5]

MEADOWSWEET

Filipendula ulmaria = *Spiraea ulmaria* flowers (bridewort, dolloff, meadsweet, meadow queen, meadow-wort, pride of the meadow, queen of the meadow; Ger.: madesuss, spierblumen; Fr.: reine des pres, ulmaire)

Contraindications

1) **allergic hypersensitivity** to salicylates (speculative)[4,6,24]

MILK THISTLE

Silybum marianum = *Carduus marianus* seeds (holy thistle, Marythistle, St. Mary's thistle; Ger.: Mariendistel; Fr.: chardon-Marie)

Drug Interactions

1) the extract silymarin helps prevent liver damage from hepatotoxins including **butyrophenones, phenothiazines** (PO in human clinical study),[84] **acetaminophen** (IV in rats),[117] **halothane** (PO in mice),[118] **dilantin** (human case report),[119] and ethyl **alcohol** (IP in rats)[120] due to liver cell membrane-stabilizing and antioxidant effects of the flavonolignans silybin (silibinin), silydianin, silychristin (IP in rats)[120,188] and the inhibition by silibinin of 5-lipoxygenase products by the Kupffer cells (*in vitro*)[189]

2) altered metabolism of **aspirin** can be improved in liver cirrhosis when milk thistle flavonolignans given concurrently (PO in rats)[121]
3) silibinin, a major active component, helps prevent kidney damage from nephrotoxic anti-tumor agent **cisplatin** (IV in rats)[186,187] without diminishing the anti-tumor activity against human testicular cancer cell lines (*in vitro*)[187]

MISTLETOE

**Viscum album* plant
(European mistletoe, all-heal, birdlime, devil's fuge; Ger.: mistel, vogelmistel, leimmistel, hexenbesen, drudenfuss; Fr.: herbe de gui; Sp.: muerdago)

Contraindications

1) **pregnancy** (speculative)[2] due to the uterine stimulant action shown by its constituent tyramine (*in vitro* or in animals)[74]

MOTHERWORT

Leonurus cardiaca plant
(lion's ear, lion's tail, Roman motherwort, throw-wort; Ger.: herzgespann; Fr.: agripaume)

Contraindications

1) due to its emmenogogue effect (empirical)[7] and the uterine stimulant action of its constituents stachydrine and leonurine (*in vitro* or in animals)[74] its excessive internal use should be avoided in early **pregnancy** (speculative)[2]

MUGWORT

Artemisia vulgaris plant
(common mugwort, felon herb, sailor's tobacco; Ger.: gemeiner beifuss; Fr.: armoise commune)

Contraindications

1) **pregnancy** due to its emmenagogue[150] and abortifacient effects[6,74] and uterine stimulant action (*in vitro* or in animals)[74] associated with its major volatile constituent thujone[15]

MUSTARD

**Brassica nigra*, **Brassica alba*, **Brassica juncea* (sometimes identified as *Sinapis* spp.) seed
(black mustard, white mustard, and Chinese mustard, respectively; Ger.: echter kohl; Fr.: moutarde noir; Sp.: mostaza; It.: senape, mostarda)

Contraindications

1) **irritative poisoning** or **corrosive poisonings**[1] disallows its internal use as an emetic due to its own irritant effect[150] and the re-exposure of esophageal tissue to corrosives (empirical)
2) **stomach inflammation** or **intestinal inflammation** (empirical) due to the irritation cause by allyl isothiocyanate release[2,5]
3) **pregnancy**[1,2] due to the emmenagogue and abortifacient effects (empirical)[74] when taken in large amounts
4) **externally** over **unprotected skin**[2,7] due to blistering and ulceration of skin (empirical) caused by isothiocyanate in the volatile oil[2,5,7]
5) applied **externally** for an **excessive time**, especially over 15-30 minutes[150] or when burning sensation becomes uncomfortable,[5,7] or for regular **extended use** of over two weeks due to blistering and ulceration of skin (empirical)[2,5,7,150] caused by isothiocyanate in the volatile oil[2]
6) **externally** on **children** under 6 years of age[150] due to blistering and ulceration of delicate skin (empirical) caused by isothiocyanate in the volatile oil[2,5,7]
7) **kidney disorders** when *B. alba* used externally or internally due to possibility of irritant poisoning[150]

MYRRH

Commiphora myrrha, Commiphora molmol gum-resin
(gum myrrh; Ger. & Fr.: myrrhe)

Contraindications

1) acute, internal **inflammation** (empirical) [1,5,148] since large doses can cause gastric burning (empirical)[5]
2) **fever** (empirical) [1,5] since myrrh augments the heat of the body (empirical)[5]
3) **arterial agitation** or excitement since large doses can accelerate the pulse (empirical)[5]
4) **pregnancy**[150] due to its emmenagogue[5,74,150] and abortifacient effects (empirical)[74]
5) excessive **uterine bleeding** due to its emmenagogue effects (empirical)[150]

Drug Interactions

1) precipitates when mixed with **water** and adheres to the container (empirical)[9]

NIGHT-BLOOMING CEREUS

**Selenicereus grandiflorus* = *Cactus grandiflorus*
fresh stems
(cactus, large-flowered cactus, sweet-scented cactus, vanilla cactus, cereus grand; Ger.: konigin der nacht; Fr.: ciege a grandes fleurs)

Contraindications

1) **high blood pressure** or **heart over-activity** (empirical)[1] due to cardiac-stimulating effect of the fresh alcohol extract (empirical)[5] and the positive inotropic and hypertensive effects (in rats and dogs)[105] of the alkaloid constituent hordenine[106]

Drug Interactions

1) due to its constituent hordenine[106] which is selectively metabolized by MAO-B (*in vitro*)[107] and which increases blood pressure by liberating

norepinephrine (in rats and dogs)[105] and/or inhibiting norephinephrine uptake (*in vitro*)[107] **monoamine oxidase inhibitors** could potentiate its cardiac effects (speculative)

NUTMEG

**Myristica fragrans* seeds
(Ger.: muskatbaum; Fr.: muscadier; Sp: nuez moscada)

Contraindications

1) **pregnancy**[2,150] due to its potential abortifacient effect (empirical)[6,10,74,150] in toxic doses[6] and the potential mutagenic effect of its component safrole[150]

Drug Interactions

1) may potentiate **psychoactive drugs**[10] especially **monoamine oxidase inhibitors** (speculative),[150] due to its mild monoamine oxidase inhibiting action (empirical)[10,150]

OAK

Quercus spp. bark
(Ger.: eicherinde; Fr.: chene, gravelier; Sp.: encina)

Contraindications

1) **externally** on **skin damage over a large area** due to absorption of tannins (empirical)[4,150] and as teas in **full baths for weeping eczema, fever, infections, heart failure** stages III and IV of NYHA, and hypertonia stage IV of WHO[150]

Drug Interactions

1) reduced absorption of **alkaloids** and other **basic drugs** (empirical)[4,6] due to precipitation by the tannins[2,5,9]
2) its tannins precipitate **iron** salts[5]

OAT

Avena sativa fresh plant or green seeds
(Ger.: hafer; Fr.: avoine; Sp.: avena)

Drug Interactions

1) extract antagonizes the pain-relieving effect of **morphine** (PO and IP in mice) [54]
2) antagonizes the hypertensive response to **nicotine** (IP in rats) [54]

OLIVE

Olea europaea oil
(Ger.: olivenbaum; Fr.: olivier; Sp.: olivo)

Contraindications

1) **locally on the eyes** due to its irritating effect on the surface (empirical) [1]
2) **bile stones** due to risk of inducing biliary colic (speculative) [6] by its cholagogue effect (empirical) [7]

PAPAIN

Carica papaya extract from unripe fruit
(papaya latex)

Contraindications

1) **allergic hypersensitivity** to chymopapain occurring in 1% of patients can lead to anaphylaxis (empirical) [24]
2) due to the emmenogogue and abortifacient effects of the fruit and its latex (empirical) [74] excessive internal use should be avoided in **pregnancy** (speculative) [2]

Drug Interactions

1) increases **warfarin** anticoagulation effects if used concurrently (PO in human case report) [143] possibly due to its activating adenylate cyclase in low amounts (1 μg/ml) which may decrease platelet aggregation (*in vitro*) [298]

PAREIRA

Chondodendron tomentosum root
(Por.: pareira brava)

Contraindications

1) **pregnancy** due to its emmenagogue effect (empirical)[24]

PARSLEY

**Petroselinum sativum* = *Apium petroselinum* seed (fruit), root
(common parsley, garden parsley, rock parsley; Ger.: gartenpetersilie, petersilie; Fr.: persil)

Contraindications

1) **pregnancy**[2,6,7,150] due to the emmenogogue effect of the fruit or root (empirical)[7,74] and the abortifacient (empirical) and uterine stimulant actions of its volatile oil component apiole (*in vitro* or in animals)[74]
2) **kidney inflammation** (empirical)[4,6,7,150] due to the epithelial irritation caused by the essential oil[4]

PASSION FLOWER

Passiflora incarnata leaves
(Maypops, passion vine, purple passion flower; Ger.: passionblume, fleischfarbige passionsblume; Fr.: fleur de la passion, passiflore; Sp.: passionaria, flor de passion, passiflorina, corona de cristo, madre selva)

Contraindications

1) **pregnancy** (speculative)[2] due to the uterine stimulant action of its alkaloids harman and harmaline (*in vitro* or in animals)[74] and its content of the cyanogenic glycoside gynocardin[257]

Drug Interactions

1) the active sedative component maltol increases sleeping time induced by **hexobarbital** (PO and SC in mice)[60] as passion flower extract potentiates **pentobarbital** (IP in rats, PO in mice)[125, 169]

PEACH PIT

**Prunus persica* seeds

Contraindications

1) **pregnancy**[2,150] due to its emmenagogue and abortifacient effects (empirical)[74] and its content of a cyanogenic glycoside amygdalin[2,24,150]

PENNYROYAL

**Hedeoma pulegioi*des plant
(American pennyroyal, mock pennyroyal, mosquito plant, squaw balm, squawmint, tickweed; Sp.: poleo)

Contraindications

1) **pregnancy**[2,7,150] due to the emmengogue [7,74] and abortifacient effects (empirical)[7] associated with reflexive uterine stimulation from the urinary tract irritation by its volatile oil component pulegone[2]
2) **kidney disease** due to irritation of the kidneys by the volatile oil (empirical)[2]

PEONY

Paeonia officinalis root
(common peony; Ger.: echte pfingstrose; Fr.: peone, pivoine officinale)

Contraindications

1) due to its emmenagogue effect (empirical)[74] excessive internal use should be avoided in early **pregnancy** (speculative)[2]

PEPPERMINT

Mentha piperita leaves

(brandy mint, lamb mint; Ger.: pfefferminz, katzenkraut, frauenmussatze, grune rossmunze; Fr.: menthe anglaise, menthe poivree, feuilles de menthe, menthe de notre dame, menthe verte; Sp.: menta piperita; It.: erba Santa Maria, mente vere)

Contraindications

1) due to its emmenagogue effect (empirical)[74] excessive use should be avoided in early **pregnancy** (speculative)[2]

2) **gallstones** unless consulting a physician (speculative) due to its choleretic activity[4]

3) **hiatal hernia** (speculative)[24] due to its relaxing effect on the lower esophageal sphincter (PO in human study)[25]

4) essential oil should not be inhaled by small **children** (empirical)[6]

PERIWINKLE

Vinca minor plant

(common periwinkle, lesser periwinkle, early-flowering periwinkle, wintergreen, evergreen; Ger.: immergrun, sinngrun, wintergrun; Fr.: violette de sorcier, pervenche pucellage, petite pervenche; It.: centocchio, pervinca, mortine; Sp.: pervince; Hol.:maagdepalm; Tur.: kucuk)

Contraindications

1) **low blood pressure** (speculative)[150] due to the hypotensive activity of its alkaloid vincamine[149]

2) **constipation**[150] due to its astringent activity (empirical)[7]

PERUVIAN BALSAM

Myroxylon pereirae oleoresin of fruit

(balsam of Peru)

Contraindications

1) **allergic hypersensitivity** (empirical)[6] due to its cinnamein content[10]
2) **extended use** of more than 1 week or **excessive concentration** over 10% when applied **externally** to large surfaces (empirical)[6] due to its potential for allergic skin reactions[6,10]
3) **inflammation**[148] or **fever** (empirical)[5,148] due to its irritant and stimulating effects[5]

PINE

Pinus spp. needles
(common pine; Ger.: fichtensprossen; Fr.: pin; Sp.: pino)

Contraindications

1) **pregnancy** due to potential abortifacient effects (empirical)[6]

PINKROOT

**Spigelia marilandica* root
(Carolina pink, Indian pink, star bloom, worm grass)

Contraindications

1) **prolonged use**[2,150] due to depressive effects upon the heart (empirical)[2]

PLEURISY ROOT

**Asclepias tuberosa* root
(butterfly weed, Canada root, flux root, orange swallow-wort, tuber root, white root, wind root)

Contraindications

1) **pregnancy**[2] due to the uterine stimulant action (*in vitro*; IV in rabbit, dog, and cat)[72,74] and its estrogenic activity (in rats)[72,170]

Drug Interactions

1) due to the heart stimulating effects of the extract (in frogs)[170] and the cardiac glycoside content of the root[150,171] the activity of **digitaloid glycosides** may be enhanced (speculative)

POMEGRANATE

**Punica granatum* root bark
(Sp.: granada; Ch.: shi liu gen pi)

Contraindications

1) early **pregnancy**[2] due to its emmenogogue effect (empirical) and uterine stimulation action (*in vitro* or in animals)[74]

PRICKLY ASH

Zanthoxylum americanum = *Xanthoxylum americanum* bark
(toothache bush, toothache tree, yellow wood)

Contraindications

1) acute **stomach ulcers** and/or **intestinal ulcers** (empirical)[1] due to its stimulating gastrointestinal mucosal secretions (empirical)[5]
2) **stomach inflammation** or **intestinal inflammation** (empirical)[1] due to its mucosal stimulation[5]
3) **pregnancy**[24,150] due to its emmengogoue effect (empirical)[5]
4) **nursing mothers** (speculative)[24] probably since it can irritate the stomach[5]

PRIMROSE

Primula veris = *Primula officinalis* flowers
(butter rose, English cowslip; Ger.: primel, schlusselblume; Fr.: primevere; Sp.: primavera)

Contraindications

1) **allergic hypersensitivity** due to rare contact allergy (empirical)[6,7]

PSYLLIUM

Plantago psyllium = *Plantago afra* and *Plantago ovata* = *Plantago ispaghula* seed

(fleaseed, psyllion, psyllios; Ger.: strauchwegerich; Fr.: plantain des sables, plantain pucier) and (blond psyllium, Indian plantago; Ger.: ispaghula, spogel seed, Indisches psyllium; Fr.: ispaghul)

Contraindications

1) **esophageal stenosis** and **abnormal intestinal narrowing**[4,6] or **bowel obstruction** (empirical)[24,150] due to the bulk forming effect which may cause, or further complicate, impaction (empirical)[4]

2) difficult-to-control **diabetes** since insulin need may be reduced (speculative)[4,6,150]

Drug Interactions

1) reduced absorption of **oral drugs** (speculative)[4,6] such as **lithium** salts (PO human case report)[40,345] unless taken one hour before psyllium[150]

2) **insulin** dosage may need reduction due to slowing of dietary carbohydrate absorption (speculative)[4,150]

PULSATILLA

**Anemone pulsatilla* = *Pulsatilla vulgaris* plant

(pasque flower, wind flower, meadow anemone, meadow windflower, passe flower, Easter flower; Ger.: kuchenschelle)

Contraindications

1) **pregnancy**[2,6] due to its uterine stimulant action (*in vitro* or in animals)[74]

2) **nursing mothers**[24] because of its gastrointestinal irritant effect[2]

QUEEN ANN'S LACE

Daucus carota seeds

(wild carrot, beesnest plant, bird's nest root; Ger.: karotte, mohrrube; Fr.: carotte)

Contraindications

1) **pregnancy**[2,150] due to its emmenagogue and abortifacient effects (empirical) and its uterine stimulant action (*in vitro* or in animals)[74]

RASPBERRY

Rubus idaeus leaves

(garden raspberry, European red raspberry; Ger.: himbeere; Fr.: framboisier)

Contraindications

1) **pregnancy with a history of precipitate labor** (empirical)[147] due to its uterine stimulant activity (*in vitro*)[258,259] as well as its having antigonadotropic activity (*in vitro*)[260]

REHMANNIA

Rehmannia glutinosa root

(Chinese foxglove; Ch.: sheng di huang)

Contraindications

1) **diarrhea** and **anorexia** due to its irritant effect on the gastrointestinal tract[150]

RHUBARB

**Rheum palmatum*, **Rheum officinale* root

(Chinese rhubarb, turkey rhubarb; Ger.: chinesischer rhabarber; Fr.: rhubarbe de Chine; Sp.: ruibarbo)

Contraindications

1) **pregnancy** (speculative)[1,2,4,6,150] due to uterine stimulant action (*in vitro* or in animals)[74] and the content of potentially mutagenic and genotoxic anthraquinones (*in vitro*)[6]

2) **children** under age twelve due to depletion of water and electrolytes (empirical)[6,150]
3) severe **fever** and **inflammation** (empirical)[5,148] including **intestinal inflammatory diseases**[1,6] such as **appendicitis, colitis, irritable bowel,**[150] **Crohn's disease** and **ulcerative colitis** (empirical)[6,150] due to the irritating effects of the anthroquinone derivative components rhein, emodin, aloe-emodin[6]
4) **intestinal obstruction** (empirical)[6] due to the cathartic effect of its anthranoid components rhein and the sennosides[4,5,6]
5) **extended use** for more than 8 - 10 days due to pathological alterations to the colon smooth muscles (empirical)[6,150] and a substantial loss of electrolytes[6]
6) **abdominal pain** of unknown origin[6] due to possible rupture from contraction of inflamed viscus such as the appendix (empirical)
7) **nursing mothers**[6,24,150] due to passage of the anthraquinones into the milk that may cause catharsis in infants (speculative)[6] and passage into milk of potentially genotoxic emodin and aloe-emodin[6]
8) a history of **kidney stones** (speculative) due to oxalate content[150]
9) **hemorrhoids** (empirical)[24] due to the potential for inducing or aggravating hemorrhoidal thrombosis and/or prolapsis[6]

Drug Interactions

1) reduced absorption of **oral drugs** due to decreases bowel transit time (speculative)[6]
2) overuse or misuse can cause potassium loss leading to increased toxicity of **cardiac glycosides** (empirical)[4,6] such as those in ***Adonis***, ***Convallaria***, ***Urginea***,[2,6] ***Helleborus***, ***Strophanthus***, and ***Digitalis***[2]
3) aggravates potassium loss from use of **diuretics** (empirical)[6]

ROSEMARY

Rosmarinus officinalis leaves
(Ger.: rosmarin; Fr.: incensier, romarin; Sp.: romero; It.: rosmarino, ramerino)

Contraindications

1) **pregnancy**[4,6,150] due to its emmenagogue[7,150] and abortifacient effects (empirical)[150] and toxic side effects from components of the essential oil[4]

RUE

**Ruta graveolens* leaves and unripe fruit
(common rue, garden rue, German rue, herb-of-grace; Ger.: raute; Fr.: rue officinale; Sp.: ruda)

Contraindications

1) **pregnancy**[2,7,148,150] due to its emmenogogue[74,75] and abortifacient effects (empirical)[5,10,74,75,150] and the uterine stimulant activity of its constituent skimmianine (*in vitro* or in animals)[74]
2) excessive exposure to **ultraviolet light** due to possible photodermatitis reaction (empirical)[6,150]
3) **kidney insufficiency**[150] since it is a stimulant to the genito-urinary tract[5] and a renal irritant in large doses[2]

SAFFLOWER

Carthamus tinctorius flower
(American saffron, dyers' saffron, false saffron

Contraindications

1) **pregnancy** due to abortifacient and emmenagogue effects (empirical)[150]
2) **peptic ulcer** and **hemorrhagic diseases** (empirical) possibly due to prolongation of coagulation time[150]

SAFFRON

**Crocus sativus* stigma
(autumn crocus, Spanish saffron; Ger. & Fr.: safran)

Contraindications

1) **pregnancy**[2,4,150] due to its emmenogogue[7,10] and abortifacient effects in toxic doses (empirical)[4,6,74,150]

