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Medicinal Plants Used for Digestive Disorders – What the Gastroenterologist Needs to Know

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Herbal medicine is arguably the oldest form of healthcare known to humanity. Medicinal plants have been used by all cultures throughout history and still continue to be an integral part of our modern civilization. From generation to generation, various ethnic groups around the world have used a wide array of plants to treat various gastrointestinal problems. This practice is especially common among the Hispanic communities living along the United States-Mexico border. The principal afflictions for which various plants are ingested (either taken as tea made from a single plant - or multiple combinations) range from parasitic diseases, to bloating, ulcers, nausea, dyspepsia and diarrhea, just to name a few. Plants contain a myriad of secondary metabolites or phytochemicals, which may have a role in the treatment and prevention of various digestive disorders. With the remarkable surge of so-called complementary and alternative medicine, or CAM (currently known by the more accurate term of Integrative Medicine), it is imperative that the gastroenterologist be aware of both the potential risks as well as the benefits of using herbal medicine in his/her modern practice.

INTRODUCTION

Medicinal plants, collectively comprising various species of green plants as well as fungi (mushrooms), were arguably the first therapeutic agents known to humans.[1]

The use of herbs to cure diverse human and animal ailments predates recorded history. From Paleolithic cave dwellers to medieval healing monasteries as well as from Renaissance alchemists such as Paracelsus to the modern "techno era", medicinal plants have been, and continue to have, an important part in the healing therapies applied in both human as well as veterinary medicine.[2]

The application of the plethora of species used in herbal treatments has been anything but haphazard. Well-known and mastered by the Hakims (physicians) of Arabic medicine as well as the Aztec and Mayan healers of ancient Mesoamerica, herbal medicine has been a part of highly systematized medical modalities throughout the orb. Such systems include, but are not limited to, Ayurveda, Siddha, and Unani-Tibb from India, Traditional Chinese herbology and Native American herbal healing (here indicating the totality of the American continent), to name only a few.[3,4]

The infamous slave trade also brought diverse African food and medicinal plants to the American

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Table 1. Medicinal Plants Utilized for the Treatment of Dyspepsia Symptoms

Common name	Scientific name	Traditional use	Form of use	Precautions
Chamomile (German or Roman)	*Matricaria recuita* or *Anthemis nobilis*	Gastrointestinal colic, dyspepsias, diarrhea	Tea made from flowers	Avoid during pregnancy
Cinnamon, True cinnamon	*Cinnamomum verum*	gastric ulcers, diarrhea	Tea made from tree bark	Avoid frequent use during pregnancy
Ginger	*Zingiber officinalis*	Gastritis	Tea or capsules from root	Avoid in patients with gallstones
Licorice	*Glycyrrhiza glabra*	Gastritis, ulcers	Tea	Avoid use in hypertensive patients
Peppermint, Spearmint	*Mentha piperita, M. spicata*	Gastric pain, dyspepsia	Tea made from leaves, Essential oil	Unknown Avoid internal use of essential oil unless under professional advice
Guava, Guayaba	*Psidium guajaba*	Ulcers, diarrhea, dyspepsia	Tea made from leaves or fruit rind	Unknown

continent (such as okra, hibiscus and castor oil plant, for example) that both enriched and diversified the conglomerate of European, Asian and Amerindian herbal pharmacopoeias.[5,6,7]

Dyspepsia

Various plants are available usually as teas or capsules, for the treatment of dyspepsia. Chamomile (German or Roman), as well as anise (green and star anise), various mints and licorice have been regarded as traditional medicine for centuries[8] (See Table 1).

A study compared the efficacy of a ginger (Figure 1.) and artichoke supplementation compared to placebo for the treatment of dyspepsia. The design consisted of a 4-week prospective multicenter, double blind, randomized, placebo controlled, parallel-group format that compared the herbal combination versus placebo. A dose of two capsules per day was given before two meals (lunch and dinner) to the 126 participants suffering from dyspepsia. The study showed that after two weeks, only the treatment group showed a substantial decrease in symptoms of gastric discomfort including nausea, epigastric fullness, epigastric pain, and bloating. The researchers concluded that the herbal combination of ginger and artichoke leaf extracts appears safe and efficacious for the treatment of dyspepsia.[9]

Because medicinal plants usually contain hundreds of active ingredients, many are multifaceted, that is, they can be applied to various (apparently) unrelated ailments. One example is cinnamon (*Cinnamomum verum*), which can have both anti-flatulent as well as hypoglycemic properties.

Nausea and Vomiting

Certain medicinal plants can help to reduce nausea and vomiting due to various conditions such as motion sickness or vomiting that may accompany the early

Figure 1. Ginger plant (Zingiber officinale)
The root is taken as a tea or in capsules for the treatment of nausea, vomiting and indigestion.

