

Herbal Remedies for Functional Dyspepsia and Traditional Iranian Medicine Perspective

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Abstract

Context: Functional dyspepsia (FD) is a functional gastro-intestinal disorder with high prevalence. Among various treatment options, treatment by complementary and alternative medicines especially herbal remedies also practiced. Traditional Iranian medicine (TIM), a valuable resource of valid applied studies of ancient Iranian scholars, recommends numerous medicinal plants to treat dyspepsia symptoms. In this study, through investigation of TIM references, we aimed to identify medicinal plants for treatment of digestion insufficiency.

Evidence Acquisition: In this qualitative study, dyspepsia symptoms including fullness, early satiety, bloating, nausea, and belching were checked under reliable sources of traditional medicine. Then medicinal plants recommended for the treatment of the symptoms were extracted from the books. Likewise, for investigating the pharmacological properties of medicinal plants used for the relieving of dyspepsia symptoms, electronic databases such as PubMed, Scopus, Google Scholar and some Iranian databases like SID and IranMedex were employed.

Results: The study yielded 105 plants from 37 families which could treat various dyspepsia symptoms; fifty-seven plants, mainly from Apiaceae, Lamiaceae, Amariaceae and Zingiberaceae had digestive effects. In this research, based on the information in TIM reference texts, we obtained 58 plants effective for bloating, 40 for nausea, 37 for appetite loss and 7 for belching. In human clinical trials conducted on medicinal plants effective for FD symptoms, 7 single plants were used.

Conclusions: Finding the medicinal plants effective on digestion insufficiency based on TIM could suggest a better strategy for the relieving of dyspepsia symptoms. Traditional Iranian medicine prescribes medicinal plants based on each patient's personal characteristics and practices multiple target therapies.

Keywords: Herbal Medicine, Dyspepsia, Medicinal Plants, Medicine, Traditional

1. Context

Functional Dyspepsia (FD) is a Non organic gastro-intestinal disorder causing different symptoms such as fullness, early satiety, bloating and nausea in upper abdomen (1, 2). This common nonlife-threatening disorder with its recurring symptoms needs numerous medical visits, which impose high costs on the society and affect the patients' quality of life (3).

The cause for FD is not known yet, but a number of theories was introduced to provide explanation; delay in emptying the stomach contents, genetic factors, infection with a bacterium called *Helicobacter pylori*, neurologic-hormonal disorders, autonomic disorders, stress and mental disorders, visceral hypersensitivity, and altera-

tion of duodenum sensitivity to acids and lipids are some speculated causes (1).

A number of medicinal and non-medicinal treatments have been suggested; most of these fail to cure patients completely and mainly focus on relieving the symptoms. The medicinal treatments used to date include acid suppressing medicines like proton pump inhibitors, H₂-blockers, and simethicone, motility affecting drugs such as mosapride, domperidone, erythromycin, anti-depressants, Selective Serotonin re-uptake inhibitors (SSRIs) and medicinal plants (4).

In recent years, herbal treatments in general and for FD in particular have received increasing attention. To treat

FD symptoms, various plants have been examined. Most of the medicines obtained this way are combinations of several plants from studies of traditional medicine in different countries (4).

Iranian Traditional medicine (TIM) with a concentration on temperament and humors is a valuable resource of carefully conducted applied studies of medical scientists and scholars of Iran in the course of history. These studies have passed on to us in the form of medical prescriptions for prevention, diagnosis, and treatment of health conditions (5).

One of the realms TIM has tackled is digestive disorders and an important disease often discussed in TIM is digestion insufficiency (za'f-ol-hazm) (6, 7). In TIM, digestion insufficiency is defined so: "Digestive insufficiency is when food does not leave stomach in time and the stay exceeds usual time, which entails symptoms such as stomach fullness, nausea, belching, and bloating" (7).

From TIM perspective, treatment of digestion disorders includes lifestyle modification, drug therapy, and nondrug techniques such as massage (Dalk) and reflex therapy (Ghamz). Either during lifestyle modification period (particularly modification of physical activity, eating habits, and sleep habits) or after it, treatment with medicinal plants is practiced (6, 8).

In this study, through investigation of TIM references, we aimed to identify medicinal plants for treatment of digestion insufficiency and provide a coherent account of how TIM deals with digestion insufficiency.