SAGE

**Salvia officinalis* leaves
(garden sage; Ger.: salbei; Fr.: sauge; Sp.: salvia)

Contraindications

1) **pregnancy** due to its emmenagogue[2,4,6,15,74] and abortifacient effects (empirical)[74] associated with its volatile oil component thujone[2,4,6,15] in the essential oil and alcoholic extracts[6]
2) **prolonged use** of the alcoholic extract or essential oil due to possible epileptiform cramps (speculative)[6]

SANDALWOOD

Santalum album wood
(white sandalwood, white saunders, yellow sandalwood; Ger.: weisses sandelholz, weisser sandelbaum; Fr.: santal blanc; Sp.: sandalia; It.: sandalo bianco; Ind.: chaudana)

Contraindications

1) due to its abortifacient effect (empirical)[74] excessive use should be avoided in **pregnancy**[2]
2) **kidney disease** (empirical)[6] due to its irritant volatile oil[5] which has a diuretic effect[7]
3) **prolonged use** for more than 6 weeks unless consulting a physicians (speculative)[6] probably due to its volatile oil content[5,7]

SASSAFRAS

**Sassafras albidum* = *Sassafras officinale* bark
(ague tree, cinnamon wood, saxifrax, saloop; Ger.: fenchelholz; Fr.: bois odorant; Sp.: sasafras; It.: sassafraso, lauro degl'Trocchesi; Tur.: sassafras ag)

Contraindications

1) early **pregnancy**[2] due to its emmenogogue effect (empirical)[74]
2) **prolonged use**,[6,150] such as daily for one year,[344] of forms containing its essential oil component safrole due to its toxic and hepatocarcinogenic effects (in animals)[6,150,344]

Drug Interactions

1) the essential oil component safrole and its derivatives prolong **hexobarbital** narcosis due to their inhibition of hepatic microsomal enzyme function (in mice)[324]

SAVIN

**Juniperus sabina* tops
(savine; Sp.: sabina)

Contraindications

1) general or local **inflammation** (empirical)[1,5] due to irritation caused by the essential oil components sabinene and sabinyl acetate from direct contact externally with the skin or internally on mucosa, resulting in gastroenteritis, hepatitis, pneumonitis and nephritis when taken in an oral overdose[6]
2) **pregnancy**[1,5] due to its abortifacient effect (empirical)[5,6]

SCOTCH BROOM

**Cytisus scoparius* = *Sarothamnus scoparius* tops
(broom, link, Irish broom; Ger.: besenginster; Fr.: genet a balai)

Contraindications

1) **high blood pressure** (empirical)[1,6] due to the cardiac stimulant activity of an alkaloid component sparteine[2,5,6]
2) acute **kidney disorders** (empirical)[1] possibly due to the diuretic activity of its component scoparin[5]
3) **spleen** and **liver disorders** (empirical)[1]
4) **pregnancy**[1,2] due to the abortifacient (empirical) and uterine stimulant activities of sparteine (*in vitro* or in animals)[74,150]

Drug Interactions

1) **monoamine oxidase inhibitors** (speculative) due to the high content of tyramine in the flowers[6]

SENEGA

**Polygala senega* root
(milkwort, mountain flax, seneca root, rattlesnake root, Seneca snakeroot, Senega snakeroot; Ger.: klapperschlangenwurzel)

Contraindications

1) active **feverish conditions** (empirical)[1] due to its CNS depressant effect[2]
2) active **inflammation** due to its local stimulant activity (empirical)[5] and intestinal irritant effects[2,150]
3) **stomach ulcers** and **stomach inflammation** due to its irritant properties, the same as for the related species *Polygala sibirica* and *Polygala temuifolia* (empircal)[150]
4) **prolonged use** due to its irritant properties on the gastrointestinal tract (empirical)[150]
5) **pregnancy**[2,150] due to its emmenagogue (empirical)[150] and uterine stimulant action (*in vitro* or in animals)[74]

SENNA

**Cassia* spp. = *Senna* spp. leaves or pods
(locust plant, wild senna, American senna, Alexandrian senna, Tinnevelly senna, Indian senna, purging cassia; Fr.: sene; Sp.: sen, hispidula, frijolillo, pico de pajaro)

Contraindications

1) **intestinal obstruction** (empirical)[4,6,24] due to stimulation of peristalsis by its anthroquinone sennosides[4,6]
2) **stomach inflammation** (empirical)[1,5,7,148] due to griping[5] and **intestinal inflammatory diseases** (empirical)[1,5,6,148] such as **appendicitis, colitis, irritable bowel,**[150] **ulcerative colitis,**[6] and **Crohn's disease**[6,150] due to irritation caused by anthroquinones[4]
3) **anal prolapse** (empirical)[5,148] due to aggravation by enhancing the bowel's expulsive force[4]
4) **hemorrhoids** (empirical)[5,7,148,150] due to possible induction of stenosis, thrombosis, and prolapse[6]
5) **pregnancy**[4,150] due to possible endometrial stimulation (speculative)[6,24] and the content of potentially mutagenic and genotoxic anthraquinones (*in vitro*);[6] however, sennosides have been shown to depress pregnant uterine motility (intracolonically in ewes)[198] and standardized senna concentrate was shown to be safe for pregnant mothers at effective laxative doses though some abdominal pain may occur (human clinical studies)[267,268]
6) **nursing mothers** due to passage of potential genotoxins and laxative anthroquinones into mother's milk (speculative)[4,5,6,150] that have caused occasional diarrhea in the infant (human clinical study)[268] even though no change in nursing infant bowel habits occurred with laxative doses of standardized senna given to their mothers (PO in human sudy)[296] and studies of senna and sennosides indicate that the the active metabolite rhein is secreted in insufficient

quantity to produce a laxative effect in nursing infants (PO in monkeys, PO in human study)[199,200]
7) **children** under age 12 due to water and electrolyte loss (empirical)[6,150]
8) **extended use** for more than 8-10 days[6,24,150] due to decreased peristalsis from intestinal smooth muscle damage (empirical)[6]
9) **appendicitis** and **abdominal pain** whose cause in unknown[24] due to possibly inducing a rupture from contraction of the inflamed organ (empirical)

Drug Interactions

1) sennosides may aggravate nephropathy from **analgesics** associated with dehydration (speculative)[6]
2) decrease absorption of **oral drugs** due to decrease in bowel transit time (speculative)[6]
3) overuse or misuse can cause potassium loss leading to increased toxicity of **cardiac glycosides** (empirical) such as those in ***Adonis, Convallaria, Urginea,***[2,6] ***Helleborus, Strophanthus,*** and ***Digitalis***[2]
4) aggravates loss of potassium associated with use of **diuretics** (empirical)[6]

SHEPHERD'S PURSE

Capsella bursa-pastoris plant
(cocowort, pick-pocket, St. James' weed, shepherd's heart, toywort; Ger.: hirtentaschel; Fr.: bourse a pasteur, fleur de S. Jacques; Sp.: bolsa de pastor; It.: borsa di pastore)

Contraindications

1) **pregnancy**[2] due to its emmenagogue and abortifacient effect (empirical)[7,74] and its uterine stimulant action (*in vitro* or in animals)[74]

SIBERIAN GINSENG

Eleutherococcus senticosus = *Acanthopanax senticosus* root

(touch-me-not, devil's shrub, wild pepper, eleuthero ginseng, devil's bush; Ger.: taigawurzel; Fr.: eleutherocoque)

Contraindications

1) **high blood pressure** (empirical)[6] in excess of 180/90 mm Hg (human studies)[150] probably due to the increased production of adrenalin in the adrenal glands (PO in rats)[115]

2) **prolonged use** without periodic breaks every one to three months (empirical)[150]

Drug Interactions

1) increases effect of **hexobarbital** (IP in mice)[6,111] due to inhibition of its metabolic breakdown (*in vitro*)[111]

2) increases efficacy of antibiotics **monomycin** and **kanamycin** in treating *Shigella* dysentery and *Proteus* enterocolitis (human clinical study)[112] probably due to enhancement of T-lymphocyte activity (human study)[113]

3) due to hypoglycemic effects of extract (IP in mice)[116] **insulin** dosage may need adjusting (speculative)

ST. JOHN'S WORT

Hypericum perforatum plant

(amber, goatweed, Johnswort, Klamath weed, Tipton weed, hardhay; Ger.: hartheu, Johanniskraut, blutkraut, herrgottsblut, walpurgiskraut, hexenkraut; Fr.: millepertuis; Sp.: corazoncillo)

Contraindications

1) **pregnancy**[3] due to its emmenagogue and abortifacient effects (empirical) and its uterine stimulant action (*in vitro* or in animals)[74]

2) prior to exposure to sunlight,[6] therapeutic **ultraviolet light** or **solarium therapy** (speculative)[4,6] if very high doses of its hypericin component are consumed,[4] as research demonstrated that an extremely large single dose of 3600 mg standardized extract or a thrice daily large dose of 600 mg for 15 days of this extract standardized to 0.3% total hypericin was needed to slightly increase photosensitivity to UV-A after the one dose and to both solar simulated irradiation and UV-A after the multiple doses[336]

3) **endogenous depression**[24] since it has mainly been shown to be effective in mild or moderate forms of depression (PO in human clinical studies),[95] though one study has shown St. John's wort extract to be equivalent to imipramine in treating severe depression but with less adverse effects[377]

Drug Interactions

1) **monoamine oxidase inhibitors** (MAO-inhibitors) may be potentiated (speculative)[150,327,376] due to the inhibition of monoamine oxidase by xanthones (*in vitro*)[49] and a number of flavonoid components of St. John's wort (*in vitro*).[50] Earlier recommendations that foods and medicine known to negatively interact with MAO-inhibitors drugs should be avoided with St. John's wort (speculative)[373,390] are no longer considered pertinent (empirical). However, physician monitoring for additive effects with MAO-inhibiting drugs is advisable.[374]

2) due to inhibition of serotonin reuptake by St. John's wort extract (*in vitro*)[96] combining with selective serotonin reuptake inhibitors (**SSRI**) may result in serotonin syndrome (speculative). Physician monitoring for additive effects with such drugs as **fluoxetine** is advisable. When replacement of SSRI medication is desirable, a trial for several weeks combining a reduced dose of St. John's wort or the

SSRI prior to withdrawal of the pharmaceutical medication may be judiciously attempted if under physician supervision (empirical).[374,375,376] Another discretionary clinical approach avoids mixing these similar remedies, but rather implements a three-week wash-out period for the SSRI before switching to St. John's wort extract (speculative).[390]

3) extract enhanced sleeping time from narcotic effect of **alcohol** and antagonized the effects of **reserpine** (PO in mice)[51]

STINGING NETTLE

Urtica spp. leaves

(nettle, common nettle, great stinging nettle, common stinging nettle; Ger.: brennessel, hanfnessel; Fr.: ortie; Sp.: ortiga; It.: ortica)

Contraindications

1) due to its emmenagogue and abortifacient effects (empirical) and the uterine stimulant action of its serotonin constituent (*in vitro* or in animals)[74] excessive internal use should be avoided in **pregnancy**[2,3]

Drug Interactions

1) a leaf extract enhances the anti-inflammatory effect of low doses of **diclofenac** (PO in human clinical trial)[386] due in part to inhibition of cyclooxygenase products by the extract and 5-lipoxygenase production of leukotriene B_4 by its phenolic component caffeic malid acid (*in vitro*)[387] and possibly to inhibition of cytokine release as shown by a reduction in whole blood of induced tumor necrosis factor-α and interleukin-1β (*in vitro*, PO in human study)[388,389]

SWEET CLOVER

**Melilotus officinalis* plant
(yellow melilot, field melilot, hay flowers, king's clover, yellow sweet clover; Ger.: steinklee, honigklee, mottenklee, barenklee, mallotenkraut; Fr.: petit trefle jaune, trefle des mouches, herbe aux puces, couronne royale, melilot)

Drug Interactions

1) **salicylates,**[2] **acetaminophen,** and **bromelain** due to potentiating hemorrhagic diathesis (human case report)[31] from its coumarin components[2,5,31,345]

TANSY

**Tanacetum vulgare* leaves
(bitter buttons, hindheal, parsley fern)

Contraindications

1) **pregnancy**[2,150] due to the emmenagogue[5,7,15,74,75,150] and abortifacient effect (empirical)[5,7,15,150] from uterine stimulant action (*in vitro* or in animals) caused by its toxic volatile oil containing thujone[5,15,74]

TEA

Camellia sinensis = *Thea sinensis* leaves
(black tea, green tea, oolong tea; Ger.: Chinesischer tee; Fr.: theier)

Contraindications

1) **kidney disorders** (speculative) due to the diuretic effect of caffeine and theophylline[8,184]
2) **duodenal ulcers** (speculative) due to reactivation of the ulcers from increased gastric acid secretion after large doses of caffeine[8]
3) **heart disorders** (speculative) due to excessive caffeine and theophylline consumption increasing heart rate and causing or exacerbating arrhythmias (empirical)[8,184]

4) **psychological disorders** (speculative) since caffeine can aggravate depression or induce anxiety neurosis in large doses[8]
5) **prolonged use** of fermented black tea (speculative)[150] since this may lead to caffeine-associated adverse reactions such as insomnia, restlessness, anxiety, irritability, stomach pain and similar effects[8]
6) **pregnancy** (speculative) since caffeine crosses the placenta and has been weakly associated with fetal loss, low birth weight and premature deliveries in humans,[8] as well as causing known birth defects in animals[8,10]
7) since caffeine appears in breast milk at half the concentration as in the mothers plasma[8] it is best avoided by **nursing mothers** (speculative)
8) young **children** due to an increased incidence of microcytic anemia (PO in human study) probably due to reduced absorption of iron (speculative) following precipitation by tannins (*in vitro*),[382] though supplying pharmacological doses of iron can overcome this problem (PO in human clinical study)[383]

Drug Interactions

1) reduced absorption of some **oral drugs** may occur (speculative) due to their precipitation by the tannins in tea (*in vitro*) though the precipitates dissolve in an acid pH as found in the stomach[345]
2) combined with **ephedrine** caffeine and/or theophylline increases thermogenesis (PO in mice, PO in human study)[18,305] and weight loss due to a reduction of body fat (PO in mice; PO in human clinical study)[18,19] as well as increasing agitation, tremors, and insomnia (PO in human clinical study)[19]
3) excessive consumption of caffeine should be avoided with **monoamine oxidase inhibitors** such as **isocarboxazid, phenelzine,** and **tranylcypromine**

since it may cause hypertensive reactions (empirical)[184] and stimulation by caffeine is enhanced[345]

4) cataleptic effects of **chlorpromazine** are abolished when administered with tea (PO in rats) probably due to its precipitation (*in vitro*) by noncaffeine components[381]

5) hemodynamic effects of **adenosine** are inhibited by xanthines (human studies) and its antiarrhythmic effects may be as well (speculative)[345]

6) **clozapine** effects are altered when taken less than 40 minutes after caffeinated drinks (human case report)[345]

7) sedative effects of **benzodiazepines** including **diazepam, clonazepam** and **triazolam,** or **zopiclone** or the **barbiturate pentobarbital** are reduced by caffeine (PO in human studies)[345]

8) blood pressure of those taking the **beta-blockers propranolol** and **metoprolol** was somewhat increased by consuming caffeine (PO in human study)[345]

9) severely increased blood pressure and mania can result by combining caffeine sources with **phenylpropanolamine** (PO in human studies and case report)[345]

10) serum levels of **lithium** are decreased by caffeine (human studies)[345] which in cases of sudden caffeine withdrawal can result in increased lithium levels (PO in human clinical study)[384] and lithium tremors (PO in human case studies)[385]

11) absorption and bioavailability of **aspirin** is increased by caffeine (PO in human studies)[345]

12) **oral contraceptives, cimetidine**[8,345] **furafylline, verapamil, disulfiram, fluconazole, mexiletine, phenylpropanolamine**, several **quinolone antibiotics** including **enoxacin, pipemidic acid, ciprofloxacin**, and **norfloxacin**, and especially **idrocilamide** and **methoxsalen** inhibit the

metabolism and/or clearance of caffeine, thereby increasing its stimulating effects (PO in human studies)[345]

13) **phenytoin** increases the metabolism and loss of caffeine from the body (human clinical study)[345]

THYME

**Thymus* spp. leaves

(garden thyme, common thyme; Ger.: echter thymian, romischer quendel; Fr.: thym; Sp.: tomillo; It.: timo)

Contraindications

1) **pregnancy**[2] due to its emmenagogue effect (empirical)[74]

TOBACCO

**Nicotiana tabacum* leaves

(The following high risk conditions are based on very **prolonged use** of smoking tobacco.)

Contraindications

1) **pregnancy** due to lower birth weight and size and higher risk of prematurity, miscarriage, and neurological impairment to the baby (human studies)[2,10,81] and possible damage to alveolar septa in the lungs of newborns with continued exposure from being breastfed (in rats)[309]

2) members of **families with heart disease** due to decreased levels of high-density lipoprotein (human studies)[81]

3) **cancer** associated with tobacco use including lung, mouth, pharyngeal, laryngeal, esophageal, bladder, and pancreatic cancers due to continuing exacerbation (human studies)[10,81]

4) tobacco **smoking-related diseases** including **ulcers, high blood pressure, diabetes, osteoporosis, blood clots** in the legs, **glaucoma,**[81] **heart disease, emphysema,** and **bronchitis**[10] due to

possible exacerbation of existing conditions (human studies)[10,81]

5) prior to medical **lab tests** due to the many changes and false positives induced by smoking (human studies)[81]

6) regular and/or excessive **toxin exposure** due to adverse combined effects of tobacco with carbon monoxide, asbestos, particulate matter, heavy metals, and other xenobiotics (human studies)[81]

7) **poor health** due to lifestyle-related conditions such as **obesity, alcoholism**, and **lack of exercise** (human studies)[81]

8) **type A personality** due to the increased risk of heart disease (human studies)[81]

9) prior to **surgery** due to the increased number of complications from higher carbon monoxide levels in the blood (human studies)[81]

10) **nursing mothers** due to diminished production of breast milk,[311] excretion of nicotine and its byproducts in breast milk (human studies)[2,301,310,311] which causes immediate changes in respiration and oxygen saturation in the infant,[312] and exposure to passive smoke which can lead to an increased incidense of lower respiratory infections[310] and may alter a child's intelligence and behavioural development and increase their future risk of lung cancer[311]

11) **children** due to the increased risk of developing cardiovascular and respiratory system conditions and the potential for becoming addicted (human studies)[311] as well as the acute toxicity associated with nicotine and smoking (empirical)[2]

Drug Interactions

1) decreases the blood levels of **H_2-blockers** such as **cimetidine**,[81,345] **acetaminophen**, and **vitamin B_{12}** (human clinical studies)[81]

2) speeds the elimination of **benzodiazepines**[81,345] including **alprazolam, chlordiazepoxide, clorazepate, diazepam, lorazepam, oxazepam**, and **triazolam,**[345] **heparin, pentazocine, tricyclic antidepressants**[81,345] including **amitriptyline, clomipramine, desipramine, glutethimide, imipramine**, and **nortriptyline**[3], **diflunisal,**[345] **caffeine, amobarbital**, and **vitamin C** (human clinical studies)[81]

3) **phenylbutazone,**[81,345] **estrogen,**[81] **flecainide, haloperidol**, oral **lignocaine, quinine, tacrine, thiothixene, zolpidem**, and **phenothiazines** including **chlorpromazine** and **fluphenazine**[345] are metabolized more quickly (human clinical studies)[81,345]

4) **furosemide,**[81] **insulin,**[345] **propoxyphene**, and **beta-blockers** such as **propanolol** are less effective (human clinical studies)[81,345]

5) enhances the drug effects of **glutethimide** (human clinical studies)[81,345]

6) increases risk of clots, strokes and heart attack in women over age 30 using **oral contraceptives** (human clinical studies)[81,345]

(The following interactions are based on smoking or chewing tobacco.)