Köhler's Medizinal-Pflanzen. Licensed under Public Domain via Wikimedia Commons

stages of pregnancy (hypermesis gravidarium). One of the plants most employed in traditional medicine against nausea and emesis is ginger (*Zingiber officinalis*-Zingiberaceae). The underground stem (rhizome) of this plant is considered to have "warming" properties by both Ayurvedic as well as Chinese medicine and has been recommended to treat both digestive as well as respiratory disorders throughout Asia for many centuries.

Ginger's antiemetic effects are not completely understood, but it seems the plant's main bioactive ingredients (gingerol and various shogaols) act directly on the gut via the peripheral nervous system but not via the central nervous system (CNS). Ginger's phytochemicals may have beneficial anti-inflammatory actions as well as an inhibitory effect on platelet aggregation.[10]

Ginger can be taken as a tea or in capsules containing the dried and pulverized stem. In Europe, this plant is widely used to treat nausea and vomiting during the first trimester of pregnancy

Ginger extracts containing gingerols and shogaols exert their activity upon cholinergic and serotonergic receptors.

A systematic review of double-blind, placebo-controlled, randomized studies with ginger emphasized the possible efficacy of this plant on the prevention and treatment of nausea and vomiting of various origins. The review focused on pregnancy-induced nausea and vomiting, as well as nausea induced by chemotherapy. The authors hypothesized that ginger extracts do have a therapeutic role in the treatment of nausea and vomiting from various causes, and with minimal side effects. For this reason, the authors concluded, ginger preparations can be a potential alternative to traditional prokinetic pharmaceuticals such as domperidone, levosulpiride or metoclopramide, as well as conventional antiemetics like the phenotiazines and 5HT 3 antagonists, for example.[11]

Diarrhea

Traditionally, plants that are rich in tannins are used for the treatment of diarrhea due to their astringent properties. Many medicinal plants may also contain additional phytochemicals, such as quercetin (a polyphenolic compound with antioxidant and anti-inflammatory properties), that maybe useful in curtailing the symptoms.

Teas made form Guava leaves are used throughout the American tropics for the treatment of diarrhea in adults and children. The plant contains tannins, quercetin and is a good source of Vitamin C.

A review of the pharmacological experiments with guava in both *in vitro* and *in vivo* models found that guava's diverse bioactive phytochemicals include phenolic, flavonoid, carotenoid, terpenoid and triterpene compounds. Extracts obtained from the leaves and fruits possess antispasmodic and antimicrobial properties that are useful for the treatment of diarrhea (including infantile rotavirus enteritis) and dysentery.[12]

Bloating (flatulence)

In herbal medicine, the term *carminative* refers to a plant whose active ingredients ease flatulence and colic in the gut. This property is usually due to volatile oils, as well as other phytochemicals produced by the plant.[1,13]

Some of the commonly used herbal products for treating flatulence include anise (*Pimpinella anisum*-Apiaceae) also known as green anise or European anise. European or green anise may be mistaken for another different spice with similar actions and flavor: star anise. Although star anise contains some of the same ingredients, it may not be safe to give to small children, since it may be neurotoxic (see Table 2 as well as description for star anise below).

Star anise (*Illicium verum* –Illiaceae), is also

(continued on page 20)

(continued from page 14)

referred to as Chinese star anise (to differentiate it from the toxic Japanese star anise: *I. anisatum*). The fruits of this small Asian tree are used as a tea to relieve bloating and indigestion. Star anise and European (green) anise are different plants, although they contain some of the same ingredients. The fruits are star shaped (hence the vernacular name) and are rich in essential oils as well as terpenoid and phenolic compounds.

The phytochemicals act as carminatives as well as spasmolytics. The fruits' antiseptic properties are due to anethol, since this compound has both antibacterial as well as antifungal actions. Traditionally, Star anise has been employed as a carminative as well as a eupeptic (substance that promotes good digestion). However, its use in children younger than 6 years of age should be undertaken only under the supervision of a professional due to the possibility of side effects due to the adulteration with another very similar species known as Japanese star anise, which can be very toxic to the nervous system.[14, 15]

Constipation

Caution should be practiced recommending using certain herbs as laxatives due to their potentially irritating effects on the gastrointestinal tract (See Table 3). These plants include aloe vera (whole leaf preparations including the latex and gel), as well as any species of rhubarb root. However, certain over-the-counter (OTC) medications), such as senna leaf (sometimes sold as a proprietary laxative known as Senokot®) are generally regarded as safe to use during limited periods. Chronic use as a laxative can darken the mucosa of the colon-an endoscopic observation referred to as *melanosis coli*.