2. Evidence Acquisition

In this qualitative study, traditional medicine reference books from various historical eras, such as The Canon of Medicine by Avicenna (10th and 11th centuries) (6), Sharh-ol-Asbabval Alamat by Nafis-ebne-avaz-e-Kermani (15th century) (7), Tohfah-ol-Momenin by Hakim Momen Hussein (17th century) (9) and Makhzan- Al'Advieh by Hakim AghiliKhorasani (18th century) (10) were firstly selected after consulting the team of authors.

To find matches for old names in modern scientific classification, two botany references (11, 12) and electronic databases such as United States Department of Agriculture (USDA) and the plantlist.org suggested by the research team were used.

To investigate the pharmacological properties of medicinal plants used in clinical trials for the relief of dyspepsia symptoms, electronic databases like PubMed, Scopus, Google Scholar and some Iranian databases like SID and IranMedex were employed.

Data collected from TIM books and modern sources, like names and pharmacological properties were submitted to research team; thus, all authors were involved in the process of analysis.

After selecting search references, dyspepsia symptoms including fullness, early satiation, bloating, belching, and nausea were firstly checked under their equal items in TIM references. Then, effective drugs were searched in TIM sources by fullness (SeqI-e-meda), early satiety (Noqsan-e-shahvat-a-ta'am), bloating (Nafkh-e-me'di), belching (Aroq), nausea (Tahavo) and digestion insufficiency (za'f-ol-hazm).

To study the properties of medicinal plants in clinical trials, key words such as nonulcer dyspepsia, dyspepsia, functional dyspepsia, the plants' scientific names, and their pharmacological properties were used.

3. Results

After finding matches between main symptoms of dyspepsia (fullness, early satiety, bloating, belching, and nausea) and symptoms mentioned in TIM references and later, searching effective plants for these symptoms, we obtained 105 plants from 37 plant families effective for relieving dyspepsia symptoms. Most plants belonged to Apiaceae (14 plants), Lamiaceae (11 plants), Rosaceae (8 plants), Compositae (7 plants), Amaryllidaceae (6 plants), Rutaceae (5 plants), Zingiberaceae (5 plants), Anacardiaceae (4 plants), Brassicaceae (4 plants), Piperaceae (4 plants), respectively (Table 1).

Table 1. Medicinal Plants Indicated for Different Symptoms of Dyspepsia From Traditional Iranian Medicine Perspective^a

Scientific Name	Family	Common Name	Parts Used	Stomach-Strengthening Characteristics From the TIM Perspective	Effective in Dyspepsia Symptoms					EI
					Di	Ap	Na	Bl	Be	
<i>Acorus calamus</i> L.	Acoraceae	Calamus	Rhizome	*	*		*		*	
<i>Allium cepa</i> L.	Amaryllidaceae	Onion	Bulb	*	*	*	*		*	
<i>Allium hirtifolium</i> Boiss.	Amaryllidaceae	Persian shallot	Bulb		*				*	
<i>Allium ampeloprasum</i> L.	Amaryllidaceae	wild leek	Leaf, root		*				*	
<i>Allium Sativum</i> L.	Amaryllidaceae	Garlic	Bulb			*			*	
<i>Pistacia atlantica</i> Desf.	Anacardiaceae	Chio Gum	Gum		*				*	
<i>Pistacia lenticus</i> Desf.	Anacardiaceae	Mastic tree	Oleogum Resin	*	*	*	*	*	*	