7) increases the circulatory effects of **adenosine**[345]

8) **theophylline** is metabolized more quickly (human clinical studies)[81,345]

9) **cimetidine** and **ranitidine** reduce metabolic breakdown of nicotine (human study)[345]

TROPICAL ALMOND

Terminalia chebula fruit
(Ch.: he zi)

Contraindications

1) acute **cough,** acute **diarrhea,** and early stage **dysentery** (empirical)[150] possibly due to its

astringency impairing initial secretory flushing of the mucosa, since it is used when these conditions are prolonged

TURKEY TAIL

Trametes versicolor = *Coriolus versicolor* mycelia extracts
(Ch.: Yun-zhi; Jap.: kawaratake)

Drug Interactions

1) polysaccharide peptide (PSP) components prevented a significant drop in white blood cell count following three courses of **chemotherapy** treatment when used as pretreatment and taken with **vincristine, cyclophosphamide,** and **4'epidoxorubicin** (PO in human clinical trial)[222]
2) protein-bound polysaccharide K (PSK) significantly increased overall survival in node-negative, estrogen receptor-negative, Stage IIA T2N1 breast cancer patients treated with **ftorafur chemotherapy** following surgery and **mitomycin C** (PO in human clinical trial)[223]
3) PSK significantly improves survival time and disease-free survival time when used with **5-fluorouracil** and **mitomycin C** as **chemotherapy** adjuvant treatment following curative surgery for colorectal and gastric cancers (PO in human clinical trials)[224,225]
4) PSK increased the survival curve of patients receiving combination **chemotherapy** with **5-fluorouracil, cyclophosphamide, mitomycin C,** and **predonisolone** following curative surgery for operable breast cancer (PO in human clinical trial)[226]
5) duration of complete remission and survival time for patients with myelocytic, monocytic and lymphocytic leukemias in remission induced by combination **chemotherapy** increased significantly when PSK (Krestin) was given with a maintenance

therapy of **6-mercaptopurine** (PO in human clinical trial)[227]

TURMERIC

Curcuma longa = *Curcuma domestica, Curcuma aromatica* root
(Indian saffron; Ger.: kurkumawurzelstock, gelbwurzel; Fr.: rhizome de curcuma, safran des Indes)

Contraindications

1) **bile duct obstruction** (empirical)[4,6,150] due to its cholagogue activity (empirical)[4,6]
2) **gallstones** (speculative)[4,150] unless a physician has first been consulted though its yellow component curcumin has a choleretic effect[4] and was shown to reduce biliary cholesterol concentration,[349,363] reduce the incidence of cholesterol gallstones (PO in hamsters),[349] and cause regression of pre-existing cholesterol gallstones (PO in mice)[363]
3) **stomach ulcers** or **excess stomach acid**[150] due to mild ulcerogenic effect of the component curcumin (PO in rats)[181] even though a solid alcoholic extract of turmeric root was shown to have anti-ulcerogenic effects (PO in rats)[350]
4) **pregnancy**[150] due to its emmenogogue and abortifacient effects (empirical) from its uterine stimulant activity (*in vitro* or in animals)[74]

Drug Interactions

1) turmeric root solid alcoholic extract significantly reduced the frequency of gastric and duodenal ulacer induced by **reserpine** and **indomethacin** (PO in rats)[350]

VALERIAN

**Valeriana officinalis* root/rhizome
(fragrant valerian, all-heal, English valerian, German valerian, wild valerian, heliotrope, setwall, vandal

root, Vermont valerian; Ger.: baldrian; Fr.: herbe aux chats, valeriane; Sp.: valeriana, hierba de los gatos, raiz de gato)

Drug Interactions

1) volatile component valerenic acid increases sleeping time induced by **pentobarbital** (IP in mice)[52] while dried aqueous alkaline extract increases **thiopental** sleeping time (PO in mice)[123] and the ethanol extract prolonged thiopental anaesthesia (IP in mice)[153] due to affinity with barbiturate receptors (*in vitro*)[154]

2) due to affinity of valerian extracts and valepotriates with GABA and benzodiazepine receptor sites (*in vitro*)[154,353,354] and the diminishment in **diazepam** withdrawal effects caused by a sufficiently large dose of valepotriates (IP in rats),[362] valepotriate-containing valerian products may be helpful in withdrawal from **benzodiazepine** drugs (empirical)[166]

WATERCRESS

Nasturtium officinale plant

(scurvy grass, tall nasturtium; Ger.: brunnenkresse, wasserkresse; Fr.: cresson de Fontaine, cresson au poulet, nasilord; Sp.: berro di agua; It.: crescione di fonte; Hol.: waterkres)

Contraindications

1) **pregnancy**[7,150] due to its emmenagogue and abortifacient effects (empirical)[74]

2) **peptic ulcers** (empirical)[6,150] since its juice can cause inflammation of the stomach[7]

3) **kidney inflammation** (empirical)[6,150] since excessive or prolonged use can lead to kidney problems[7]

4) **children** under age 4 due to possible gastrointestinal upset (empirical)[6,150]

5) **prolonged use** of more than 4 weeks due to potential kidney irritation (empirical)[7]

WILD CHERRY

**Prunus serotina* bark

(wild black cherry, black choke, choke cherry, rum cherry; Ger.: kirschenstiele; Fr.: tige de cerise; Sp.: tallo de cereza)

Contraindications

1) **pregnancy** (speculative) due to its teratogenic effects and content of the cyanogenic glycoside prunisin[2]

2) **prolonged use** (speculative) due to its content of the cyanogenic glycoside prunasin[150]

WILD GINGER

Asarum canadense root/rhizome

(black snakeweed, Canada snakeroot, coltsfoot snakeroot, false coltsfoot, heart snakeroot, Indian ginger, southern snakeroot, Vermont snakeroot)

Contraindications

1) **stomach inflammation** and/or **intestinal inflammation** (empirical) [1,5,148] due to its spicey stimulant effects[5]

2) **pregnancy** due to its emmenogogue and abortifacient activities (empirical)[10,150] and the genotoxic and mutagenic effects of its constituent aristolochic acid[150]

3) **prolonged use** due to toxic and potentially carcinogenic effects of its components[150]

WILD INDIGO

**Baptisia tinctoria* plant

(American indigo, horsefly weed, indigo broom, false indigo, yellow broom, yellow indigo)

Contraindications

1) **hyperemia** (empirical)[148] due to the alkaloid baptitoxine and the phenolic glycoside baptin acting as gastrointestinal irritants[2]

2) **prolonged use** unless under the supervision of a qualified practitioner (speculative)[150] probably due to the potential toxicity (empirical)[2]

WILD MARJORAM

Origanum vulgare plant

(Ger.: wilder majoran; Fr.: marjolaine sauvage, origan vulgaire; Sp.: mejorana; It.: maggiorana)

Contraindications

1) excessive use should be avoided in **pregnancy**[2] due to its emmenagogue and abortifacient effects (empirical)[74]

WOOD SORREL

Oxalis acetosella plant

(common sorrel, cuckoo bread, green sauce, mountain sorrel, shamrock, sour trefoil, stubwort, white sorrel)

Contraindications

1) excessive internal use should be avoided in early **pregnancy**[2] due to its emmenagogue effect (empirical)[74]

WORMSEED

**Chenopodium ambrosioides* seed

(feather geranium, goosefoot, Jerusalem oak, Jesuit tea, Mexican tea, American wormseed; Ger.: wurmsamen)

Contraindications

1) **pregnancy**[2] due to the emmenogogue and abortifacient effects of the seed oil (empirical)[74,75]

2) **stomach disease** or **intestinal disease**[2] since the seed oil acts as an irritant to the alimentary tract (empirical)[2,3]
3) **heart disease**[2] since the seed oil acts as a cardiac depressant (empirical)[2,3]
4) **liver disease** since the seed oil has toxic hepatic effects (empirical)[2]
5) **repeated use** more than once of 1-3 cc of the seed oil in a one-week period[3]
6) use of seed oil alone in the **undernourished,** in **debilitated subjects,** or in very young **children**[3] due to potential toxicity[2]
7) **kidney disease** since the seed oil has renal toxic effects[2,3]

WORMWOOD

**Artemisia absinthium* plant
(Ger.: wermut, meifuss; Fr.: absinthe, armoise commune; Sp.: ajenjo, zona diri Johannes, artemisa comun; It.: artemisia, erba di San Giovanni)

Contraindications

1) **pregnancy**[2,150] due to its emmenagogue[74,150] and abortifacient effects (empirical)[15,74] from the uterine stimulant action of its thujone content (*in vitro* or in animals)[2,15]
2) **stomach ulcers** or **intestinal ulcers** (empirical)[6] due to irritation of the stomach and stimulation of the GI tract[5]
3) **prolonged use** of forms high in the essential oil such as alcoholic extracts due to toxic effects of the component thujone (empirical)[150]

YARROW

Achillea millefolium plant
(milfoil, noble yarrow, nosebleed, sanguinary, soldier's woundwort, thousandleaf; Ger.: gemeine schafgarbe, tausendaugbraum; Fr.: achilee, herbe aux charpentiers, millefeuille; Sp.: milefolio; It.: achillea,

millegoglie, erba da falegname, erba da carpentieri; Tur.: civan percemi; Ind.: roga mari, birangasifa)

Contraindications

1) **pregnancy**[2,150] due to its emmenogogue and abortifacient effects (empirical)[74,150] if the essential oil with its thujone component is used[2,15]
2) **allergic hypersensitivity** to yarrow or other Asteracea such as arnica, calendula, or chamomile (empirical)[4] based on sesquiterpene lactone content[6]

YELLOW CEDAR

**Thuja occidentalis* leaves
(arborvitae, tree of life, white cedar, swamp cedar; Ger.: abendlandischer lebensbaum; Fr.: thuya du Canada)

Contraindications

1) **pregnancy**[2,150] due to its emmenogogue and abortifacient effects (empirical)[2,7,15,74,150] and the uterine stimulant activity (*in vitro* or in animals)[74] associated with its volatile oil component thujone[2,15]
2) **prolonged use** due to its content of the toxic volatile oil component thujone[150]

YERBA MANSA

Anemopsis californica roots/rhizome
(swamp root, lizard's tail; Am. Ind.: ch'-ponip [Paiute], vavish [Pima], nupitchi [Shoshone]; Sp.: hierba del manso, babisa, hoja de babisa)

Drug Interactions

1) sedative effect of the roots and the volatile component methyleugenol (IP in rats)[53] potentiates the hypnotic action (IV in rabbits, cats, dogs or monkeys) of **thiopental, pentobarbital,**[68] and **hexobarbital**[69] and enhances the central depressant effect of **chlorpromazine**[68]

YOHIMBE

**Pausinystalia yohimbe* = *Corynanthe yohimbe* bark (yohimbehe)

Contraindications

1) **schizophrenia**[76,184] since psychotic episodes can be induced by its alkaloidal constituent yohimbine (IV in human clinical study)[76]

2) **depression**[184] since yohimbine may elicit manic-like symptoms in patients with bipolar depression (PO in human clinical study)[273] or suicidal tendencies in endogenous depressive psychosis (human case report)[76]

3) **anxiety**[344] due to its exacerbation by the alkaloidal component yohimbine (PO and IV in human clinical studies)[76,79,344]

4) **high blood pressure**[344] due to its increase by the alkaloidal component yohimbine (PO and IV in human clinical studies)[76,79,344]

5) **kidney disease**[150,184,344] due to antidiuresis caused by yohimbine (empirical)[184]

6) **prolonged use** (speculative)[80,150] due to lack of long-term toxicological and carcinogenicity studies of its potent alkaloid yohimbine[80]

7) **pregnancy** (speculative)[184,344] due to a lack of teratolgy studies[80]

8) in **elderly** patients[184] or **children** (speculative)[184,344] due to potential toxicity of yohimbine[2,184]

9) **liver disease**[150] possibly due to alteration in the metabolism of yohimbine (speculative)

10) chronic **inflammation** of **sexual organs** or **prostatitis** (empirical)[150] probably due to its α_2-adrenoceptor antagonism and the increased vascular congestion produced by yohimbine in male sexual organs[80]

11) **allergic hypersensitivity** to yohimbine[184] resulting in possible development of dermititis, acute

renal failure, and lupus-like syndrome (PO in human case report)[78]

12) **angina pectoris** and **cardiac disease** due to hypertension caused by alkaloid yohimbine (PO in human studies) in spite of traditional use of yohimbe bark for treating angina and hypertension[344]

Drug Interactions

1) hypertension may occur with yohimbine and **tricyclic antidepressants** including **clomipramine, imipramine** (IV and PO in human clinical study),[76,272] and **amitriptyline** (SC in mice)[344] while yohimbine reduces the decrease in blood pressure induced by desipramine (PO in human clinical study)[348]

2) toxicity of yohimbine due to its α_2-adrenoceptor antagonism is increased by **phenothiazines**[77] such as **chlorpromazine** (SC in mice;[344] IV in human clinical study[79]) and **promazine,** and the thioxanthene **chlorprotixene** (SC in mice) and α-adrenoceptor blocking agents such as **phenoxybenzamine** and **phentolamine** (SC in mice)[344]

3) reversal of hypotensive effects of **clonidine,**[262,263,344] and central α_2-adrenergic agonists **guanabenz** and **α-methylnorepinephrine,**[344] due to yohimbine's α_2-adrenergic antagonism (injected in rabbits and rats[262,263] and IV or PO in humans[344])

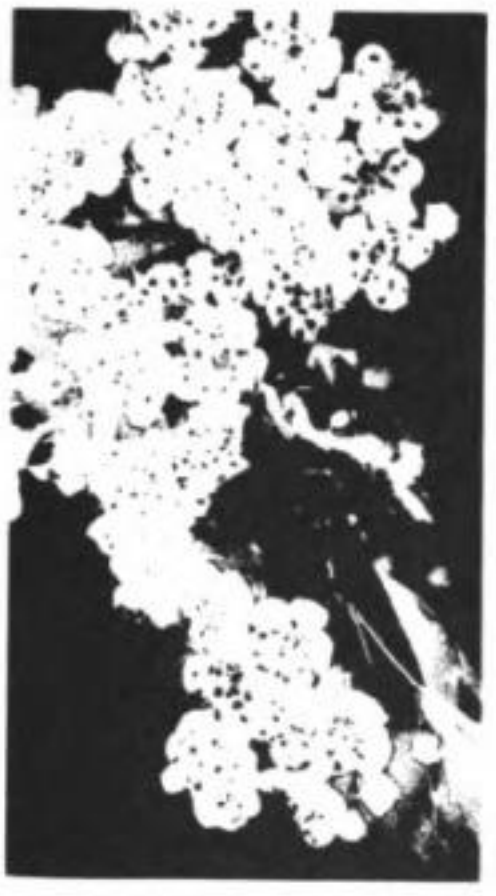
4) anxiety induced by yohimbine was blocked by **reserpine** (IV in human study)[79] and **clonidine** (PO in human studies)[344] and increased blood pressure caused by yohimbine was reduced by **reserpine, atropine,** (IV in human study)[79] **amobarbital** (IV in human study and human clinical study),[76,79] and **clonidine** (PO in human studies), though atropine in moderate to high doses increased yohimbine toxicity to some extent (SC in mice)[344]

5) may potentiate **monoamine oxidase inhibitors** (speculative)[150] and vice versa for some such as **tranylcypromine** and **phenelzine** (SC in mice)[344] though yohimbine and its isomers were shown to be only weak MAO inhibitors by themselves (*in vitro*)[274]

6) **beta-blockers** including **propranolol**, **penbutolol**, and **metoprolol** provide protection against yohimbine toxicity (in mice)[344]

7) **sympathomimetics** with central stimulant activity such as **epinephrine** (IV in human clinical study),[76] **ephedrine, amphetamines,** and **cocaine** increase yohimbine toxicity (SC in mice)[344]

8) effects of yohimbine and the narcotic antagonist **naloxone** are synergistically enhanced when used together including anxiety, nervousness, tremors, palpitations, nausea, hot and cold flashes, and increased plasma cortisol, as well as erections in male subjects (PO in human study)[347]



Appendices

Appendix A
Herbs To Be Used
With Caution

Appendix B
Herb/Drug Interactions

Appendix C
Herbs Contraindicated
For Mothers And Children

Appendix D
Vitamin/Mineral/Drug Interactions

Appendix A

HERBS TO BE USED WITH CAUTION

A.1 Due To Potential Allergic Response

While an allergic response is theoretically possible with all plants or any substance, particular species have more commonly elicited an allergic hypersensitivity reaction.

Certain medicinal plants in the aster family (Asteraceae, formerly known as Compositae) may induce a cross-sensitivity resulting in contact dermatitis or other allergic effects, often due to their content of certain sesquiterpene lactones. Allergic sensitivity to one of these plants may result in a similar sensitivity to the others in this list. A number of members of the carrot family (Apiaceae, formerly known as Umbelliferae) are also prone to causing allergic reactions such as contact dermatitis. Several genera of the **Salicaceae (S)** and individual plants of other families contain salicylates that may induce idiosyncratic reactions in susceptible individuals.

(Based on references 3, 4, 6, **10**, **63**, 64, 265, and 393.)

A.1.1 Aster Family

Arnica flowers *(*Arnica montana*)
Artichoke leaves (*Cynara scolymus*)
Blessed thistle (*Cnicus benedictus*)
Boneset (*Eupatorium perfoliatum*)
Burdock (*Arctium lappa*)
Camomile (*Anthemis cotula*)
Canada fleabane plant (*Erigeron canadensis*)
Chamomile, German flowers (*Matricaria recutita*)
Chamomile, Roman flowers (*Chamaemelum nobile*)
Chicory root (*Cichorium intybus*)
Dandelion leaves and root (*Taraxacum officinale*)

*Denotes herbs in this appendix having other side effects when taken in excessive doses.

Echinacea herb juice/root (*Echinacea* spp.)
Elecampane root (*Inula helenium*)
Feverfew (*Tanacetum parthenium*)
Goldenrod tops (*Solidago virgaurea*)
Hemp agrimony *(*Eupatorium cannabinum*)
Mugwort (*Artemisia vulgaris*)
Sagebrush leaves and tops (*Artemisia* spp.)
Spiny clot-bur plant (*Xanthium spinosum*)
Tansy tops *(*Tanacetum vulgare*)
Wormwood *(*Artemisia absinthium*)
Yarrow leaves and flowers (*Achillea millefolium*)

A.1.2 Carrot Family

Asafoetida (*Ferula* spp.)
Caraway (*Carum carvi*)
Celery (*Apium graveolens*)
Coriander (*Coriandrum sativum*)
Dill (*Anethum graveolens*)
Fennel (*Foeniculum vulgare*)

A.1.3 Salicylate-Containing Plants

Black cohosh rhizome *(*Cimicifuga racemosa*)
Meadowsweet flower (*Filipendula ulmaria = Spiraea ulmaria*)
Poplar bark and/or buds (*Populus* spp.) S
Sweet birch bark (*Betula lenta, Betula pendula*)
Willow bark (*Salix* spp.) S
Wintergreen leaves *(*Gaultheria procumbens*)

A.2 Due to Potential Photosensitizing Effect

Certain medicinal plants of the carrot family (Apiaceae, formerly known as Umbelliferae) can cause a photodermatitis in humans from sensitization of the skin to ultraviolet light due to their furanocoumarins which are similar in structure to psoralen. Furanocoumarins and other components from plants not in the carrot family can also act as photosensitizers. Use of plants containing any of these phototoxic

components should be avoided during excessive periods in sunlight or while undergoing cosmetic or therapeutic ultraviolet light exposure, especially when 8-methoxypsoralen is being taken concurrently.

(Based on references 3, 4, 6, 7, **10**, and **150**.)

A.2.1 Carrot Family

Angelica root and fruit (*Angelica* spp.)
Celery (*Apium graveolens*)
Dill (*Anethum graveolens*)
Fennel (*Foeniculum vulgare*)
Khella fruit *(*Ammi visnaga*)
Lomatium root (*Lomatium dissectum*)
Lovage root (*Levisticum officinale*)
Masterwort (*Heracleum lanatum*)
Parsley (*Petroselimum sativum*)
Queen Ann's lace (*Daucus carota*)

A.2.2 Other Plant Families

Agrimony (*Agrimonia eupatoria*)
Bergamot peel (*Citrus bergamia*)
Bitter orange peel (*Citrus aurantium*)
Buttercup plant *(*Ranunculus* spp.)
Fig (*Ficus carica*)
Goosefoot (*Chenopodium* spp.)
Lime peel (*Citrus limonia*)
Psoralea seeds *(*Cullen corylifolia* = *Psoralea corylifolia*)
Rue leaves *(*Ruta graveolens*)
St. John's wortleaves and tops (*Hypericum perforatum*)
Yarrow plant (*Achillea millefolium*)

A.3 Due to Local Irritant Effects When Fresh

Plants containing substances that can cause inflammatory reactions when handled in their fresh state should normally be dried before local application or consumption. Some of these reactions are simply due to chemical **irritation (I)**, while others are a result of allergic **contact dermatitis (CD)** or both effects simultaneously. Chemical irritants usually affect people in general, whereas compounds causing contact

dermatitis trouble those individuals who have an **allergic hypersensitivity** to those plants. For contact dermatitis prolonged or repeated contact is sometimes necessary, and a reaction usually does not occur for hours or days. Plants producing contact dermititis will usually produce inflammation even in their dried or extracted forms for those individuals who are sensitive to them.