When constipation is due to tension or stress, the anthraquinone-containing laxatives should be avoided due to their potentially irritating action on the gastrointestinal tract.[16]

Medicinal Plant Use on the U.S.-Mexico Border

The U.S./Mexico border is approximately 2,000 miles in length with a population of nearly 12 million inhabitants. People of Hispanic origin (principally of Mexican ancestry) comprise approximately 80% of the population living on the U.S. side of the border. The El Paso, Texas/Ciudad Juarez, Chihuahua international community comprises the largest US/Mexico border population.[17]

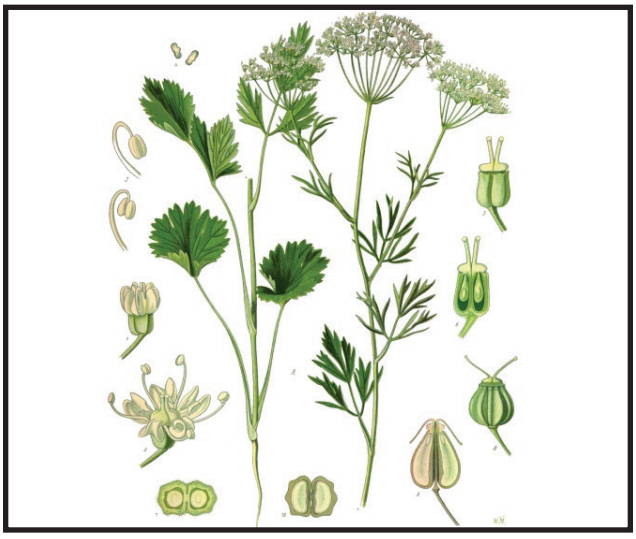

Figure 2. Green anise (*Pimpinella anisum*)
The seeds are taken as a tea to relieve the symptoms of bloating.
Köhler's Medizinal-Pflanzen. Licensed under Public Domain via Wikimedia Common

Various parameters related to healthcare activities are unique to the bi-national border region. These include, but are not limited to, the use of so-called complementary and alternative medicine (CAM), especially employing medicinal plants, by the predominantly Hispanic population. Even though a copious amount of research has been conducted in the U.S. to determine the extent of the formerly known alternative medical therapies by the general population, far less research has taken place within the largest ethnic minority living on the southwestern border.

A dearth of studies are available but have shown a higher prevalence of medicinal plant use among the Hispanic population. Research undertaken to evaluate the use of herbs and related supplements has shown that between 13-19% of the U.S. population report taking these products.[18, 19] A study conducted in El Paso, Texas assessed the rates and types of herbal product use among patients interviewed at local hospitals and clinics. It is worth noting the El Paso's population is 80% Hispanic. The results of the study demonstrated that 59% of the patients mentioned using various herbal supplements within the previous year.[20]

Plants Used in Mexican Traditional Medicine to Treat Digestive Problems

Throughout developing countries, the so-called "third world" nations, various gastrointestinal diseases continue to be one of the most challenging health

Table 2. Summary of herbs used to treat bloating

Common name(s)	Scientific name	Form of use	Precautions
Aniseed, Green anise	*Pimpinella anisum*	Tea	None known
Cassia	*Cinnamomum aromaticum*	Tea, powdered bark used as spice	Use with caution during pregnancy
Celery	*Apium graveolens*	Tea, condiment	Safe as condiment
Cinnamon	*Cinnamomum verum*	Tea, powdered bark used as spice, essential oil	Use with caution during pregnancy
Dill	*Anethum graveolens*	Tea	None known
Fennel	*Foeniculum vulgare*	Tea	None known
Ginger	*Zingiber officinalis*	Tea, capsules, powdered rhizome used as spice	Use with caution in patients with gallstones or taking blood thinners
Parsley	*Petrosilenum crispus*	Tea, condiment	Use with caution during pregnancy
Pennyroyal	*Mentha pulegium*	Tea	Avoid during pregnancy and lactation
Peppermint	*Mentha spicata*	Tea, essential oil	None known
Star Anise	*Illicium verum*	Tea	Avoid during pregnancy and in small children
Thyme	*Thymus vulgaris*	Tea, essential oil	None known

issues. This is the case for various indigenous peoples of Mexico.[21]

Many of these ethnicities posses a wealth of native knowledge regarding the use of a wide array of plants to treat disease. According to the indigenous viewpoint on the healing characteristics of herbs, certain plants are employed in the treatment of a various diseases due to the particular plant's characteristic taste or aroma.[22] Healing herbs that possess astringent properties are used particularly to treat diarrhea and dysentery, while herbs with bitter and aromatic characteristics are used to treat pain and gastrointestinal cramping. For the treatment of diarrhea and dysentery, for example, plants rich in tannins are used. Many plants frequently employed in Mexican traditional medicine address bloating, diarrhea and other gastrointestinal problems. Guava (*Psidium guajaba*), *Quassia amara*, and wormseed (*Dysphania ambrosioides*), are good examples, but have only limited availability in the United States.[23]