<i>Pistacia vera</i> L.	Anacardiaceae	Pistachio	Rind	*		*		*
<i>Rhus coriaria</i> L.	Anacardiaceae	Sumac	Fruit			*	*	*
<i>Anethum greveolens</i> L.	Apiaceae	Dill	Leaf, seed		*	*		*
<i>Apium graveolens</i> L.	Apiaceae	Celery	Herb, seed	*	*		*	*
<i>Bunium persicum</i> (Boiss.) B.Fedtsch	Apiaceae	Wild Caraway	Fruit	*	*	*	*	*
<i>Coriandrum sativum</i> L.	Apiaceae	Coriander	Leaf, seed			*	*	*
<i>Cuminum cyminum</i> L.	Apiaceae	Cumin	Fruit		*	*	*	*
<i>Daucus carota</i> L.	Apiaceae	Carrot	Seed, root	*	*			*
<i>Eryngium caeruleum</i> M.Bieb.	Apiaceae	Eryngo	Herb	*	*		*	*
<i>Falcaria vulgaris</i> Bernh.	Apiaceae	Common falcaria	Herb				*	*
<i>Ferula asafoetida</i> L.	Apiaceae	Aassa-Foetida	Gum	*	*	*	*	*
<i>Ferulago angulata</i> (Schldtl.) Boiss	Apiaceae	Ferulago	Fruit	*	*	*	*	*
<i>Foeniculum vulgare</i> Mill.	Apiaceae	Fennel	Fruit				*	*
<i>Petroselinum crispum</i> (Mill.) Fuss	Apiaceae	Parsley Seed	Seed	*	*		*	*
<i>Pimpinella anisum</i> L.	Apiaceae	Anise	Fruit	*			*	*
<i>Trachyspermum ammi</i> (L.) Sprague	Apiaceae	Bishop's Weed Fruit	Fruit		*	*	*	*
<i>Asparagus officinalis</i> L.	Asparagaceae	Common asparagus	Root, seed			*		*
<i>Drimia maritima</i> (L.) Stearn	Asparagaceae	Squill	Bulb	*	*			*
<i>Berberis vulgaris</i> L.	Berberidaceae	Barberry	Fruit	*	*		*	*
<i>Asperugo procumbens</i> L. ^b	Boraginaceae	German Madwort	Herb	*	*			*
<i>Brassica nigra</i> (L.) K.Koch	Brassicaceae	Black mustard	Fruit			*		*
<i>Descurainia sophia</i> (L.) Webb ex Prantl	Brassicaceae	Flixweed	Seed		*	*		*
<i>Lepidium sativum</i> L.	Brassicaceae	garden cress	Leaf, seed		*		*	*
<i>Raphanus raphanistrum</i> subsp. <i>sativus</i> (L.) Domin	Brassicaceae	Black radish	Leaf		*			*
<i>Boswellia sacra</i> Flueck.	Burseraceae	Oliban	Oleogum resin		*	*	*	
<i>Commiphora myrrha</i> (Nees) Engl.	Burseraceae	Common myrrh	Gum				*	
<i>Commiphora gileadensis</i> (L.) C.Chr.	Burseraceae	Balessan	Bark, seed	*	*		*	
<i>Nardostachys jatamansi</i> (D.Don) DC.	Caprifoliaceae	Indian valerian	Root	*		*	*	
<i>Valeriana sisymbriifolia</i> Vahl	Caprifoliaceae	Mountain valerian	Root				*	*
<i>Terminalia bellirica</i> (Gaertn.) Roxb	Combretaceae	bastard myrobalan	Fruit	*		*		
<i>Terminalia chebula</i> Retz.	Combretaceae	Myrobalan Fruit	Fruit	*	*		*	
<i>Artemisia absinthium</i> L.	Compositae	Wormwood	Herb	*		*	*	*
<i>Cichorium intybus</i> L.	Compositae	Chicory	Herb	*		*		*
<i>Doronicum pardalianches</i> L.	Compositae	Leopardsbane	Root	*	*		*	*
<i>Gundelia tournefortii</i> L.	Compositae	Galgal	Leaf, Flower		*		*	*
<i>Inula helenium</i> L.	Compositae	Elecampane	Rhizome	*	*		*	*
<i>Lactuca sativa</i> L.	Compositae	Lettuce	Herb, seed			*		*
<i>Tanacetum balsamita</i> L	Compositae	Costmary	Leaf	*			*	*