In certain cases (for example, the *Urtica* spp. stinging nettles) irritant plants can have a beneficial therapeutic effect when specifically applied for the local reaction or when the components contained in the fresh plant produce the desired internal effect. In most accidental cases, however, the fresh plant or its juice will simply cause undesirable inflammation and/or blistering. Though not always (for example, the *Sinapis* spp. mustard seed), often the irritants in a fresh plant are converted to innocuous substances by drying. The extracts of these fresh plants can be utilized if the irritant components are not extracted in the process or if they are enzymatically converted to innocuous compounds in the extracted fluid medium. For these reasons the extract of the following irritant fresh plants or their dried forms are normally used.

Plants containing insoluble calcium oxalates can also cause local irritation on skin or mucosa exposed to the juice. (See Appendix A.4 for a listing of calcium oxalate-containing ornamental plants.)

The aster and carrot plant families each have a number of medicinal plants that may cause contact dermatitis for someone with an allergic sensitivity to another member of that family. (See Appendix A.1.1 and A.1.2 for lists of potentially problematic plants from these families.)

(Based on references 2, 5, **7**, **10**, 340, and 394.)

American cowslip plant (*Caltha palustris*) I
American pulsatilla plant *(*Anemone patens*) I, CD
Arnica flowers *(*Arnica montana*) CD
Bitter orange peels *(*Citrus aurantium*) CD
Bloodroot rhizome *(*Sanguinaria canadensis*) I, CD
Blue flag roots/rhizome *(*Iris versicolor, Iris virginica*) I
Bryony roots *(*Bryonia alba, Bryonia dioica*) I
Buttercup plant *(*Ranunculus* spp.) I

Butternut leaves *(*Juglans cinerea*) CD
Cayenne fruit *(*Capsicum frutescens*) I, CD
Celandine leaves *(*Chelidonium majus*) I, CD
Christmas rose plant *(*Helleborus niger*) I
Dock plant (*Rumex* spp.) I, CD
Fennel plant (*Foeniculum vulgare*) CD
Feverfew plant (*Tanacetum parthenium*) CD
Garlic cloves *(*Allium sativum*) I, CD
Ginger rhizome, plant (*Zingiber officinale*) CD
Ginkgo leaves (*Ginkgo biloba*) CD
Horse radish root *(*Armoracia rusticana*) I
Ipecac root *(*Cephalis ipecacuanha*) I
Larkspur plant *(*Delphinium ajacia, Delphinium virescens*) CD
Levant wormseed plant *(*Artemisia cina*) I
Liverwort plant (*Hepatica triloba, Hepatica nobilis*) I
Milkweed plant *(*Asclepias* spp.) CD
Mustard leaves or seeds *(*Sinapis* spp.) I, CD
Pipsissewa leaves (*Chimaphila umbellata*) CD
Poison ivy plant *(*Toxicodendron radicans*) CD
Poplar (*Populus* spp.) CD
Pulsatilla plant *(*Anemone pulsatilla*) I, CD
Rue plant *(*Ruta graveolens*) I
Smartweed plant *(*Polygonum hydropiper, Polygonum punctatum*) I
Spurge plant *(*Euphorbia* spp.) I, CD
Stinging nettle plant (*Urtica* spp.) I
Sundew plant (*Drosera rotundifolia*) I
Tansy plant *(*Tanacetum vulgare*) CD
Virgin's bower leaves (*Clematis virginiana*)
White cohosh plant *(*Actea* spp.) I
Wormseed seed and plant *(*Chenopodium ambrosioides*) CD
Wormwood plant *(*Artemisia absinthium*) CD

A.4 In Acute Inflammation of the Urinary Tract

Certain plants containing volatile oils or other irritant components that are partially or primarily excreted through the kidneys have been used in treating urinary tract conditions due to their diuretic and/or antimicrobial activity. However, when the renal or mucosal tissue of

the urinary tract are acutely inflamed, the irritant properties of these substances can further aggravate kidney inflammation and urinary tract discomfort. Overdoses or overuse of plants containing irritant constituents can even cause urinary tract inflammation when it does not already exist. Unless appropriate steps are taken to relieve, protect, or prevent the local inflammation, the use of plant remedies irritating to the urinary tract should be avoided.

In the case of plants containing soluble sodium or potassium oxalates, insoluble calcium oxalate crystals can be formed in the blood and deposited in the kidneys. These insoluble oxalates can mechanically injure the kidneys and cause or complicate problems in these vital organs. Though the kidneys would be most susceptible to damage when acutely inflamed, anyone with a history of kidney disease should avoid consumption of oxalate-containg herbs. Large quantities of oxalates can damage healthy kidneys. Soluble oxalates that pass through the kidneys and precipitate with calcium to form crystals in the kidney pelvis or bladder can further extend the irritation. Double boiling is one means of removing most soluble oxalates for consumption as foods. Oxalates are generally highest in fresh leaves or roots.

Plants containing insoluble calcium oxalates produce intense local irritation and swelling of the mouth, tongue, and throat, leading to speaking problems and/or suffocation. They are a common cause of oral poisoning from some common ornamental plants. Examples are caladium *(*Caladium* spp.), dumbcane *(*Dieffenbachia* spp.), elephants ear *(*Colocasia antiquorum*), hyacinth *(*Hyacinthus* spp.), jack in the pulpit *(*Arisaema triphyllum*), malanga *(*Xanthosma sagittifolium*), narcissus, jonquil and daffodil *(*Narcissus* spp.), philodendron *(*Monstera* spp.; *Philodendron* spp.), and wild calla *(*Calla palustris*).

(Based on references **1**, 2, 5, 7, **10**, **150** and 151.)

A.4.1 Urinary Irritants

Asiatic dogwood fruit (*Cornus officinalis*)
Asparagus rhizomes (*Asparagus officinalis*)
Buchu leaves *(*Barosma betulina*)
Celery seed (*Apium graveolens*)
Cinnamon bark (*Cinnamomum zeylanicum*)
Coffee seeds *(*Coffea arabica*)

Copaiba oleoresin (*Copaiba langsdorffii*)
Cubeb unripe fruit *(*Piper cubeba*)
Dill seed (*Anethum graveolens*)
Eucalyptus leaves *(*Eucalyptus* spp.)
Fragrant sumach root bark (*Rhus aromatica*)
Horse radish fresh root (*Armoracia rusticana*)
Juniper berries *(*Juniperus* spp.)
Lovage root (*Levisticum officinale*)
Myrrh gum-resin (*Commiphora myrrha, Commiphora molmol*)
Parsley fruit *(*Petroselinum sativum*)
Pennyroyal leaves *(*Hedeoma pulegioides*)
Pine needles (*Pinus* spp.)
Rue leaves *(*Ruta graveolens*)
Sandalwood bark (*Santalum album*)
Sassafras bark *(*Sassafras albidum*)
Thyme leaves *(*Thymus* spp.)
Watercress plant (*Nasturtium officinale*)
Yellow cedar leaves *(*Thuja occidentalis*)
Yerba mansa root/rhizome (*Anemopsis californica*)

A.4.2 Oxalates

Beet fresh leaves (*Beta vulgaris*)
Black haw bark (*Viburnum prunifolium*)
Chard leaves (*Beta vulgaris* v. *cicla*)
Garden rhubarb leaves *(*Rheum rhaponticum*)
Lamb's quarters fresh leaves (*Chenopodium album*)
Purslane plant (*Portulaca oleracea*)
Quillaja bark *(*Quillaja saponaria*)
Rhubarb root *(*Rheum palmatum, Rheum officinale*)
Shepherd's purse plant (*Capsella bursa-pastoris*)
Skunk cabbage root, plant *(*Symplocarpus foetidus*)
Sorrel leaves (*Rumex acetosa, Rumex acetosella*)
Spinach fresh leaves (*Spinacea oleracea*)
Wood sorrel leaves *(*Oxalis* spp.)
Yellow dock roots (*Rumex crispus, Rumex obtusifolius*)

A.5 In Gastrointestinal Irritation

For cases in which the stomach and/or the intestinal tract are extremely sensitive to agents that produce irritant or stimulatory effects, such herbs are best avoided. The sensitivity may be inherent in an individual or a result of infectious or inflammatory conditions that typically result in diarrhea. Herbal agents that could aggravate inflammation of the alimentary tract include mucosal **irritants (I)** that act locally, **bitters (B)** that increase gastric mucosal and gall bladder secretions, **emetics (E)** and stimulant **laxatives (L)** that induce muscular contractions in the gut, and drastic **purgatives (P)** that can produce inflammation themselves as a result of their own strong irritant effects. If necessary antimicrobial agents used to treat gastroenteritis have irritant properties, they can be combined with soothing demulcent agents that will help protect the gut mucosa from further irritation. If ingestion of toxic substances that produce a chemical gastroenteritis requires purgatives be used to speed their passage through the gut, saline purgatives are preferable and should be followed by demulcent agents.

Soluble oxalates also act as irritants when they form insoluble salts with calcium in the GI tract. (See Appendix A.4.2 for listings of oxalate-containing plants.)

(Based on references 1, 2, 5, 7, 148, **150**, and 344.)

Alisma rhizome (*Alisma orientale*) I
Aloes dried leaf sap *(*Aloe* spp.) L
Alum root *(*Heuchera americana*) I
American pulsatilla plant *(*Anemone patens*) I
Arnica flowers *(*Arnica montana*) I
Asafetida root (*Ferula assa-foetida*) I
Asarabacca rhizome *(*Asarum europaeum*) E
Barberry bark *(*Berberis vulgaris*) B
Bearberry leaves (*Arctostaphylos uva-ursi*) I
Beth root (*Trillium erectum*) I
Bittersweet root *(*Solanum dulcumara*) I, P
Blazing star root *(*Aletris farinosa*) I (fresh), B
Blessed thistle plant (*Cnicus benedictus*) I
Bloodroot rhizome *(*Sanguinaria canadensis*) I, E

Blue flag roots/rhizome *(*Iris versicolor*, *Iris virginica*) I, E, L
Bryony roots *(*Bryonia alba*, *Bryonia dioica*) I, P
Buckthorn fruit (*Rhamnus catharticus*) L
Buttercup plant *(*Ranunculus* spp.) I
Butternut leaves *(*Juglans cinerea*) L
Camphor tree bark *(*Cinnamomum camphora*) I
Canadian hemp roots *(*Apocynum cannabinum*, *Apocynum androsaemifolium*) I
Cascara sagrada bark *(*Rhamnus purshiana*) I, L
Castor bean oil (*Ricinus communis*) L
Cayenne fruit *(*Capsicum frutescens*) I
Celandine root and plant *(*Chelidonium majus*) I
Chinatree bark *(*Melia azedarach*) E
Christmas rose root *(*Helleborus niger*) I
Cinnamon bark *(*Cinnamomum verum*) I
Coffee seeds *(*Coffea arabica*) I
Cola seed (*Cola nitida*) I
Colocynth fruit pulp *(*Citrullus colocynthis*) I, P
Cubeb unripe fruit *(*Piper cubeba*) I
Cynomorium root (*Cynomorium songaricum*)
Dyer's weed plant (*Genista tinctoria*) E
Eucalyptus leaves *(*Eucalyptus* spp.) I
Fo ti root (*Polygonum multiflorum*) I
Frangula bark *(*Rhamnus frangula*) I, L
Gamboge bark *(*Garcinia* spp.) P
Garlic cloves *(*Allium sativum*) I
Gentian root *(*Gentiana lutea*) B
Goldenseal root *(*Hydrastis canadensis*) B
Green hellebore root *(*Veratrum viride*) I, E
Helonias rhizome (*Chamaelirium luteum*) I
Horse chestnut seeds *(*Aesculus hippocastanum*) I
Horse radish root *(*Armoracia rusticana*) I
Iceland moss lichen (*Cetraria islandica*) I
Ipecac root *(*Cephalis ipecacuanha*) I, E
Jalap root *(*Exogonium purga*) I, P
Juniper berries *(*Juniperus communis*) I
Kousso flower *(*Brayera anthelmintica*) I
Leptandra root *(*Veronicastrum virginicum*) I, E, P

Levant wormseed plant *(*Artemisia cina*) I
Lobelia plant or seeds *(*Lobelia inflata*) E
Mayapple root/rhizome *(*Podophyllum peltatum*) I, P
Meadow saffron *(*Colchicum autumnale*) I
Mustard seed *(*Brassica nigra, Brassica alba, Brassica juncea.*) I, E
Myrrh gum-resin (*Commiphora myrrha*) I
Oregon grape root bark (*Mahonia* spp.) B
Pill-bearing spurge plant (*Euphorbia pilulifera*) I
Pink pepper fruit (*Schinus molle*) I
Pleurisy root *(*Asclepias tuberosa*) I, E
Poke root *(*Phytolacca americana*) I, L
Prickly ash bark (*Zanthoxylum americanum*) I
Pulsatilla plant *(*Anemone pulsatilla*) I
Quassia wood *(*Picrasma excelsa*) B, I
Queen's root *(*Stillingia sylvatica*)
Quillaja bark *(*Quillaja saponaria*) I
Rhubarb root *(*Rheum palmatum, Rheum officinale*) I, L
Rue plant *(*Ruta graveolens*) I
Senega root *(*Polygala senega*) I
Senna leaves or pods *(*Cassia* spp.) L
Skunk cabbage root and plant *(*Symplocarpus foetidus*) I
Smartweed plant *(*Polygonum hydropiper, Polygonum punctatum*) I
Spurge plant *(*Euphorbia* spp.) I, E, P
Squill bulb leaf scales *(*Urginea maritima, Urginea indica*) I
Stavesacre seed *(*Delphinium staphisagria*) I
Surinam quassia bark (*Quassia amara*) B, I, E
Tansy plant *(*Tanacetum vulgare*) I
Thyme leaves *(*Thymus* spp.) I
Virginia snakeroot rhizomes *(*Aristolochia serpentaria*) I
Wahoo bark *(*Euonymous atropurpureus,Euonymous americanus*) B, L
White cohosh plant *(*Actea* spp.) I
Wild ginger root/rhizome (*Asarum canadense*) I
Wild indigo plant *(*Baptisia tinctoria*) E, I, L
Wintergreen leaves *(*Gaultheria procumbens*) I
Wormseed seed and plant *(*Chenopodium ambrosioides*) I
Wormwood plant *(*Artemisia absinthium*) B

Yellow cedar leaves *(*Thuja occidentalis*) I
Yellow dock root *(*Rumex crispus, Rumex obtusifolius*) I, L

A.6 In Hypothyroid Conditions or Euthyroid Goiter

Medicinal and food plants can act in several ways to reduce thyroid hormone output. Certain cruciferous and other food plants are goitrogenic. They contain glucosinolates which upon maceration release thiocyanates and isothiocyanates that reduce iodine uptake by the thyroid, which in turn lowers thyroxin output. The low blood levels of thyroxin lead to a hypothalamo-pituitary response to increase thyroid growth in response to this low output. The enlarged thyroid in most cases can absorb enough iodine to maintain an adequate hormone output. However, some cruciferous vegetable cultivars and most crucifer seeds also release the glucosinolate product oxazolidinethione which blocks iodine uptake more completely. Some plants outside the cabbage (Brassicaceae, formerly Cruciferae) family contain goitrogenic compounds of **nonglucosinolate (N)** origin. For someone already suffering from diminished thyroid function who is not on hormone replacement therapy, a further reduction in iodine absorption will aggravate the condition.

Other plants are known to have anti-goiter effects through their ability to block thyroid stimulating hormone production and/or release. Some of these also block thyroxine production and/or its conversion to triiodothyronine, the more active form. Since these plants reduce thyroid size while actively suppressing thyroid function even in the presence of iodine, they can be more disruptive with long term consumption. They can also suppress gonadotropic hormone output and further disrupt endocrine function.

(Based on references 3, 6, 161, 162, **163**, **164**, and 165.

A.6.1 Goitrogens

Abyssinian kale seeds (*Crambe abyssinica*)
Black mustard seeds *(*Brassica nigra*)
Broccoli flower buds (*Brassica oleracea* v. *italica*)
Brussels sprouts buds (*Brassica oleracea* v. *gemmifera*)
Cabbage leaves (*Brassica oleracea* v. *capitata*)
Cassava root (*Manihot esculenta*) N

Cauliflower unopened flowers (*Brassica oleracea* v. *botrytis*)
Chinese cabbage leaves (*Brassica campestris* v. *pekinensis*)
Chinese kale leaves (*Brassica oleracea* v. *alboglabra*)
Chinese mustard seeds *(*Brassica juncea*)
Collard leaves (*Brassica oleracea* v. *acephella*)
Garden cress leaves (*Lepidium sativum*)
Horse radish root (*Armoracia rusticana*)
Kale leaves (*Brassica oleracea* v. *fruticosa*)
Kohlrabi corm (*Brassica gongyloides*)
Millet seeds (*Pennisetum americanum*) N
Pak choi leaves (*Brassica campestris* v. *chinesensis*)
Radish root (*Raphanus sativus*)
Rape seed (*Brassica napus*)
Rutabaga root (*Brassica napobrassica*)
Savoy kale leaves (*Brassica oleracea* v. *sabauda*)
Soybean seeds (*Glycine max*) N
Turnip root and leaves (*Brassica rapa*)
Turnip rape seeds (*Brassica campestris* v. *oleifera*)
White mustard seed *(*Brassica alba* = *Sinapis alba*)

A.6.2 Antigoitrogens

Balm leaves *(Melissa officinalis*)
Bugleweed leaves (*Lycopus virginicus*, *Lycopus europaeus*)
Mother of thyme plant (*Thymus serpyllum*)
Stoneseed plant (*Lithospermum officinale*, *Lithospermum ruderale*)

Appendix B

HERB/DRUG INTERACTIONS

B.1 Modifying Intestinal Absorption of Medicines

High fiber diets are known to slow and/or reduce the absorption of a number of drugs. Plant parts or products containing water-soluble, hydrocolloidal fiber extracted in warm or cool water can also slow absorption of oral drugs and reduce serum nutrient levels. This action results when these types of fiber are taken with medicine or food due in part to a resulting increase in viscosity and delay or gastric emptying. They can also form a semi-permeable barrier by coating the gut mucosa. These gums and mucilages are generally insoluble in alcohol.

The use of laxative agents or caffeine sources will decrease bowel transit time and may reduce the absorption of orally-administered drugs. (See Appendix B.2.2.a for a listing of laxative herbs and B.2.2.b for caffeine-containing herbs.)

Plants and their parts which yield high quantities of tannins when extracted by hot water can precipitate alkaloids in medicinal plants *(e.g., *Atropa belladonna, Lobelia inflata*), alkaloidal drugs (e.g., ephedrine, colchicine), proteins (e.g., albumin), salicylates, iodine and iodides, and metals (e.g., zinc, iron, copper) thereby slowing, reducing or blocking their absorption. Though drug-tannin precipitates are maintained in an alkaline pH, they can dissolve in an acid environment such as the stomach. Precipitates formed with tea and nonalkaloidal phenothiazines and butyrophenones *in vitro* did not appear to effect serum levels of these drugs or behavior in patients consuming tea. The drug-tannin reaction can interfere with dosing if sources of the two compounds are combined in solution prior to administration. Unless the solution is shaken well, precipitates will settle in the bottom, leading to low or no amounts in initial doses and high or toxic amounts when the last doses from the bottle are taken. The alkaloid-tannin

*Denotes herbs in this appendix having other side effects when taken in excessive doses.

precipitates are generally soluble in mixtures containing over 15-40% alcohol. Tannins will not precipitate low concentrations of alkaloidal salts in the presence of many of the gums. (See Appendix B.1.1.) Tannin content is given below by percentages when known.

Iodine can precipitate alkaloids and tannins. Alkaloidal-iodine precipitates will, however, dissolve in an alkaline environment such as the intestines. Brown algae species are the major plant source of iodine for human consumption.

Salicylates can also precipitate some alkaloids. (See Appendix A.1.3 for a listing of plants that contain salicylates.)