Potential Toxicity of Certain Herbal Products

Practitioners of modern phytotherapy are well aware that the common saying: "if it's natural, it must be safe" is not a realistic viewpoint. Many of the most

Table 3. Summary of Commonly used Laxative Herbs

Common name(s)	Scientific name	Form of use	Precautions
Aloes	*Aloe vera, A. barbadensis*	Whole leaf preparations taken internally	Avoid in pregnancy and lactation – Prolonged use causes gastrointestinal irritation and griping – do not use for extended periods
Cascara sagrada	*Rhamnus purshiana*	Tea or capsules made from the bark	Avoid in pregnancy and lactation – do not use for extended periods
Rhubarb	*Rheum raponticum*	Root	Avoid in pregnancy and lactation – do not use for extended periods
Senna, Senna pods	*Senna alexandrina*	Tea, capsules, pills	Avoid in pregnancy and lactation – do not use for extended periods

toxic substances known to man (from the carcinogenic aflatoxins from microscopic fungi to the bacterial botulism toxins, for example) are naturally occurring substances. On the other hand, this does not mean that all herbal or fungal products are inherently dangerous.

However, of special concern is the great variability in quality control among the various foreign and domestic companies that market these "natural supplements" as OTC products. Since the majority of these products are classified in the United States as nutritional supplements rather than medications, they are not required to be under the direct supervision of the FDA.

Hepatotoxicity is a Concern for Certain Herbs

Certain herbs used in traditional medicine for the treatment of various illnesses are known to harm the liver, especially if taken internally for an extended period. A few examples include Creosote bush, the so-called "Chaparral" (Larrea tridentata –Zygophyllacaeae). The leaves and twigs of this xerophytic shrub are taken either as teas or pills to treat a myriad of afflictions, ranging from venereal disease to kidney and gastrointestinal tract ailments. The pills tend to be more concentrated and thus pose a greater risk for toxicity.

Comfrey (*Symphytum officinale*-Boraginaceae) as well as Colt's foot (*Tussilago farfara*-Asteraceae) teas can also be liver toxic due to their content of pyrrolizidine alkaloids. Additionally, there are a few cases of kava kava (*Piper methysticum*- Piperaceae) hepatotxicity, especially if combined with certain medications or alcoholic beverages.[24]

Medicinal and Toxic Fungi

The use of medicinal fungi in traditional medicine is very common, especially in Oriental traditional medicine. Currently, they are available in health food stores throughout the U.S. Various species of higher fungi ("mushrooms") are used to treat various ailments, including some types of cancer. They contain complex polysaccharides that act as immuno-modulators and may be useful as cytotoxic agents against certain cancer cell lines.[25]

On the other hand, toxic mushroom poisonings are usually accidental and occur through careless handling and misidentification when consuming mushrooms from the wild. Some species contain poisonous cyclopeptides that are very toxic to the liver and kidneys, sometimes causing death.

Interestingly, a natural compound known as

(continued on page 25)

(continued from page 22)

silymarin, (derived from the medicinal plant known as Milk thistle (*Silybum marianum* - Asteraceae), is used by physicians in Germany as an antidote for mushroom poisoning, provided it is applied intravenously within 24 hours after ingestion of the offending species.[26]

CONCLUSION

Every day thousands of medicinal plant and fungal species are being taken by our patients to treat a wide array of ailments, from infant colic to stomach cancer. Scientific herbal medicine or phytotherapy is very commonly practiced in many regions, especially Western Europe, not only by herbalists but by physicians as well. Unfortunately, many species of plants used by indigenous traditional medicine in many developing countries have not been studied in depth. However, we have reviewed those that should be considered by gastroenterologists for incorporation into their practice regimens, in order to both enrich as well as diversify their therapeutic armamentarium. A better knowledge of the commonly used medicinal plants and their active constituents will aid the physician in more effectively communicating with the patient who may be taking some of these agents without officially informing their physician. In addition, it is important to assess the possibility of an herb-drug interaction. Overall, we can say that using certain herbal preparations for digestive problems available on the U.S. market today would have minimal to no unexpected toxic effects, apart from rare idiosyncratic allergic reactions or their proscribed use during pregnancy.

Although no official FDA approval process is currently in place, when used judiciously, a plethora of medicinal plant and fungal species can certainly add to the therapeutic repertoire of the Western physician.

We hope this review will prepare you to understand and incorporate certain herbs to improve the symptoms of patients with various entities. ■

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