<i>Cuscuta epithymum</i> (L.) L.	Convolvulaceae	Clover dod- der	Herb				*	*
<i>Juniperus oxycedrus</i> L.	Cupressaceae	Western Prickly Juniper	Fruit , Bark	*			*	*
<i>Cyperus rotundus</i> L.	Cyperaceae	Nutsedges	Root	*	*	*	*	
<i>Elaeagnus angustifolia</i> L.	Elaeagnaceae	Oleaster	Flower	*			*	*
<i>Dracocephalum multicaule</i> Mont- bret and Aucher ex Benth.	Lamiaceae	Dragonhead	Herb	*	*	*	*	*
<i>Melissa officinalis</i> L. ^b	Lamiaceae	Balm	Herb	*	*			*
<i>Mentha longifolia</i> (L.) L.	Lamiaceae	Wild mint	Herb	*			*	*
<i>Mentha spicata</i> L.	Lamiaceae	Mint	Leaf	*	*	*	*	*
<i>Hyssopus officinalis</i> L.	Lamiaceae	Hyssop	Flower				*	*
<i>Ocimum basilicum</i> L.	Lamiaceae	Basil	Leaf	*			*	*
<i>Salvia macrosiphon</i> Boiss.	Lamiaceae	Wild sage seeds	Seed	*			*	*
<i>Satureja hortensis</i> L.	Lamiaceae	Summer savory	Herb, seed	*		*	*	*
<i>Stachys lavandulifolia</i> Vahl	Lamiaceae	Betony	Flower		*	*		*
<i>Teucrium polium</i> L.	Lamiaceae	Poleyger- mander	Leaf, flower		*			*
<i>Ziziphora clinopodioides</i> Lam.	Lamiaceae	Wild Thyme	Herb	*	*	*		*
<i>Cinnamomum cassia</i> (L.) J.Presl	Lauraceae	Cassia	Bark	*			*	
<i>Cinnamomum verum</i> J.Presl	Lauraceae	Cinnamon	Bark	*			*	
<i>Caesalpinia bonduc</i> (L.) Roxb	Leguminosae	Nicker tree	Fruit	*	*			
<i>Glycyrrhiza glabra</i> L.	Leguminosae	Licorice	Rhizome	*			*	*
<i>Lupinus albus</i> L.	Leguminosae	Yellow Lupine	Seed			*	*	
<i>Tamarindus indica</i> L.	Leguminosae	Tamarind	Fruit pulp	*			*	*
<i>Myristica fragrans</i> Houtt.	Myristicaceae	Nutmeg	Fruit	*	*	*		*
<i>Myrtus communis</i> L.	Myrtaceae	Myrtle	Leaf, fruit	*			*	*
<i>Syzygium aromaticum</i> (L.) Merr. and L.M.Perry	Myrtaceae	Clove	Bud		*	*	*	*
<i>Chelidonium majus</i> L.	Papaveraceae	Greater celandine	Rhizome				*	*
<i>Phyllanthus emblica</i> L.	Phyllanthaceae	Indian gooseberry	Fruit	*		*	*	
<i>Piper betle</i> L.	Piperaceae	Betel nut	Leaf	*	*	*		
<i>Piper cubeba</i> L. ^c	Piperaceae	Cubebs	Fruit	*			*	
<i>Piper longum</i> L.	Piperaceae	Long pepper	Fruit	*	*		*	
<i>Piper nigrum</i> L.	Piperaceae	Black pep- per	Fruit		*		*	*
<i>Bambusa bambos</i> (L.) Voss	Poaceae	Golden Bam- boo	Secretions	*			*	
<i>Cymbopogon jwarancusa</i> subsp. Olivieri (Boiss.) Soenarko	Poaceae	Lemongrass	Root, bud	*		*	*	*
<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Bermudag- rassroot	Rhizome				*	*
<i>Persicaria hydropiper</i> (L.) Delarbre	Polygonaceae	Water-pep- per	Seed		*			*
<i>Rheum ribes</i> L.	Polygonaceae	Rhubarb	Root	*		*	*	*
<i>Rumex conglomeratus</i> Murray	Polygonaceae	clustered dock	Fruit			*	*	*
<i>Portulaca oleracea</i> L.	Portulacaceae	Common Purslane	Seed				*	*
<i>Nigella sativa</i> L.	Ranunculaceae	black cumin	Seed				*	*