Other plants can enhance the absorption of some drugs due to their local stimulation of the gastrointestinal mucosa which leads to increased local circulation and enhanced digestive secretions.

(Based on references 2, 4, 5, 7, 9, 42, 43, 44, 61, **62**, 136, 142, 145, **150**, **151**, 160, 204, 205, 206, 332, **344**, and 345.)

B.1.1 Impairment by Hydrocolloidal Fiber

Acacia tree exudate (e.g., *Acacia senegal*)
Agar powder, granules, flakes, or strips from certain red algae (e.g., *Gelidiella acerosa*, *Gelidium* spp.; *Gracilaria confervoides*)
Alginate powder from certain brown algae (e.g., *Macrocystis pyrifera*)
Aloe gel (*Aloe vera*)
Carrageenan gum from certain red algae (e.g., *Gigartina mamillosa*)
Fenugreek seed (*Trigonella foenum-graecum*)
Flax seed or meal remaining after expression of the linseed oil (*Linum usitatissimum*)
Furcellaran extract from a red algae (*Furcellaria fastigiata*)
Ghatti gum tree exudate (*Anogeissus latifolia*)
Guar gum seed endosperm (*Cyamopsis tetragonolobus*.)
Iceland moss lichen (*Cetraria islandica*)
Irish moss red algae (*Chondrus crispus*)
Karaya gum tree exudate (e.g., *Sterculia uren,, Cochlospermum gossypium*)
Konjac tuber powdered glucomannan (*Amorphophallus konjac*)
Locust bean gum from carob tree seed endosperm (*Ceratonia siliqua*)
Marshmallow root (*Althaea officinalis*)
Oat seed β-glucans (*Avena sativa*)

Okra fruit (*Hibiscus esculentus*)
Pectin powder from apple pomace (*Malus domestica*) and citrus peels (e.g., *Citrus limon*)
Psyllium seed husks (*Plantago psyllium, Plantago ovata*)
Quince seed (*Cydonia vulgaris*)
Slippery elm bark (*Ulmus fulva*)
Tragacanth gummy exudate (*Astragalus gummifer*)

B.1.2.a Selective Precipitation by Tannins

Alder bark (*Almus* spp.)
Alum root (*Heuchera americana*) 9.3-19.6%
Bayberry bark (*Myrica cerifera*)
Bearberry leaves (*Arctostaphylos uva-ursi*) 6.0-27.5%
Belleric myrobalan fruit (*Terminalia bellerica*) <17%
Betel nut *(*Areca catechu*) 11-26%
Bistort rhizome (*Polygonum bistorta*) 15-21%
Black walnut hull *(*Juglans nigra*) 44.8%
Blackberry root bark (*Rubus villosus*) 10-13%
Catechu wood extract (*Acacia catechu*) 22-50%
Chestnut leaves (*Castanea dentata, Castanea sativa*) 9%
Cranesbill rhizome (*Geranium maculatum*) 10-25%
Douglas fir bark (*Pseudotsuga taxifolia*)
French rose petals (*Rosa gallica*) 5%
Gambir leaf and shoot extract (*Uncaria gambier*) 30-35%
Hemlock spruce bark (*Tsuga canadensis*)
Kino inspissated juice (*Pterocarpus marsupium*) 30-80%
Logwood heartwood (*Hematoxylon campechianum*) 12%
Mountain laurel leaves (*Kalmia latifolia*)
Oak bark (*Quercus* spp.) 6-20%
Oak leaf galls (*Quercus infectoria*) 40-70%
Persimmon bark and unripe fruit (*Diospyros virginiana*)
Pomegranate rind (*Punica granatum*) <25.0%
Quillaja bark *(*Quillaja saponaria*) 10-15%
Raspberry leaves (*Rubus idaeus*) 13-15%
Red pine bark (*Pinus resinosa*)
Red root dried bark (*Ceanothus americanus*) 10%
Rhatany root (*Krameria* spp.) 10-15%

Rhubarb root *(*Rheum palmatum, Rheum officinale*) 4-11%
Sorrel leaves (*Rumex acetosa, Rumex acetosella*) 7-15%
Sumac leaves and fruit (*Rhus glabra*) 24-35%
Tanner's dock root (*Rumex hymenosepalus*) 30-35%
Tea leaves (*Camellia sinensis)* 12.9% (green) - 22.2% (black)
Tormentil root (*Potentilla tormentilla*) 15-20%
Tropical almond fruit (*Terminalia chebula*) 25-30%
White willow bark (*Salix alba*) 8-20%
Witchhazel leaves, bark (*Hamamelis virginiana*) 3-10%, 10%
Yellow dock root (*Rumex crispus, Rumex obtusifolius*) 12-20%

B.1.2.b Selective Precipitation by Iodine

Blackwrack thallus (*Fucus serratus*)
Bladderwrack thallus (*Fucus vesiculosus*)
Brown seaweed thallus (*Laminaria cloustoni, Laminaria saccharina*)
Dulse thallus (*Rhodymenia palmetto*)
Irish moss thallus (*Chondrus crispus*)
Kelp thallus (*Nereocystis luetkeana*)
Knobbed-wrack thallus (*Ascophyllum nodusum* = *Fucus nodosum*)
Makombu thallus (*Laminaria japonica*)
Nagakombu thallus (*Laminaria longissima*)
Rishirikombu thallus (*Laminaria ochotensis*)
Seagirdle thallus (*Laminaria digitata*)
Seaweed thallus (*Alaria esculenta*)

B.1.3 Enhancement by Pungent Herbs

Black pepper fruit (*Piper nigrum*)
Cayenne fruit (*Capsicum frutescens*)
Ginger rhizome (*Zingiber officinale*)
Long pepper fruit (*Piper longum*)

B.2 Potentiating Cardiotonic Medicines

Some plants contain steroidal cardiac glycosides similar to those contained in or derived from digitalis. By their additive effects, such glycosides can produce cardiac toxicity when used with digitalis glycosides such as digoxin, digitoxin, or similar medicines. Since they

are markedly toxic, such plant products are generally not commercially available to the public in non-homeopathic (pharmacological) dosage forms, but the plants themselves may be obtained through cultivation or wildcrafting.

Other medicinal plants that can induce toxic effects of digitaloid glycosides, such as fibrillations, include those which cause a decrease in serum potassium levels. These types of plants typically cause a significant loss of potassium in the stool when used chronically as laxatives or when consumed in large amounts. Though a few herbal diuretics cause significant potassium loss, at least one of these, dandelion leaves (*Taraxacum officinale*), also provides adequate replacement amounts of this electrolyte. Herbs containing **caffeine (C)** not only increase potassium loss, but can also increased heart rate and blood pressure.

(Based on references 1, **2**, 3, 4, 5, **6**, 7, 10, 12, **65**, 150, 306, 307, **308**, 317, and 345.)

B.2.1 Herbal Cardiotonics

Canadian hemp roots *(*Apocynum cannabinum, Apocynum androsaemifolium*)
Christmas rose roots *(*Helleborus niger*)
Grecian foxglove leaves *(*Digitalis lanata*)
Lily of the valley roots *(*Convallaria majalis*)
Oleander leaves *(*Nerium oleander*)
Pheasant's eye plant *(*Adonis vernalis*)
Pleurisy root *(*Asclepias tuberosa*)
Purple foxglove leaves *(*Digitalis purpurea*)
Squill bulb leaf scales *(*Urginea maritima, Urginea indica*)
Star of Bethlehem bulbs *(*Ornithogalum umbellatum*)
Strophanthus seeds *(*Strophanthus kombe, Strophanthus hispidus*)

B.2.2.a Stimulant Laxatives

Aloes dried leaf sap *(*Aloe* spp.)
Blue flag roots/rhizome*(*Iris versicolor, Iris virginica*)
Buckthorn fruit *(*Rhamnus catharticus*)
Butternut bark *(*Juglans cinerea*)
Cascara sagrada bark *(*Rhamnus purshiana*)

Castor bean oil (*Ricinus communis*)
Colocynth fruit pulp *(*Citrullus colocynthis*)
Frangula bark *(*Rhamnus frangula*)
Gamboge bark exudate *(*Garcinia* spp.)
Jalap roots *(*Exogonium purga*)
Leptandra root *(*Veronicastrum virginicum*)
Manna ash bark exudate (*Fraxinus ormus*)
Mayapple root *(*Podophyllum peltatum*)
Rhubarb root *(*Rheum palmatum, Rheum officinale*)
Senna leaves and pods *(*Cassia* spp.)
Wild cucumber fruit *(*Ecballium elaterium*)
Yellow dock root (*Rumex crispus, Rumex obtusifolius*)

B.2.2.b Urinary Potassium Excretion Enhancers

Cocoa seeds (*Theobroma cacao*) C
Coffee seeds *(*Coffea arabica*) C
Cola seed (*Cola nitida, Cola acuminata*) C
Guarana seeds (*Paullinia cupana*) C
Horsetail plant *(*Equisetum* spp.)
Licorice root/rhizome *(*Glycyrrhiza glabra*)
Mate leaves (*Ilex paraguayensis*) C
Tea leaves (*Camellia sinensis*) C

B.3 Potentiating Sedative or Tranquilizing Medicines

Plant products have long been used to help promote sleep, allay anxiety, and relax muscular tension or spasms. Combining such plants with tranquilizers and sedatives including antihistamines may further enhance their sedative effects. Some plant compounds without depressant effects of their own can act by simply reducing the metabolism of sedative bariturates. A number of plants or their components have been shown to prolong the hypnotic effect of barbiturates (B) in animals and /or act as agonist ligands at the benzodiazepine-GABA receptor complex (BDZ) in vitro. These effects can potentially endanger the user when the combined use further impairs cognitive, somatic, or sensory function by reducing alertness or

reaction time such as when operating a motor vehicle or working with machinery.

Extracts of the caffeine-containing herbs cola (*Cola nitida*), guarana (*Paullinia cupana*), and mate (*Ilex paraguayensis*) have been shown to interact with central benzodiazepine receptors, but their caffeine content counteracts their potential sedative effects.

(Based on references 3, 5, 7, 23, 51-53, 57-60, **65**-67, 111, 123-125, 137, 152-154, 159, 166, 169, 207, 295, **327**, **353**, and 354.)

Ashwagandha root (*Withania somnifera*) B
Balm plant (*Melissa officinalis*) B
Black cohosh roots/rhizome *(*Cimicifuga racemosa*)
Calendula flowers (*Calendula officinalis*) B
California poppy plant (*Eschscholtzia californica*) B
Catnip leaves (*Nepeta cataria*) B
Cayenne fruit[a] *(*Capsicum frutescens*) B
Chamomile, German flowers (*Matricaria recutita*) BDZ
Hops strobiles (*Humulus lupulus*) B
Jamaica dogwood bark *(*Piscidia erythrina*)
Kava root *(*Piper methysticum*) B
Lavender leaves and flowers (*Lavandula officinalis*)
Motherwort plant (*Leonurus cardiaca*)
Passion flower plant (*Passiflora incarnata*) B, BDZ
Sassafras bark *(*Sassafras albidum*) B
Siberian ginseng root (*Eleutherococcus senticosus*) B
Skullcap plant (*Scutellaria lateriflora*)
St. John's wort plant (*Hypericum perforatum*)
Valerian root/rhizome *(*Valeriana officinalis*) B, BDZ
Wild lettuce plant (*Lactuca virosa*)
Yerba mansa root/rhizome (*Anemopsis californica*) B

Note

a. Acute use of cayenne increases hexobarbital hypnotic effects and plasma concentration, but chronic use actually decreases its effects and concentration.[207]

B.4 Modifying Blood Sugar In Insulin-Dependent Diabetics

A number of plants have a documented ability to lower blood sugar levels through a variety of mechanisms. For those plants the oral hypoglycemic activity has been confirmed for an extract or an identified constituent. These herbs are usually administered in type II diabetes (non-insulin-dependent). Insulin-dependent diabetics (type I) must monitor their blood sugar carefully to prevent hyperglycemic and hypoglycemic episodes. The combined effect of hypoglycemic herbs with insulin treatment may lower blood sugar levels and could potentially result in insulin shock.

Other plants act as hydrocolloidal fiber sources that when taken in large quantities can delay gastric emptying and reduce the rate of absorption of dietary carbohydrates. (See Appendix B.1.1 for a listing of plants with a high content of soluble fiber.)

Hyperglycemic herbs act to raise blood sugar. In this case, aside from plants high in sugar or other carbohydrates, commonly-used plants are limited to a few species, most of which contain **caffeine (C)**.

(Based on references 3, 4, **8**, 10, 34, 35, 41, 88, **89**, 90, 91, 92, 93, 109, 114, 116, 126, 127, 128, 129, 130, 183, 305, 318, **319**, 338, 339, 341, **342**, and 355-357.)

B.4.1 Hypoglycemic Herbs

Aceitilla plant (*Bidens pilosa*)
Adiantum plant (*Adiantum capillus-veneris*)
Agrimony leaves *(Agrimonia eupatoria*)
Akee unripe fruit and seeds *(*Blighia sapida*)
Aloe gel (*Aloe vera*)
Aloes dried exudate (*Aloe* spp.)
Banana flowers and roots (*Musa sapientum*)
Banyan stem bark *(*Ficus bengalensis*)
Barley sprouts (*Hordeum vulgare*)
Barleria plant (*Hygrophila auriculata*)
Bilberry leaves (*Vaccinium myrtillus*)
Bitter melon fruit (*Momordica charantia*)
Box thorn leaves (*Lycium barbarum*)
Bugleweed plant (*Lycopus virginicus*)
Burdock roots (*Arctium lappa*)

Carob bean gum (*Ceratonia siliqua*)
Cashew leaves (*Anacardium occidentale*)
Catarinita flowers (*Salpianthus arenarius*)
Coccinia roots (*Coccinia grandis*)
Copalchi root bark (*Coutarea latiflora*)
Corn silk stigmas (*Zea mays*)
Cucumber fruit (*Cucumis sativus*)
Cumin seed (*Cuminum cyminum*)
Damiana leaves (*Turnera diffusa*)
Dandelion plant (*Taraxacum officinale*)
Devil's club root bark (*Fatsia horrida* = *Oplopanax horridum*)
Eucalyptus leaves (*Eucalyptus globulus*)
Fenugreek seeds (*Trigonella foenum-graecum*)
Fluggea seeds (*Securinega virosa*)
Fo ti root (*Polygonum multiflorum*)
Garlic cloves *(*Allium sativum*)
Ginseng roots (*Panax ginseng*)
Goat's rue seeds (*Galega officinalis*)
Guar gum seeds and pods (*Cyamopsis tetragonolobus*)
Guarumo leaves and stem (*Cecropia obtusifolia*)
Gulancha plant (*Tinospora cordifolia*)
Gurmar leaves (*Gymnema sylvestre*)
Horse chestnut seeds (*Aesculus hippocastanum*)
Injerto flowers, leaves, and stem (*Psittacanthus calyculatus*)
Ivy gourd leaves (*Coccinia indica*)
Jambul seeds (*Syzygium cumini*)
Juniper berries (*Juniperus communis*)
Jute leaves (*Corchorus olitorius*)
Kidney bean immature pods (*Phaseolus vulgaris*)
Konjac tubers (*Amorphophallus konjac*)
Lagerstroemia leaves and ripe fruit (*Lagerstroemia speciosa*)
Lotus roots (*Nymphaea lotus*)
Lupin seeds (*Lupinus albus*)
Madagascar periwinkle leaves (*Vinca rosea*)
Maitake mushroom fruiting bodies (*Grifola frondosa*)
Mulberry leaves (*Morus* spp.)
Olive leaves (*Olea europaea*)
Onion bulbs (*Allium cepa*)

Phyllanthus leaves *(Phyllanthus niruri)*
Psyllium seed (*Plantago psyllium, Plantago ovata*)
Prickly pear stems (*Opuntia* spp.)
Reishi mushroom fruit bodies (*Ganoderma lucidum*)
Rivea leaves (*Argyreia cuneata*)
Sacred basil plant (*Ocimum sanctum*)
Salt bush leaves (*Atriplex halimus*)
Siberian ginseng root (*Eleutherococcus senticosus*)
Solomon's seal root (*Polygonatum multiflorum*)
Spinach leaves (*Spinacea oleracea*)
Staghorn sumach leaves *(Rhus typhina)*
Sweet broom plant (*Scoparia dulcis*)
Thorny burnet root bark (*Sarcopoterium spinosum*)
Tronadora leaves (*Tecoma stans*)
Wheat leaves (*Triticum sativum*)
White button mushroom fruit body (*Agaricus bisporus*)
White lupin seeds (*Lupinus albus*)
White mulberry leaves (*Morus alba*)
Willowstrife plant (*Lythrum salicaria*)

B.4.2 Hyperglycemic Herbs

Annato seeds (*Bixa orellana*)
Cocoa seeds (*Theobroma cacao*) C
Coffee seeds *(*Coffea arabica*) C
Cola seeds (*Cola nitida, Cola acuminata*) C
Guarana seeds (*Paullinia cupana*) C
Ma huang plant *(*Ephedra sinica*)
Mate leaves (*Ilex paraguayensis*) C
Rosemary leaves (*Rosmarinus officinalis*)
Tea leaves (*Camellia sinensis*) C

B.5 Modifying the Effects of Prothrombopenic Anticoagulants

Bishydroxycoumarin (Dicoumarol®), warfarin (Coumadin®), and acenocoumarol are equivalent representative compounds used to compete with vitamin K and inhibit the hepatic production of

prothrombin, an essential coagulation factor. Any influences that decrease vitamin K or decrease coagulation in other ways would enhance the effect of these prothrombin-lowering (prothrombopenic) anticoagulants. This could result in serious bleeding tendencies or frank hemorrhage. Vitamin K levels can be diminished by the use of potent broad-spectrum antibiotics and oral sulfonamides that can disrupt the bacterial flora of the intestines which manufactures most of the vitamin K that humans absorb. However, herbal antiseptics are not known to be potent enough with normal usage to result in eradication of the vitamin K-producing flora.

Most problems involving using herbs with anticoagulants seem to arise from coumarin-containing plants which have an additive effect with pharmaceutical coumarin anticoagulants or with herbs that inhibit platelet aggregation. Simultaneous consumption of grapefruit juice slows down the metabolism of coumarin and enhances the risk of increasing hemorrhagic potential. Generally, relatively large doses of these herbs or their combinations need to be used for a prolonged period before bleeding tendencies can occur. In combination with potent prothrombopenic anticoagulants there is a greater potential risk, but consumption of large amounts of these herbs would probably still be required to have a significant risk. In cases of excessive use even combining them with other pharmaceuticals anticoagulants such as aspirin (acetylsalicytic acid) can be dangerous. However, natural sources of salicylates seem to lack aspirin's effect of inhibiting platelet aggregation. (See Appendix A.1.3 for a list of salicylate-containing plants.)

In instances where vitamin K levels are increased, the anticoagulant effects of coumarin-type drugs are diminished. Regular consumption of large amounts of vitamin K-containing plants, mostly green leafy vegetables, can lead to increased risk of clotting for those on blood-thinning medication. A single large serving of vitamin K-rich vegetables usually does not alter the anticoagulant effects of warfarin significantly, but their consumption daily for one week typically changes the required therapeutic dosage. The potential for embolic strokes or myocardial infarction could be enhanced if anticoagulant agents such as warfarin were rendered ineffective.

(Based on references 10, **31**-33, 65, 104, 131, 132, 143, 150, 168,

194-196, 202, 209, 271, 279-285, 289-294, 297-299, 302-304, 318, 320, 331, **345**, 351, and 352.)