<i>Crataegus microphylla</i> K.Koch.	Rosaceae	Hawthorn	Fruit	*	*	*	*
<i>Cydonia oblonga</i> Mill.	Rosaceae	Quince	Fruit	*	*	*	*
<i>Malus domestica</i> Borkh.	Rosaceae	Apple	Fruit	*	*	*	*
<i>Prunus mahaleb</i> L.	Rosaceae	rock cherry	Seed	*	*	*	*
<i>Prunus scoparia</i> (Spach) C.K.Schneid	Rosaceae	Mountain almond	Fruit	*	*	*	*
<i>Pyrus communis</i> L.	Rosaceae	Pear tree	Fruit	*	*	*	*
<i>Rosa canina</i> L.	Rosaceae	Dog-rose	Flower	*	*	*	*
<i>Rosa damascena</i> Herrm.	Rosaceae	Damask rose	Flower	*	*	*	*
<i>Aegle marmelos</i> (L.) Correa	Rutaceae	Bael	Leaf, seed	*	*	*	*
<i>Citrus aurantiifolia</i> (Christm.) Swingle	Rutaceae	Lime Fruit	Fruit	*	*	*	*
<i>Citrus aurantium</i> L.	Rutaceae	Bitter Or- ange Peel	Rind of fruit	*	*	*	*
<i>Citrus medica</i> L.	Rutaceae	Citrus peel	Rind of fruit	*	*	*	*
<i>Ruta graveolens</i> L.	Rutaceae	Common Rue	Leaf	*	*	*	*
<i>Taxus baccata</i> L.	Taxaceae	Yew	Leaf	*	*	*	*
<i>Camellia sinensis</i> (L.) Kuntze	Theaceae	Green tea	Leaf	*	*	*	*
<i>Aquilaria agallocha</i> Roxb. ^c	Thymelaeaceae	Agarwood	Bark	*	*	*	*
<i>Vitis vinifera</i> L.	Vitaceae	Vine grape	Fruit, leaf, Vinegar	*	*	*	*
<i>Alpinia officinarum</i> Hance	Zingiberaceae	Lesser Galangal	Rhizome	*	*	*	*
<i>Amomum subulatum</i> Roxb.	Zingiberaceae	Nepal carda- mom	Fruit	*	*	*	*
<i>Curcuma zedoaria</i> (Christm.) Roscoe	Zingiberaceae	Zedoary	Rhizome	*	*	*	*
<i>Elettaria cardamomum</i> (L.) Maton	Zingiberaceae	Lesser Car- damom	Fruit	*	*	*	*
<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Ginger	Rhizome	*	*	*	*

^aAbbreviations: Ap, appetite; Bl, bloating; Be, belching; Di, digestion; EI, endemic in Iran; Na, nausea; TIM, traditional Iranian Medicine.

^bTwo matches were found for Badranj buye: one was German Madwort (*Asperugo procumbens* L.) from Boraginaceae family and the other was Limon Balm (*Melissa officinalis* L.) from Labiatae. Both have been used as medical treatments.

^cAn unresolved name.

Seventy-eight plants were endemic in Iran. Some plants like green tea were not originally in Iran but had been grown in recent centuries. Plants from Zingiberaceae, Combretaceae, Burseraceae, Piperaceae, Poaceae groups are imported to Iran. Fifty-seven plants mainly from Apiaceae, Lamiaceae, Amaryllidaceae, Zingiberaceae groups were effective for digestion insufficiency. Fifty-eight plants mainly from Lamiaceae, Zingiberaceae, Compositae, Apiaceae families were effective for bloating. Forty plants effective for nausea were from Rosaceae, Apiaceae, Lamiaceae, Zingiberaceae, Rutaceae groups. Thirty-seven plants from Rosaceae and Rutaceae, Apiaceae, Lamiaceae families had appetite-increasing features (Table 1).

According to TIM viewpoint, from those plants effective for different symptoms of dyspepsia, 68 plants had stomach-strengthening characteristics.

3.1. Modern Evidence for the Efficacy of Some Medicinal Plants in Traditional Iranian Medicine Used for the Treatment of Dyspepsia

The systematic review conducted by Thompson coon and Ernst yielded 44 plants effective for FD symptoms (13). The effectiveness of seven of these medicinal plants which we have described in Table 1 has been confirmed in the mentioned study (Table 2).

Some recent evidences for dyspepsia concerning these 7 plants are made as follows:

3.1.1. *Chelidonium majus*

Greater celandine is a member of the Papaveraceae family, which is called Mamiran in TIM. From the viewpoint of TIM, the rhizome of celandine is carminative,

Table 2. Randomized Clinical Trials of Single Herbs Used in the Treatment of Functional Dyspepsia