B.5.1.a Potentiation by Coumarin-Containing Plants

Horse chestnut bark *(*Aesculus hippocastanum*)
Sweet clover plant *(*Melilotus officinalis, Melilotus alba*)
Sweet vernal grass leaves (*Anthoxanthum odoratum*)
Sweet-scented bedstraw plant (*Galium triflorum*)
Tonka bean seeds (*Dipteryx odorata, Dipteryx oppositifolia*)
Vanilla leaf leaves (*Trilisa odoratissima*)
Woodruff plant (*Asperula odorata*)

B.5.1.b Potentiation by Platelet Aggregation Inhibitors

Bromelain from fruit and stem (*Ananas comosus*)
Cayenne fruit *(*Capsicum frutescens*)
Chinese skullcap root (*Scutellaria baicalensis*)
Dan shen root (*Salvia miltiorrhiza*)
Garlic bulbs *(*Allium sativum*)
Ginger rhizome (*Zingiber officinale*)
Ginkgo leaves (*Ginkgo biloba*)
Onion plant (*Allium cepa*)
Papain from leaves and unripe fruit (*Carica papaya*)
Reishi fruit bodies (*Ganoderma lucidum*)
Turmeric root (*Curcuma longa, Curcuma aromatica*)

B.5.2 Antagonism by Plants High in Vitamin K

Alfalfa plant (*Medicago sativa*)
Beet root and greens (*Beta vulgaris*)
Broccoli flower buds (*Brassica oleracea* v. *italica*)
Brussels sprouts buds (*Brassica oleracea* v. *gemmifera*)
Cabbage leaves (*Brassica oleracea* v. *capita*)
Chinese cabbage leaves *(Brassica campestris* v. *pekinensis*)
Collard leaves (*Brassica oleracea* v. *acephala*)
Corn silk stigmas (*Zea mays*)
Kale leaves (*Brassica oleracea* v. *fruticosa*)
Lettuce leaves (*Lactuca sativa*)

Parsley leaves (*Petroselinum crispum*)
Plantain leaves (*Plantago major*)
Shepherd's purse (*Capsella bursa-pastoris*)
Smartweed plant *(*Polygonum hydropiper, Polygonum punctatum*)
Spinach leaves (*Spinacea oleracea*)
Stinging nettles plant (*Urtica* spp.)
Turnip leaves (*Brassica rapa*)
Watercress (*Nasturtium officinale*)

B.6 Concerning Incompatible Gastrointestinal Tract Medications

Incompatible remedies are those with activites that operate at cross purposes with one another. In other words they are not suitable for use in combination or with simultaneous administration. The incompatibility may be chemical such as the combination of alkaloids with tannins which results in precipitation. (See Appendix B.1.2.a.) Physiologic incompatibility results between compounds with antagonistic influence on normal function such as pharmacologic prothrombopenic anticoagulants and dietary vitamin K. (See Appendix B.5.) Therapeutic incompatibility occurs when there is opposition in the therapeutic effect between medicines. It is this type of interaction of medicines acting in the gastrointestinal tract that is considered here.

Several categories of remedies seem to have specific therapeutic incompatibility when used to treat conditions of the gastrointestinal tract. The administration of stimulant laxatives (See Appendix B.2.2.a.) is intended to enhance colon evacuation by increasing peristalsis and the fluidity of bowel contents. The secretion of water and electrolytes into the bowel are necessary to obtain an effective outcome. Oral consumption of tannin-containing astringent herbs (See Appendix B.1.2.a.) has traditionally been used in part to diminish fluid loss from the intestinal tract in cases of severe diarrhea or dysentery. The concurrent use of laxative and astringent herbs would tend to diminish the effects of one or the other, depending on which had the more dominant dose. The fact that laxative anthranoid compounds coexist with tannins in certain herbs (e.g., rhubarb root (*Rheum palmatum, Rheum officinale*) and yellow dock root (*Rumex crispus, Rumex obtusifolius*) provides a natural modification of the laxative

effect. The laxative action takes greater predominance in the rhubarb which has both more potent anthroquinone derivatives and less tannins than yellow dock. Such therapeutic opposition is generally not intended when combining separate agents, unless a modified effect is desired for a particluar reason.

A more likely case of inadvertent combining of incompatible gastrointestinal remedies occurs with medications for the treatment of "heartburn," acid indigestion, and peptic ulcers. Such antipeptic medicines are consumed by a relatively large proportion of the population in modern Western nations and urban centers worldwide. These medications include antacids and gastric acid secretion inhibitors, particularly histamine H_2 receptor antagonists. The use of such agents together with herbs which have a reputation for enhancing stomach acid secretion would be counterproductive and in most cases inadvisable. The identification of herbs that enhance gastric acid is based mainly on their empirical use as bitter stomachics acting through vagal cholinergic stimulation or as pungent condiments whose irritative mucosal effects induce peptic secretions.

(Based on references 3, 5, 7, 10, 149, **243**, 313-315, and 332.)

B.6.1 Stomach Acid-Secretion Stimulants

American centaury plant (*Sabatia angularis*)
Angelica plant, root (*Angelica archangelica*)
Barberry bark *(*Berberis vulgaris*)
Bitter orange peel (*Citrus aurantium* ssp. *amara*)
Black pepper fruit (*Piper nigrum*)
Blazing star root (*Aletris farinosa*)
Blessed thistle plant (*Cnicus benedictus*)
Buckbean leaves (*Menyanthes trifoliata*)
Calamus root *(*Acorus calamus*)
Cayenne fruit *(*Capsicum frutescens*)
Cinchona bark *(*Cinchona* spp.)
Cinnamon bark (*Cinnamomum verum*)
Coffee seeds *(*Coffea arabica*)
Cola seed (*Cola nitida, Cola acuminata*)
Colomba root (*Jateorhiza palmata*)
Corydalis *root (Dicentra canadensis*)
Cubeb unripe fruit *(*Piper cubeba*)

European centaury flowering plant (*Centaurium umbellatum*)
Dandelion root (*Taraxacum officinale*)
Devil's claw root and tubers (*Harpagophytum procumbens*)
Galangal root (*Alpinia galanga*)
Gentian root *(*Gentiana lutea*)
Ginger rhizome (*Zingiber officinale*)
Goldenseal root *(*Hydrastis canadensis*)
Goldthread root (*Coptis trifolia*)
Guarana seeds (*Paullinia cupana*)
Horseradish root (*Armoracia rusticana*)
Ironweed root (*Vernonia fasiculata*)
Jamaican quassia bark *(*Picrasma excelsa*)
Mate leaves (*Ilex paraguayensis*)
Mustard seed *(*Brassica nigra, Brassica juncea, Brassica alba*)
Prickly ash bark (*Zanthoxylum americanum, Zanthoxylum Clava-herculis*)
Quassia bark (*Quassia amara*)
Tobacco leaves *(*Nicotiana tabacum*)
Virginia snakeroot rhizome *(*Aristolochia serpentaria*)
Wormwood tops, leaves *(*Artemisia absinthium*)
Yarrow flowering plant (*Achillea millefolium*)

Appendix C

HERBS CONTRAINDICATED FOR MOTHERS AND CHILDREN

C.1 During Pregnancy

The use of plants or other substances affecting normal or abnormal functions in the human body should not be used during pregnancy unless there is a known need for such agents. Indiscriminate experimentation with herbal or chemical drugs or medicines is an irresponsible act, particularly when it endangers the life, health, and future of a vulnerable and defenseless life carried in the womb. Trained doctors, pharmacists, or practitioners knowledgeable in the art and science of prescribing should be consulted for information, advice, or instructions on the appropriate use of medicinal agents, most especially during pregnancy.

Pregnancy is a special time, when ordinary influences can have extraordinary consequences. Uterine contractions or significant changes in uterine tone can have disastrous effects, since carrying a baby to term necessitates stability. Alterations in uterine circulation may disrupt normal processes. Rapid system and organ growth is especially vulnerable to substances that interfere with cellular division. Abnormal hormonal influences may result in permanent developmental alterations.

Plants that have been used down through the centuries in treating women's reproductive functions have demonstrated distinctive effects on the uterus. Those that enable the onset of menstruation are known as **emmenogogues (E)**. Those that have induced miscarriages are called **abortifacients (A)**. The knowledge of these effects is through empirical observations and applications. If *in-vitro* or animal research has shown that plants cause uterine contractions, they are termed **uterine stimulants (US)**. Plants acting as uterine stimulants that have been used empirically to enhance or speed labor are known as

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*Denotes herbs in this appendix having other side effects when taken in excessive doses.

oxytocics (O). All of the above types of plants may disrupt pregnancy by expelling the embryo or fetus prematurely or by partially shearing the placenta from the uterus, leading to uterine hemorrhage and/or fetal, and possibly maternal, death. Certain **uterine relaxants (UR)** that empirically or through animal research have been shown to diminish spasms may also reduce uterine tone or interfere with effective labor.

Relatively large quantities of plant substances that stimulate the uterus are usually needed to produce undesirable effects in pregnancy. Sometimes even toxic amounts must be taken. In cases where a toxic excess of irritant volatile antiseptics for the urinary tract or of irritant cathartics for the intestinal tract is used, uterine stimulation may occur reflexively.

Other plants can influence normal cellular reproduction. Substances that interfere with the mother's hormonal balance or fetal genetic expression can disrupt fetal development. In the cases of gender-specific reproductive organs, plants shown in humans or animals to cause **hormonal (H)** changes may alter normal expression. **Mutagens (M)** and **genotoxins (G)** can likewise disturb normal growth as shown by *in vitro* studies. **Teratogens (T)** have been shown to interfere with normal development of a multiplicity of growing structures, and plants with **fetotoxins (F)** endanger the very life of the developing child. In cases where these effects occur, birth defects are a possible unfortunate result.

In many cases parts of the plant itself or its extracts are known to have the above-mentioned effects, but in some instances only isolated **components (c)** of the plant have been shown to demonstrate a particular activity. In the cases where only an isolated constituent has shown activity, the use of the crude plant part or extract is probably safe in reasonable quantities.

For some herbs no particular qualifying activity is given as a reason for their being listed here as contraindicated in pregnancy. These herbs were designated as "not to be used during pregnancy" in reference 150 with no further explanation. Other reference sources suggest no specific reasons for such a designation in these cases, other than potential toxicity from excessive doses for some of the herbs.

(Based on references 1, **2**, 3, 4, 6, 7, 10, **74**, 75, 144, 148, **150**, 234 and 344.)

Achyranthes root (*Achyranthes bidentata, Achyranthes longifolia*) E
Agave plant (*Agave americana*) E, A
Alfalfa plant (*Medicago sativa* var. *italica*) USc, H
Alkanet root (*Alkanna tinctoria*) F
Aloes dried leaf sap *(*Aloe* spp.) E, A; G, M
American mistletoe leaves and stems (*Phoradendron flavescens*) A
Amolillo roots (*Glycyrrhiza lepidota*) E; H
Andrographis plant (*Andrographis paniculata*) A
Angelica plant and root (*Angelica archangelica*) E
Anise (fruit) (*Pimpinella anisum*) H
Arnica flowers *(*Arnica montana*) US
Asafetida root (*Ferula assa-foetida*) Ec, A
Asarabacca rhizome *(*Asarum europaeum*) Gc, Mc
Ashwagandha root (*Withania somnifera*) A
Balm leaves and flowers (*Melissa officinalis*) E; H
Ban xia rhizome (*Pinellia ternata*)
Barberry root bark *(*Berberis vulgaris*) USc
Barley sprouts (*Hordeum vulgare*)
Basil plant (*Ocimum basilicum*) E; Mc
Bearberry leaves (*Arctostaphylos uva-ursi*) O
Beet seeds, root, and leaves (*Beta vulgaris*) E, A
Betel nut seed *(*Areca catechu*) T, F
Beth root (*Trillium erectum*) E
Bitter melon fruit (*Momordica charantia*) E, A
Black cohosh roots/rhizome *(*Cimicifuga racemosa*) US; H
Black horehound leaves and flowers (*Ballota nigra*) E
Black pepper fruit (*Piper nigrum*) A
Bladderwrack thallus (*Fucus vesiculosus*) H
Blazing star root *(*Aletris farinosa*) US,UR
Blessed thistle plant (*Cnicus benedictus*)
Bloodroot rhizome *(*Sanguinaria canadensis*) US
Blue cohosh root (*Caulophyllum thalictroides*) A, E, USc
Blue flag roots/rhizome *(*Iris versicolor, Iris virginica*)
Blue lobelia plant *(*Lobelia siphilitica*)
Boneset plant (*Eupatorium perfoliatum*) A
Borage leaves (*Borago officinalis*) F, M
Buchu leaves *(*Barosma betulina*)
Buckthorn fruit *(*Rhamnus catharticus*) G, M

Bugleweed leaves (*Lycopus virginicus, Lycopus europaeus*) H
Burdock root (*Arctium lappa*) US, O
Butterbur rhizome *(*Petasites hybridus*) E; G
Buttercup plant *(*Ranunculus* spp.) USc
Butternut bark *(*Juglans cinerea*)
Calamus root *(*Acorus calamus*) E
Calendula flowers (*Calendula officinalis*) E, A
California poppy plant (*Eschscholtzia californica*) USc
Camphor tree bark *(*Cinnamomum camphora*) Ec; Fc
Capillary artemisia plant (*Artemisia capillaris*)
Cardamom seeds (*Elettaria cardamomum*) E
Cascara sagrada bark *(*Rhamnus purshiana*) G, M
Cassia cinnamon bark (*Cinnamomum cassia*) E, A
Castor bean oil (*Ricinus communis*) E, A
Catnip leaves and flowers (*Nepeta cataria*) E, A
Celandine root and plant *(*Chelidonium majus*) US
Celery root and seeds (*Apium graveolens*) E, US, A
Chamomile, German plant (*Matricaria recutita*) E
Chamomile, Roman flowers and plant (*Chamaemelum nobile*) E, A
Chaste tree berries (*Vitex agnus-castus*) E; H
Chervil plant (*Anthriscus cerefolium*)
Chicory root (*Cichorium intybus*) E, A
Chinese cucumber root (*Trichosanthes kirilowii*) A
Chinese motherwort fruit, plant (*Leonurus heterophyllus, Leonurus sibiricus*) E
Chinese wormwood plant (*Artemisia annua*)
Christmas rose plant *(*Helleborus niger*) E
Cinchona bark *(*Cinchona* spp.) US, Oc, A; T, Fc
Cinnamon bark (*Cinnamomum zeylanicum*) Ec
Coca leaves *(*Erythroxylon coca*) E; F
Coffee seeds *(*Coffea arabica*) Ac; Tc
Cola seeds (*Cola nitida, Cola acuminata*)
Colocynth root and fruit pulp *(*Citrullus colocynthis*) A
Coltsfoot leaves *(*Tussilago farfara*) A, F
Columba root (*Jateorhiza palmata*) USc
Comfrey root *(*Symphytum officinale*) H, F
Corydalis rhizome (*Corydalis yanhusuo*) E
Cotton root bark (*Gossypium herbaceum*) E, O, A

Croton seed oil *(*Croton tiglium*) A
Cyathula root (*Cyathula officinalis*)
Dill fruit (*Anethum graveolens*) E
Dong quai root (*Angelica sinensis*) US, UR
Dormilon plant (*Rudbeckia hirta*) E
Dulse thallus (*Rhodymenia palmetto*) H
Dyer's weed plant (*Genista tinctoria*) USc
Elecampane root (*Inula helenium*)
English yew leaves *(*Taxus baccata*) E, A
Ergot sclerotium on rye kernerls *(*Claviceps purpurea*) E, US, O, A
European pennyroyal plant (*Mentha pulegium*) E
Fennel fruit (*Foeniculum vulgare*) E; H
Fenugreek seed (*Trigonella foenum-graecum*) E, US, A
Feverfew plant (*Tanacetum parthenium*) E
Flax seeds *(*Linum usitatissimum*) E
Forsythia fruit (*Forsythia suspensa*) E
Frangula bark *(*Rhamnus frangula*) US; G, M
Fritallary bulb (*Fritillaria* spp.)
Garlic bulbs *(*Allium sativum*) E, US
Ginger rhizome[a] (*Zingiber officinale*) A
Goldenseal root/rhizome *(*Hydrastis canadensis*) USc
Goldthread rhizome (*Coptis chinensis, Coptis groenlandica*) E
Gotu kola plant (*Centella asiatica*) E
Guggul gum-resin (*Commiphora mukul*) E, A
Helonias rhizome (*Chamaelirium luteum*) E
Hemp agrimony plant *(*Eupatorium cannabinum*) E, A; F
Henna leaf (*Lawsonia inermis*) A
Hibiscus flowers (*Hibiscus rosa-sinensis*) E, A
Horehound plant (*Marrubium vulgare*) E, US, A
Horse radish fresh root (*Armoracia rusticana*) A
Hyssop plant (*Hyssopus officinalis*) E, A
Inmortal root *(*Asclepias capricornu*) E, O, A
Ipecac root *(*Cephalis ipecacuanha*) USc
Jaborandi leaves *(*Pilocarpus jaborandi*) US; T
Jalap root *(*Exogonium purga*) E
Job's tears seeds (*Coix lacryma-jobi*)
Joe-Pye weed root (*Eupatorium purpureum*) A
Jujube seeds (*Ziziphus spinosa*) E

Juniper berries and leaves *(*Juniperus* spp.) E, US
Kava root *(*Piper methysticum*) UR
Kelp thallus (*Nereocystis luetkeana*) H
Khella fruit *(*Ammi visnaga*) E, US
Kousso flower *(*Brayera anthelmintica*) A
Knot grass plant (*Polygonum aviculare*) A
Lavender flowers (*Lavandula officinalis*) E
Lemon grass plant (*Cymbopogon citratus*) E, US
Leptandra root *(*Veronicastrum virginicum*) A; T
Levant wormseed plant *(*Artemisia cina*) Fc
Licorice root/rhizome *(*Glycyrrhiza glabra*) E; H
Life root plant *(*Senecio aureus*) E, O; T
Liverwort plant (*Hepatica nobilis*)
Lobelia plant or seeds *(*Lobelia inflata*) UR
Lomatium root (*Lomatium dissectum*)
Long birthwort root, rhizome or plant *(*Aristolochia clematitis*) Mc,Gc
Lovage root (*Levisticum officinale*) E
Lycium berry or root bark (*Lycium barbarum*, *Lycium chinense*)
Ma huang plant *(*Ephedra sinica*) US
Madder root (*Rubia tinctorum*) E; G
Magnolia bark (*Magnolia officinalis*)
Maidenhair fern plant (*Adiantum pedatum*)
Male fern rhizome *(*Dryopteris filix-mas*) A
Mallow plant (*Malva* spp.) E
Marjoram plant (*Origanum marjorana*) E
Marsh tea plant *(*Ledum palustre*) US, A
Masterwort plant (*Heracleum lanatum*) E
Mate leaves (*Ilex paraguayensis*) Tc
Mayapple root/rhizome *(*Podophyllum peltatum*, *Podophyllum emodi*) T, Fc
Meadow saffron *(*Colchicum autumnale*) M,F
Milk thistle seed[b] (*Silybum marianum*) E
Ming dang shen root (*Changium smyrnoides*)
Mistletoe plant *(*Viscum album*) USc
Monarda plant (*Monarda* spp.) E; Mc
Motherwort plant (*Leonurus cardiaca*) USc, E
Mugwort plant (*Artemisia vulgaris*) E, USc, A
Mustard seed *(*Brassica nigra*, *Brassica juncea*, *Brassica alba*) E, A

Myrrh gum-resin (*Commiphora myrrha, Commiphora molmol*) E, A
Nard root (*Nardostachys jatamansi*) E
Nutmeg seeds *(*Myristica fragrans*) A
Ocotillo stem (*Fouquieria splendens*)
Opium poppy seed capsule exudate *(*Papaver somniferum*) Fc
Oregon grape root (*Mahonia* spp.)
Osha root (*Ligusticum porterii*) E, A
Papaya fruit and latex (*Carica papaya*) E, A
Pareira root (*Chondodendron tomentosum*) E
Parsley fruit or root *(*Petroselinum sativum*) E, USc, A
Passion flower leaves (*Passiflora incarnata*) USc; Fc
Peach pit seeds *(*Prunus persica*) E, A; Fc
Pennyroyal plant *(*Hedeoma pulegioides*) E, A
Peony root (*Paeonia officinalis*) E
Peppermint leaves (*Mentha piperita*) E
Periwinkle plant *(*Vinca rosea*) A; T
Phellodendron bark (*Phellodendron amurense, Phellodendron chinense*)
Pine needles (*Pinus* spp.) A
Pleurisy root *(*Asclepias tuberosa*) US; H
Poison hemlock plant *(*Conium maculatum*) T
Pokeweed root *(*Phytolacca americana*) US
Poleo plant (*Mentha arvensis*) E, A
Poleo chino leaves (*Hedeoma oblongifolia*) E, A
Pomegranate root bark *(*Punica granatum*) E, US
Prickly ash bark (*Zanthoxylum americanum, Zanthoxylum clava-herculis*) E
Psoralea seed *(*Cullen corylifolia = Psoralea corylifolia*) A
Pulsatilla plant *(*Anemone pulsatilla*) US
Purslane plant (*Portulaca oleracea*)
Quassia bark (*Picrasma excelsa*)
Queen Ann's lace seeds and leaves (*Daucus carota*) E, US, A
Raspberry leaves (*Rubus idaeus*) US; H
Rauwolfia root *(*Rauwolfia serpentaria*) USc, A; T
Red clover plant or flower (*Trifolium pratense*)
Rhubarb root *(*Rheum palmatum, Rheum officinale*) US; G, M
Rockweed thallus (*Fucus* spp.) H
Rosemary leaves (*Rosmarinus officinalis*) Ec, A

Rue leaves and unripe fruit *(*Ruta graveolens*) E, USc, A
Safflower flower (*Carthamus tinctorius*) E, A
Saffron stigma and styles *(*Crocus sativus*) E, A
Sage leaves *(*Salvia officinalis*) E, A
Sagebrush plant (*Artemisia* spp.) E, A
Sanchi ginseng root (*Panax notoginseng*)
Sandalwood wood (*Santalum album*) A
Sassafras bark *(*Sassafras albidum*) E
Savin tops *(*Juniperus sabina*) A
Scotch broom tops *(*Cytisus scoparius*) USc, Ac
Scouring rush plant (*Equisetum hyemale*)
Seaweed thallus (*Laminaria* spp.) H
Senega root *(*Polygala senega*) US
Senna leaves or pods[c] *(*Cassia* spp.) US; G, M
Sete sangrias plant (*Cuphea balsamona*)
Shepherd's purse plant (*Capsella bursa-pastoris*) E, US, A
Silk tree bark (*Albizia julibrissin*) E
Southernwood plant (*Artemisia abrotanum*) E
Spikenard rhizome (*Aralia* spp.)
St. John's wort plant (*Hypericum perforatum*) E, US, A
Stinging nettle plant (*Urtica* spp.) E, USc, A
Strophanthus seed *(*Strophanthus* spp.) USc
Surinam quassia bark (*Quassia amara*)
Szechuan lovage rhizome (*Ligusticum chuanxiong*)
Szechuan pepper fruit rind (*Zanthoxylum simulans, Zanthoxylum bungeanum*)
Tansy leaves *(*Tanacetum vulgare*) E, USc, A
Tea leaves (*Camellia sinensis*) Tc
Thyme leaves *(*Thymus* spp.) E
Tobacco leaves *(*Nicotiana tabacum*) A; M, T, F
Tree peony bark (*Paeonia suffruticosa*)
Turmeric rhizome (*Curcuma longa, Curcuma aromatica*) E, A
Vervain plant (*Verbena hastata, Verbena officinalis*)
Vetiver root (*Vetiveria zizanoides*) E, A
Virginia snakeroot rhizome *(*Aristolochia serpentaria*) Mc, Gc
Watercress plant (*Nasturtium officinale*) E, A
Wild angelica root (*Angelica sylvestris*) E
Wild cherry bark *(*Prunus serotina*) T, F

Wild ginger root/rhizome (*Asarum canadense*) E, A; Gc
Wild indigo root *(*Baptisia tinctoria*)
Wild marjoram plant (*Organum vulgare*) E, A
Wood sorrel plant (*Oxalis acetosella*) E
Wormseed seeds and plant *(*Chenopodium ambrosioides*) E, A
Wormwood tops and leaves *(*Artemisia absinthium*) E, USc, A
Yarrow plant (*Achillea millefolium*) Ec, Ac
Yellow cedar leaves *(*Thuja occidentalis*) E, Ac
Yellow jasmine plant *(*Gelsemium sempervirens*) US
Yohimbe bark *(*Pausinystalia yohimbe*) UR; Fc
Zedoary rhizome (*Curcuma zedoaria*) A

Notes

a. Though the German Commission E Monograph warns against its use for morning sickness, women using 250 mg of powdered ginger rhizome four times daily obtained significant relief from this condition safely.[191]

b. The milk thistle seed extract silymarin was safely used by six women with intrahepatic cholestasis of pregnancy for 15 days when given a dosage of 210 mg three times daily.[190]

c. Studies indicate that sennosides actually depress uterine motility in pregnant ewes,[198] and that standardized senna in individualised doses has been judiciously used in pregnancy by women without disrupting the pregnancy.[267,268]

C.2 While Breast Feeding

Some active constituents of medicinal plants are excreted in breast milk intact or as metabolites that maintain much of the activity of the original compounds. When this occurs it is important not to expose a breast feeding infant unnecessarily to medicinal compounds. Certain plant components are known to produce their pharmacologic effect in the nursing child. Foremost among these is the category of compounds known as anthrones that act as **laxatives (L)**. The alkaloids caffeine and ephedrine are commonly consumed **stimulants (S)** that passes into breast milk. Some compounds act as **irritants (I)** to the digestive tract and may upset the baby's stomach and cause colic. Other components are known to be potentially disruptive to organ function or tissue

growth, and nursing mothers should not risk exposure of their vulnerable infants to chemicals such as **hepatotoxic pyrrolizidine alkaloids (H)**, known **genotoxins (G)**, or other compounds potentially **toxic (T)** to small children. In addition, certain plants should be avoided while nursing that have been used as **antigalactagogues (AG)** to diminish the milk supply during the weaning process. While the plants listed here are known to be problematic when nursing, many plants have not been adequately evaluated in this regard. Do not assume that all unlisted plants are safe to use while breast feeding.

(Based on references 2, 3, 4, 5, **6**, 7, 8, 20, 24, 38, 94, 144, **150**, 167, **301**, 325, and 344.)

Alkanet root (*Alkanna tinctoria*) H
Aloes dried leaf sap *(*Aloe* spp.) L, G
Basil plant (*Ocimum basilicum*) G
Black cohosh roots/rhizome *(*Cimicifuga racemosa*) I
Bladderwrack thallus (*Fucus vesiculosus*) T
Borage leaves (*Borago officinalis*) H
Buckthorn fruit *(*Rhamnus catharticus*) L, G
Bugleweed leaves (*Lycopus* spp.) AG
Butterbur rhizome *(*Petasites hybridus*) H
Cascara sagrada bark *(*Rhamnus purshiana*) L, G
Chaparral leaves (*Larrea tridentata, Larrea divaricata*)
Cinchona bark *(*Cinchona* spp.) T
Cocoa seeds (*Theobroma cacao*) S
Coffee seeds *(*Coffea arabica*) S
Cola seeds (*Cola nitida, Cola acuminata*) S
Colocynth fruit pulp *(*Citrullus colocynthis*) L, T
Coltsfoot leaves *(*Tussilago farfara*) H
Comfrey root and leaves *(*Symphytum officinale*) H
Dulse thallus (*Rhodymenia palmetto*) T
Elecampane roots (*Inula helenium*) T
Frangula bark *(*Rhamnus frangula*) L, G
Guarana seeds (*Paullinia cupana*) S
Hemp agrimony plant *(*Eupatorium cannabinum*) H
Jasmin flowers (*Jasminum pubescens*) AG

Joe-Pye weed root *(*Eupatorium purpureum*) H
Kava root *(*Piper methysticum*) T
Kelp thallus (*Nereocystis luetkeana*) T
Levant wormseed plant *(*Artemisia cina*) T
Licorice root *(*Glycyrrhiza glabra*) T
Life root plant *(*Senecio aureus*) H
Ma huang plant *(*Ephedra sinica*) S
Madder root (*Rubia tinctorum*) G
Male fern rhizome *(*Dryopteris filix-mas*) T
Mate leaves (*Ilex paraguayensis*) S
Meadow saffron corm and seed *(*Colchicum autumnale*) T
Prickly ash bark (*Zanthoxylum americanum*, *Zanthoxylum clava-herculis*) I
Pulsatilla plant *(*Anemone pulsatilla*) I
Queen's root *(*Stillingia sylvatica*)
Rhubarb root *(*Rheum palmatum*, *Rheum officinale*) L, G
Rockweed thallus (*Fucus* spp.) T
Sage leaves *(*Salvia officinalis*) AG
Seaweed thallus (*Laminaria* spp.) T
Senna leaves and pods[a] *(*Cassia* spp.) L, G
Tea leaves (*Camellia sinensis*) S
Tobacco leaves *(*Nicotiana tabacum*) T
Wintergreen leaves *(*Gaultheria procumbens*) T

Note

a. Studies indicate that insufficient quantities of the major active metabolite, rhein, from senna are excreted in the breast milk of monkeys or humans to produce a laxative effect.[199,200] No clinical effect on nursing infants was found when 50 mothers were given laxative doses of standardized senna.[296]

C.3 In Children

The rapid development and maturing functional capacity of the young make them more susceptible to potential toxicities that are found even in some of the relatively safe medicinal plants. Great care should be taken to insure proper dosage in utilizing a plant with any record of adverse effects, but this applies most especially when medicating the

young who are often more reactive to **large doses (LD)**. The age limits for restricted use can vary, such as **infants under one (<1), young children under six (<6),** or **teens under eighteen (<18)** years of age, depending on the agent and the effect. The possibility of creating an imbalance exists even when employing plants that are relatively safe in adults. Children tend to be more sensitive to certain local **irritants (I)** and effects produced on the **nervous system (NS)**. Also, herbs that **block (B)** absorption of important nutrients, especially minerals, can have a more profound effect on developing children. For these reasons there are a number of specific herbs and several types of herbal remedies and products in general that should be avoided in children.

The use of concentrated **essential oils (EO)** containing volatile aromatic components should not be given internally (orally) to anyone, especially children, except by practioners specially trained in this approach. Teas containing small amounts of these components are safe and effective in most cases. Tinctures have higher concentrations of essential oil components than the teas but are generally safe for children if the herbs are nontoxic. (The alcohol used as an extracting solvent and preservative in tinctures is not toxic in normal doses given to children.) Certain aromatic components have been shown to exert an adverse influence on the nervous system even when used as an inhalant or near the **nose (N)** of infants or **toddlers under two (<2)** years of age.

Laxatives (L) composed of anthrone-containing herbs may not only create uncomfortable intestinal cramping in children but could cause an excessive loss of fluids and important electrolyte salts. For this reason plants containing anthranoid components should not be used in **children under twelve (<12)** years old.

The following representative herb restrictions are designated by age limits, dosage, herb form, type of application, and/or effect to be avoided.

(Based on references 2, **6**, 148, **150**, 167, and 311.)

Aloes dried leaf sap *(*Aloe* spp.) <12, L
Basil plant (*Ocimum basilicum*) <2, LD
Bitter orange peel (*Citrus aurantium* ssp. *amara*) LD
Buckthorn fruit *(*Rhamnus catharticus*) <12, L
Camphor tree bark *(*Cinnamomum camphora*) <2, N, NS

Cascara sagrada bark *(*Rhammus purshiana*) <12, L
Celandine root, plant *(*Chelidonium majus*) LD
Cocoa seeds (*Theobroma cacao*) <1, NS
Coffee seeds *(*Coffea arabica*) <12, B, NS
Cola seeds (*Cola nitida, Cola acuminata*) <2, NS
Eucalyptus leaves *(*Eucalyptus* spp.) <2, EO, N, NS
Fennel fruit (*Foeniculum vulgare*) <2, EO
Frangula bark *(*Rhammus frangula*) <12, L
Guarana seeds (*Paullinia cupana*) <12, NS
Horse radish fresh root (*Armoracia rusticana*) <4, I
Horsetail plant *(*Equisetum* spp.) I, dry powdered herb
Ipecac root, rhizome *(*Cephalis ipecacuanha*) <1, LD, NS
Jamaica dogwood *(*Piscidia erythrina*) LD, NS
Lobelia plant, seeds *(*Lobelia inflata*) LD, NS
Ma huang plant *(*Ephedra sinica*) <18, LD, NS
Mate leaves (*Ilex paraguayensis*) <2, NS
Mustard seed *(*Brassica nigra, Brassica alba, Brassica juncea*) <6, I, externally
Peppermint leaves (*Mentha piperita*) <2, EO, N, NS
Rhubarb root *(*Rheum palmatum, Rheum officinale*) <12, L
Senna leaves, pods *(*Cassia* spp.) <12, L
Tea leaves (*Camellia sinensis*) <6, B, NS
Tobacco leaves *(*Nicotiana tabacum*) LD, NS, prolonged exposure
Watercress plant (*Nasturtium officinale*) <4, I
Wormseed seed *(*Chenopodium ambrosioides*) <4, LD
Yohimbe bark *(*Pausinystalia yohimbe*) LD, NS

Appendix D

VITAMIN/MINERAL/DRUG INTERACTIONS

D.1 Drug Interactions with Vitamin Supplements Versus Herbs/Foods

Dietary supplements of vitamins often exceed the amounts typically contained in the foods we eat. In fact, as the effects of large doses of vitamins are studied in greater detail, they are being found to have beneficial effects well beyond the limit of simply preventing nutritional deficiency symptoms. The effects of large amounts, or megadoses, of some vitamins are currently being employed for therapeutic purposes. This is often done utilizing a single vitamin or several that are not balanced by the complex variety of cofactors found in natural sources. For most fat-soluble vitamins (A, D, E, and K) there are limits to the amounts (considering quantity together with duration of use) appropriate for safe consumption, depending on the circumstances. In the case of water-soluble vitamins (B-complex and C) these applications are mostly devoid of adverse effects even when self-administered in extreme amounts. However, even safe quantities of vitamin supplements can interact with certain drugs due to their relatively high concentration.

By comparison to almost all supplements the amount of vitamins present in food and medicinal herbs are not as concentrated. The amount of these nutrients believed necessary to achieve therapeutic effects usually requires some type of concentration. A common means of achieving high doses from natural sources is through the removal of fiber by juicing plants such as carrots to be able to consume larger quantities and, in this case, higher levels of beta-carotene (the vitamin A precursor, or provitamin A). Drying herbs concentrates their components somewhat simply by removal of water. Combining these methods by extracting soluble nutrients and reducing the extract to solid form is usuually necessary to provide high supplementary dosage

*Denotes herbs in this appendix having other side effects when taken in excessive doses.

levels of nutritional components from natural sources. For the most part therapeutic use (megadoses) of vitamins usually employ synthetic forms of vitamins rather than whole natural sources of these compounds.

Usually, whole food and herb sources can provide safe levels of balanced vitamin consumption in cases in which more concentrated therapeutic quantities, especially as isolated agents, have been shown to interfer with the activity of drugs. However, in the case of food and herb sources of vitamin K it has been shown that sufficient quantities of this nutrient can be consumed (in addition to the vitamin K produced by the microbial flora in the gut) to significantly disrupt the balance between the action of the vitamin and anticoagulant drugs. Excessive consumption of vitamin-rich plants could possibly lead to weak interference with drugs where it is documented for higher potency vitamin supplements. It is more probable that botanical sources through their additive effects would exacerbate adverse effects which are caused by consumption of vitamin supplements with incompatible drugs.

Interference between vitamins and drugs can work both ways. In some cases drugs will **lower vitamin (LV)** oral absorption and/or serum levels or increase excretion or metabolism, while in other cases medications can **raise vitamin (RV)** bioavailability or increase their effects. In cases where drugs reduce vitamin levels, consumption of plant sources of the vitamin would be highly desirable. Vitamins may also **raise drug (RD)** serum levels, or they may **lower drug (LD)** levels or reduce the drug's effects. Vitamin/drug interactions listed below which have caused either **toxicity (t)** or **insufficient (i)** clinical effects for one or the other are emphasized **in bold**. Other interactions listed have produced observable changes without clinically-apparent adverse effects, but monitoring is advisable.

Oral administration of vitamins are considered here. Administration of vitamins by injection would be expected to produce stronger responses in terms of drug interference but would avoid problems in cases where vitamin absorption from the gut is affected by the drug. Plant sources are listed below for the vitamins which have been shown to interact with pharmaceutical agents.

Due to the ubiquitous distribution of nutrients in innumerable plants, those identified here are by no means the only important

botanical sources of these vitamins. These lists simply provide suggestions of common plant sources for vitamins in natural balanced proportions. Since the plant listings are limited to a few major examples for each category, it should be noted that certain types of plants offer considerable advantages in providing relatively large quantities of a broad spectrum of vitamins. Good botanical sources of provitamin A, vitamin B-complex, vitamin C, vitamin E, and vitamin K are dark green leafy vegetables and herbs that are sometimes used as foods. Examples of these good general vitamin sources are alfalfa, beet greens, chard, chicory leaves, collard greens, dandelion greens, green amaranth, kale, lamb's quarters, mustard greens, parsley, plantain, purslane, seaweed, shepherd's purse, spinach, stinging nettle, turnip greens, watercress, and winter cress.

The plant sources of some vitamins are mostly staple foods (carbohydrate sources) or their oils and derivatives that are not included in the following lists. The vitamin B-complex components are obtained from yeast, whole grains, beans, nuts, and green leafy vegetables and herbs. Thiamin, riboflavin, and niacin are also found in sunflower seeds, avocados, dried fruit, green beans, sweet potatoes, potatoes, and cruciferous vegetables. In addition, folic acid can be obtained from oranges, bananas, potatoes, and fenugreek seeds. Vitamin B_6 is also plentiful in bananas, potatoes, and carrots. Except for riboflavin and niacin, B vitamin content is reduced by cooking. Vitamin B_{12} is not effectively supplied by plant sources. Though it is produced in the gut flora, the site of production does not allow for adequate absorption. Therefore, an animal, dairy, or supplemental source is necessary.

Besides green vegetables, dietary vitamins A and C are mostly derived from fruits and vegetables that are red like strawberries, peppers, and tomatoes or yellow/orange like apricots, peaches, citrus, carrots, pumpkins, and sweet potatoes. Vitamin E, while present in significant amounts in green leafy vegetables and some berries (black currants and raspberries), is most abundant in nuts, whole grains, and especially vegetable oils. In contrast, vitamin K is obtained mostly from green leafy vegetables and somewhat from oils of canola, soy, and olive. (For specific plant sources of vitamin K, see Appendix B.5.2.) Vitamin D is not effectively supplied by plant sources, but is produced in the skin in adequate amounts with regular exposure to the sun (15 minutes daily).

(Based on references 3, 7, 10, 184, 291, **345**, 366-369, 371, and **372**.)

D.1.1.a Vitamin A (Retinol) / Drug Interactions

Aluminum hydroxide - LV
Cholestyramine - LV
Clofibrate - LV
Colchicine - LV
Colestipol - LV
Corticosteroids - LV
Isoretinoin - RVt
Kanamycin - LV
Mineral oil - LV
Neomycin - LVi
Oral contraceptives (Birth control pills) - RV

D.1.1.b Provitamin A (Beta-Carotene)-Rich Plant Sources

Basil leaves (*Ocimum basilicum*)
Broccoli flower buds (*Brassica oleracea* v. *italica*)
Chard leaves (*Beta vulgaris* v. *cicla*)
Chicory leaf (*Cichorium intybus*)
Collard leaves (*Brassica oleracea* v. *acephala*)
Couch grass roots/rhizome (*Agropyron repens*)
Dandelion leaves (*Taraxacum officinale*)
Dill leaves (*Anethum graveolens*)
Fennel leaves (*Foeniculum vulgare*)
Gotu kola leaves (*Centella asiatica*)
Kale leaves (*Brassica oleracea* v. *fruticosa*)
Lamb's quarters leaves (*Chenopodium album*)
Parsley leaves (*Petroselinum sativum*)
Plantain leaves (*Plantago major*)
Primrose flowers (*Primula officinalis*)
Purslane plant (*Portulaca oleracea*)
Sage leaves (*Salvia officinalis*)
Seaweed thallus (*Alaria esculenta*)
Shepherd's purse leaves (*Capsella bursa-pastoris*)
Spinach leaves (*Spinacea oleracea*)

Summer savory leaves (*Satureja hortensis*)
Tarragon leaves (*Artemisia dracunculus*)
Turnip leaves (*Brassica rapa*)
Watercress leaves (*Nasturtium officinale*)
Winter cress leaves and buds (*Barbarea vulgaris*)
Yellow dock leaves (*Rumex crispus*)

D.1.2 Vitamin B_1 (Thiamine) / Drug Interaction

Antacids - LV
Barbiturates - LV
Mercurial diuretics - LV

D.1.3 Vitamin B_2 (Riboflavin) / Drug Interaction

Amitriptyline - LV
Chloramphenicol - LV
Chlorpromazine - LV
Chlortetracycline - LV
Imipramine - LV
Probenecid - LV
Thiazides - LV

D.1.4 Vitamin B_3 (Niacin, Niacinamide) / Drug Interaction

Colestipol - RD
Isoniazid LVi

D.1.5 Vitamin B_6 (Pyridoxine, Pyridoxamine, Pyridoxal) / Drug Interactions

Chloramphenicol - LV
Corticosteroids - LV
Cycloserine - LV
Hydralazine - LVi
Isoniazid - LVi
Levadopa - LDi, LVi
Oral contraceptives (Birth control pills) - LVi
Penicillamine - LVi
Phenobarbital - LDi

Phenytoin - LDi
Primidone - Lvi

D.1.6 Vitamin B_{12} (Cyanocobalamine) / Drug Interactions

Barbiturates - LV
Chloramphenicol - LVi
Cholestyramine - LV
Cimetidine - LVi
Clofibrate - LV
Colchicine - LV
Colestipol - LV
Cycloserine - LV
Ethanol (Alcohol) - LV
Kanamycin - LV
Metformin - LV
Methotrexate - LVi
Neomycin - LVi
Oral contraceptives (Birth control pills) - LV
Para-aminosalicylic acid (PAS) - LVi
Phenformin - LV
Phenobarbital - LVi
Phenytoin - LV
Potassium chloride - LV
Primidone - LV
Pyrimethamine - LV
Ranitidine - LV
Sodium nitroprusside - LV

D.1.7 Folic Acid / Drug Interactions

Acetylsalicylic acid (Aspirin) - LV
Antacids - LV
Azathioprine - LV
Barbiturates - LVi
Chloramphenicol - LV
Cholestyramine - LV
Co-trimoxazole - LVi
Colestipol - LV

Corticosteroids - LV
Cycloserine - LV
Ethanol (Alcohol) - LV
Isoniazid - LV
Magnesium trisilicate - LV
Mephobarbital - LVi
Metformin - LV
Methotrexate - LVi
Nitrofurantoin - LV
Oral contraceptives (Birth control pills) - LVi
Para-aminosalicylic acid (PAS) - LV
Phenobarbital - LVi
Phenytoin - LVi, LDi
Primidone - LVi
Pyrimethamine - LVi, LD
Sulfasalazine - LVi
Triamterene - LVi
Trimethoprim - LVi

D.1.8.a Vitamin C (Ascorbic Acid) / Drug Interactions

Acetylsalicylic acid (Aspirin) - LV
Aluminum hydroxide - RD
Barbiturates - LV
Corticosteroids - LV
Desferioxamine - RDt
Fluphenazine - LD
Indomethacin - LV
Levodopa - LV
Oral contraceptives (Birth control pills) - LV
Sulfonamides - LV
Tetracycline - LV

D.1.8.b Vitamin C-Rich Plant Sources

Acerola fruit (*Malpighia punidifolia*)
Basil leaves (*Ocimum basilicum*)
Blue violet leaves (*Viola papilionacea*)
Broccoli flower buds (*Brassica oleracea* v. *italica*)

Cilantro leaves (*Coriandrum sativum*)
Dandelion leaves (*Taraxacum officinale*)
Elder flowers (*Sambucus canadensis*)
Fennel leaves (*Foeniculum vulgare*)
Horseradish root (*Cochlearia armoracia*)
Lungwort leaves (*Pulmonaria officinalis*)
Mallow leaves (*Malva sylvestris*)
Onion leaves (*Allium cepa*)
Pine needles (*Pinus* spp.)
Primrose flowers (*Primula officinalis*)
Parsley leaves (*Petroselinum sativum*)
Rose hips fruit (*Rosa canina*)
Shepherd's purse leaves (*Capsella bursa-pastoris*)
Wild strawberry leaves (*Fragaria vesca*)
Winter cress leaves and buds (*Barbarea vulgaris*)

D.1.9 Vitamin D (Calciferol) / Drug Interactions

Barbiturates - LV
Cholestyramine - LV
Corticosteroids - LV
Ethosuximide - LVi
Isoniazid - LV
Kanamycin - LV
Mephobarbital - LV
Mineral oil - LV
Neomycin - LV
Phenobarbital - LVi
Phenolphthalein - LVi
Phensuximide - LV
Phenytoin - LVi
Primidone - LVi
Thiazides - RVt

D.1.10.a Vitamin E (α-Tocopherol) / Drug Interactions

Bishydroxycoumarin - LDi
Colestipol - LV
Ferrous sulphate (Iron) - LDi

Iron dextran - LDi
Mineral oil - LV
Warfarin - RDt

D.1.10.b Vitamin E-Rich Plant Sources

Asparagus stems (*Asparagus officinalis*)
Broccoli flower buds (*Brassica oleracea* v. *italica*)
Dandelion leaves (*Taraxacum officinale*)
Lettuce green leaves (*Lactuca sativa*)
Purslane plant (*Portulaca oleracea*)
Spinach leaves (*Spinacea oleracea*)

D.1.11 Vitamin K (Phylloquinone, Menaquinone) / Drug Interactions

Acenocoumarol - LDi, LVi
Acetylsalicylic acid (Aspirin) - LV
Bishydroxycoumarin - LDi, LVi
Cephalosporins - LV
Cholestyramine - LV
Clindamycin - LVi
Colestipol - LV
Gentamicin - LVi
Kanamycin - LV
Mineral oil - LV
Neomycin - LV
Phenindione - LDi, LVi
Phenobarital - LV
Phenprocoumon - LDi, LVi
Phenytoin - LV
Primidone - LV
Tetracycline - LV
Warfarin - LDi, LVi

D.2 Drug Interactions with Mineral Supplements Versus Herbs/Foods

Mineral nutrients have been recognized as essential for normal human functioning even longer that vitamins. Botanical medicines have had a number of their beneficial properties attributed to their mineral content. The mineral or ash yield of many herbs are significantly greater than that found in ordinary foodstuffs. For this reason they remain viable supplemental sources of vital mineral nutrients. Drug interactions with minerals have been documented when using mineral supplements. While consumption of plant sources of these same minerals may not result in the same drug interactions, they can potentially exacerbate the effect. For the most part they provide an adequate source of minerals when higher potency supplements may not be utilized due to drug interactions. Plant sources are listed below for most of the minerals which have been shown to interact with pharmaceutical agents.

Like vitamins, the amount of mineral nutrients required to prevent deficiency symptoms is quite small. Some minerals are acquired in excessive amounts in ordinary diets and do not need to be selectively consumed or supplemented even though the physiologic demand is relatively high. These include sodium, chloride, and phosphorus. Calcium, magnesium, and potassium are used in large milligram quantities (in decreasing order), but iron in premenopausal women, zinc, manganese and copper are usually supplemented in smaller milligram amounts (in decreasing order). Chromium, selenium, and iodine are taken in microgram quantities, while trace amounts of the others such as fluoride, molybdenum, cobalt, and silicon are generally sufficient.

Greater consumption of some minerals than are found in commercially-produced foods have been advocated as enhancing or optimizing normal functions. In these cases minerals may be perceived as therapeutic in their effects, rather than simply providing the minimum necessary amounts to prevent deficiency symptoms. Because of their action as cofactors in metabolic processes involving vitamin nutrients, the health benefits of minerals will be optimized by their relative availability. However, minerals elements have inherent toxic potential when they are consumed in excessive quantities. This is a

point that argues in favor of using natural organic sources of mineral nutrients over higher concentrations of inorganic mineral supplements.

There is also some controversy over whether inorganic minerals are as effectively assimilated or metabolically active as mineral compounds that are part of organic colloidal complexes found in plant sources. While research indicates that inorganic forms of minerals can be absorbed and effectively utilized in the body, the fact remains that plants normally contribute significant quantities of active nutrients to human physiologic function. It is not the gross amount supplied that is significant, but the net amount utilized. For example, development of supplemental forms with enhanced absorption such as amino acid chelates, synthetic colloids, and picolinates allow more absorption with less consumption. The chemical form of each mineral element determines the body's ability to absorb and assimilate it efficiently or not. Though botanical sources of minerals are surpassed in concentration by many inorganic mineral supplements, the absorption of the purified chemical compounds is often poor by comparison to minerals from plants. As a rule, the more concentrated the mineral nutrients that are ingested, the less efficient is their absorption.

However, some plants are high in substances that reduce absorption of certain minerals. Phytate sources such as whole grains, bran, and beans can chelate calcium, magnesium, iron, and zinc and block their absorption. Oxalates that are found in sesame seeds, cocoa/chocolate, wheat germ, and beet greens, chard, purslane, sorrel, and spinach chemically bind calcium and iron to reduce absorption. (See Appendix A.4.2 for a list of oxalate-containing herbs.) Precipitates formed with metal ions such as iron, copper, and zinc by tannins in herbs dissolve in acidic solution (such as in the stomach) but are maintained in the alkaline environment of the small intestine. (See Appendix B.1.2.a for a list of tannin-containing herbs.) Most iron and calcium are absorbed in the duodenum of the small intestine.

Certain plants are rich in a variety of nutrients in quantities and forms which do not significantly prevent their absorption and utilization. Culinary spices and medicinal herbs often have a higher mineral content than food plants, but due to their more potent aromatic or physiologic effects they are not used in as large of quantities. Still, they can contribute significant amounts of mineral nutrients since these are only required in small quantities. The dark green leafy vegetables,

sea plants, and herbs are foremost in supplying mineral demands, especially for calcium, magnesium, potassium, iron, zinc, and manganese. These plants include basil, beet greens, brown seaweed, cabbage, chard, collard greens, chicory leaves, cilantro, dandelion leaves, dulse, green amaranth, kale, lamb's quarters, lettuce, mustard greens, parsley, plantain, purslane, seagirdle, seaweed, shepherd's purse, spinach, turnip greens, and water cress. The sea vegetables in this group are a rich source of iodine. (See Appendix B.1.2.b for more plants rich in iodine.) Magnesium, iron, zinc, copper, and manganese are also high in nuts like almonds, black walnuts, Brazil nuts, cashews, peanuts, pecans, and walnuts. Potassium, iron, and copper content is high in sunflower seeds and in some dried fruit, especially apricots, currants, dates, figs, prunes, and raisins.

There is competition for absorption between some minerals. When taken together in the relatively large amounts that are found in supplements, the total absorption of each can be reduced. For instance, calcium diminishes absorption of magnesium, iron, and zinc, and zinc also competes for absorption with iron and copper. When the ratio of the amount of antagonistic minerals is great, as with calcium over iron or zinc, they are best consumed separately with several hours between to obtain adequate absorption of the minerals in shorter supply. Phosphates diminish calcium, magnesium, and iron absorption. Calcium in its carbonate form and magnesium as an oxide, though sometimes used as a mineral supplements, act as antacids and reduces absorption of some minerals and drugs when taken concurrently due to this alkalizing effect. Iron chelates many drugs in the gut and thereby inhibits their absorption. When a mineral/drug interaction is a result of diminished absorption, they should be taken several hours apart.

Interference between minerals administered orally together with drugs can work both ways. In some cases drugs will **lower mineral (LM)** oral absorption and/or serum levels or increase excretion, while in other cases medications can **raise mineral (RM)** bioavailability or increase their effects. The mineral forms listed below are those that have been shown to interact with the drugs. In cases where drugs affect the mineral levels, they usually act independently of the form of the mineral consumed, affecting dietary as well as supplementary sources. Even so, when drugs reduce mineral levels, consumption of plants sources rich in the mineral would be highly desirable. Minerals can also

raise drug (RD) serum levels or increase their activity, or they may **lower drug (LD)** levels or reduce the drug effects. In these cases the form documented is for the mineral salts described below. Mineral/drug interactions may lead to either **toxicity (t)** or **insufficient (i)** clinical effects for the one that is raised or lowered, respectively. These adverse interactions are noted by emphasizing the drug **in bold**. If these are not indicated, then the interaction may not produce a clinically-significant problem for either the mineral or the drug, but monitoring is advisable. Administration of minerals by injection would be expected to produce stronger responses in terms of drug interference but would avoid interference in cases where mineral absorption from the gut is affected by the drug.

(Based on references 7, 291, **345**, 367, 368, and 370-**372**.)

D.2.1.a Calcium (as a Carbonate) / Drug Interactions

Aluminum hydroxide - LM
Atenolol - LD
Capreomycin - LM
Cholestyramine - LM
Ciprofloxacin - LD
Colestipol - LM
Corticosteroids - LMi
Cycloserine - LM
Dactinomycin - LM
Digoxin - RD
Ethacrynic acid - LM
Ferrous sulphate (Iron) - LD
Furosemide - LM
Gentamicin - LMi
Isoniazid - LM
Lithium - LM
Meralluride - LM
Mersalyl - LM
Methotrexate - LM
Mineral oil - LM
Mithramycin - LM
Neomycin - LM
Phenobarbital- LMi

Phenolphthalein - LMi
Phenytoin - LMi
Prednisone - LM
Primidone - LM
Probenecid - LM
Senna - LM
Sodium clodronate - LD
Spironolactone - LM
Tetracycline - LMi, LD
Thiazides - RMt
Triamterene - LM
Verapamil - RD
Viomycin - LMi

D.2.1.b Calcium-Rich Plant Sources

Alfalfa plant (*Medicago sativa*)
Amaranth leaves (*Amaranthus retroflexus*)
Anise seed (*Pimpinella anisum*)
Basil leaves (*Ocimum basilicum*)
Broccoli flower buds (*Brassica oleracea* v. *italica*)
Cabbage leaves (*Brassica oleracea* v. *capitata*)
Celery seed (*Apium graveolens*)
Chervil leaves (*Anthriscus cerefolium*)
Cilantro leaves (*Coriandrum sativum*)
Dandelion leaves (*Taraxacum officinale*)
Dulse thallus (*Rhodymenia palmetta*)
Irish moss thallus (*Chondrus crispus*)
Lamb's quarters leaves (*Chenopodium album*)
Marjoram leaves (*Majorana hortensis*)
Mustard leaves (*Brassica alba, Brassica juncea*)
Parsley leaves (*Petroselinum sativum*)
Plantain leaves (*Plantago major*)
Seaweed thallus (*Alaria esculenta*)
Shepherd's purse plant (*Capsella bursa-pastoris*)
Summer savory leaves (*Satureja hortensis*)
Turnip leaves (*Brassica rapa*)
Wild marjoram leaves (*Origanum vulgare*)

D.2.2.a Magnesium (as an Oxide) / Drug Interactions

Amphotericin B - LM
Capreomycin - LM
Cisplantin - LM
Chlorothiazide - LM
Cycloserine - LM
Digoxin - LMt
Ethacrynic acid - LM
Ethanol (Alcohol) - LM
Furosemide - LM
Gentamicin - LMi
Hydrochlorothiazide - LM
Lomefloxacin - LD
Meralluride - LM
Mercaptomerin - LM
Mersalyl - LM
Naproxen - LD
Penicillamine - LD
Phenobarbital - LM
Phenytoin - LM
Probenecid - LM
Sodium clodronate - LD
Spironolactone - LM
Tetracycline - LM
Thiazides - LM
Viomycin - LMi

D.2.2.b Magnesium-Rich Plant Sources

Alfalfa plant (*Medicago sativa*)
Basil leaves (*Ocimum basilicum*)
Beet leaves (*Beta vulgaris*)
Celery seed (*Apium graveolens*)
Chard leaves (*Beta vulgaris* v. *cicla*)
Collard leaves (*Brassica oleracea* v. *acephella*)
Cilantro leaves (*Coriandrum sativum*)
Parsley leaves (*Petroselimum sativum*)

Seaweed thallus (*Alaria esculenta*)
Spinach leaves (*Spinacea oleracea*)

D.2.3.a Potassium (as a Chloride) / Drug Interactions

ACE inhibitors - RM
Acetazolamide - LMi
Amiloride - RM
Amphotericin B - LM
Bendroflumethiazide - LM
Bisacodyl - LM
Bumetanide - LM
Capreomycin - LM
Captopril - RM
Carbenicillin - LMi
Cephalothin - LMi
Chlorothiazide - LM
Chlorthalidone - LM
Clindamycin - LMi
Colchicine - LM
Corticosteroids - LM
Ethacrynic acid - LM
Furosemide - LM
Gentamicin - LMi
Ibuprofen - RM
Indomethacin - RM
Isoniazid - RM
Levodopa - LM
Lithium - LM
Methyldopa - RM
Metolazone - LM
Mithramycin - LM
Neomycin - LM
Penicillin - LMi
Phenolphthalein - LM
Probenecid - LM
Salicylates - LM
Senna - LM

Spironolactone - RMt
Thiazides - LM
Trandolapril - RM
Triamterene - RM
Viomycin - LM
Vitamin B_{12} - LV

D.2.3.b Potassium-Rich Plant Sources

Alfalfa plant (*Medicago sativa*)
Basil leaves (*Ocimum basilicum*)
Brown seaweed thallus (*Laminaria cloustoni, Laminaria saccharina*)
Chervil leaves (*Anthriscus cerefolium*)
Cilantro leaves (*Coriandrum sativum*)
Dandelion leaves (*Taraxacum officinale*)
Dill leaves (*Anethum graveolens*)
Dulse thallus (*Rhodymenia palmetta*)
Gotu kola leaves (*Centella asiatica*)
Ground ivy leaves (*Glecoma hederacea*)
Irish moss thallus (*Chondus crispus*)
Kelp thallus (*Nereocystis luetkeana*)
Parsley leaves (*Petroselinum sativum*)
Purslane leaves (*Portulaca oleracea*)
Seagirdle thallus (*Laminaria digitata*)
Shepherd's purse plant (*Capsella bursa-pastoris*)
Sweet pepper fruit (*Capsicum annuum*)
Tarragon leaves (*Artemisia dracunculus*)
Turmeric root (*Curcuma longa*)

D.2.4.a Iron (as Ferrous Sulphate) / Drug Interactions

Acetylsalicylic acid (Aspirin) - LM
Atropine - LM
Calcium carbonate - LMi
Chloramphenicol - LMi
Cholestyramine - LM
Cimetidine - LM
Ciprofloxacin - LD
Clofibrate - LM

Dactinomycin - LM
Doxycycline - LDi
Hexocyclium - LM
Levodopa - LDi
Levofloxacin - LD
Levothyroxine - LD
Magnesium trisilicate - LM
Methacycline - LDi
Methyldopa - LDi
Minocycline - LDi
Neomycin - LM
Norfloxacin - LD
Ofloxacin - LD
Oxytetracycline - LDi
Para-aminosalicylic Acid (PAS) - LM
Penicillamine - LD
Sodium clodronate - LD
Sulfasalazine - LM
Sulphaxalazine - LD
Tetracycline - LDi, LM
Thyroxine - LDi
Trientine - LMi
Vitamin E - LMi

D.2.4.b Iron-Rich Plant Sources

Anise seed (*Pimpinella anisum*)
Basil leaves (*Ocimum basilicum*)
Brown seaweed thallus (*Laminaria cloustoni, Laminaria saccharina*)
Celery seed (*Apium graveolens*)
Cilantro leaves (*Coriandrum sativum*)
Cumin seed (*Cuminum cyminum*)
Dill leaves (*Anethum graveolens*)
Flax seed (*Linum usitatissimum*)
Ground ivy leaves (*Glecoma hederacea*)
Lungwort leaves (*Pulmonaria officinalis*)
Marjoram leaves (*Majorana hortensis*)
Parsley leaves (*Petroselinum sativum*)
Purslane leaves (*Portulaca oleracea*)

Seagirdle thallus (*Laminaria digitata*)
Seaweed thallus (*Alaria esculenta*)
Thyme leaves (*Thymus vulgaris*)
Turmeric root (*Curcuma longa*)
Wild marjoram leaves (*Origanum vulgare*)
Yellow dock root and leaves (*Rumex crispus, Rumex obtusifolius*)

D.2.5 Zinc (as a Sulphate) / Drug Interactions

Chlorthalidone - LM
Corticosteroids - LM
Dimercaprol - LM
Ethanol (Alcohol) - LM
Methotrexate - LM
Norfloxacin - LD
Oral contraceptives (Birth control pills) - RM
Penicillamine - LM
Tetracycline - LDi, LM
Thiazides - LM

D.2.6 Copper / Drug Interaction

Antacids - LM
Dimercaprol - LM
Oral contraceptives (Birth control pills) - RM
Penicillamine - LM
Phenytoin - RM

D.2.7 Iodide (as a Potassium salt) / Drug Interaction

Lithium - RDt

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