Author	Name of Herbal Product	Type of Study	Subjects	Treatment Duration	Result	Ref
Ritter et al. 1993.	<i>Chelidonium majus</i>	Placebo-controlled double-blind trial	in patients with functional epigastric complaints	6 wk	Improvement in symptoms: in plant group 60% and in the placebo group 27.6%.	(14)
Raveendra et al. 2012.	<i>Glycyrrhiza glabra</i> L.	Placebo-controlled double-blind trial	50 patients with functional dyspepsia received either placebo or GutGard.	30 d	More effective for all FD symptoms except early satiety than the placebo.	(15)
Salem et al. 2010.	<i>Nigella sativa</i> L.	RCT (study of <i>Nigella sativa</i> and Triple Therapy in Eradication of <i>Helicobacter pylori</i> in Patients with nonulcerdyspepsia)	88 adult patients with dyspeptic symptoms and found positive for <i>Helicobacter pylori</i> infection	4 wk	This plant, while effective for dyspepsia symptoms, showed to be almost as effective as the standard treatment for <i>Helicobacter pylori</i> clearance	(16)
Rafieian et al. 2005.	<i>Ocimum basilicum</i> L.	Placebo-controlled double-blind trial	200 patients with functional dyspepsia	4 wk	Improvement in symptoms: in the plant group 80.25%.	(17)
Chawla et al. 1982.	<i>Phyllanthus emblica</i> L.	Randomized clinical trial with Amalaki and antacids	38 patients (10 patients with peptic ulcer and 28 patients with nonulcer dyspepsia)	4 wk	Effective for FD symptoms and acid reducing	(18)
Dabos et al. 2010.	<i>Pistacia lentiscus</i> Desf.	Placebo-controlled double-blind trial	148 patients with functional dyspepsia	3 wk	Improvement in symptoms: in the plant group 77% and in the placebo group 40%	(19)
Hu et al. 2011.	<i>Zingiber officinale</i> Roscoe	Placebo-controlled double-blind trial	Eleven patients with functional dyspepsia	6 wk	Gastric emptying was more rapid after ginger than placebo, no impact on gastrointestinal symptoms or gut peptides	(20)

antidiarrheal and analgesic properties. Greater Celandine contains at least 20 different alkaloids which have anti-spasmodic action on smooth muscles and also stimulate bile flow. This medicinal plant has antiviral, antibacterial, and anti-inflammatory properties (21, 22). However, the ingestion of celandine can lead to a chronic hepatitis and fibrosis (22).

3.1.2. *Glycyrrhiza glabra* L.

The rhizome of Licorice from Leguminosae family is called Shirinbayan in TIM. According to TIM, Licorice has brain strengthening characteristics, carminative, analgesic and scavenging properties. Research has shown that besides anti-inflammatory and analgesic features Licorice is also enhancing gastric mucus secretion and anti-ulcer activity, anti-*Helicobacter pylori* (15, 23).

3.1.3. *Nigella sativa* L.

The seed of black cumin from Ranunculaceae family is called Siyah-dane in TIM. This plant, according to TIM, is recommended for infection, inflammation, and gastrointestinal problems such as nausea, flatulence, dysentery, and diarrhea. Research has shown that besides anti-inflammatory and immune system features, black cumin is antibacterial (against a wide range of organ-

isms such as *Helicobacter pylori*), histamine release inhibitor, and the gastric anti-secretory, antiulcer activities (16, 24). Black seed and derived thymoquinone have been shown to modulate prostaglandins and leukotrienes production (24).

3.1.4. *Ocimum basilicum* L.

The leaf of Basil (*Ocimum basilicum* L.) from Lamiaceae family is called rehan in TIM. This plant, according to TIM, strengthens stomach, nervous system and is also carminative. Basil has the anti-inflammatory, antibacterial activities and also has been demonstrated to decrease acid and pepsin outputs (17, 25).

3.1.5. *Phyllanthus emblica* L.

The fruit of Amla (*Phyllanthus emblica* L.) is from Phyllanthaceae family. This plant, according to TIM, strengthens heart, nervous system and stomach and is an astringent medicinal plant, anti-nausea and appetite increasing plant. In addition to antibacterial, anti-cancerous, anti-inflammatory effects (26), this medicinal plant also has cytoprotective acid-reducing features (18).

3.1.6. *Pistacia lentiscus* Desf.

A commonly prescribed medicinal plant in TIM is Mas-

tic Gum (*Pistacia lenticus* Desf.) called Mastaki. It is known to positively affect brain, kidney, heart, and liver functions and is also effective for gastrointestinal problems particularly digestion disorder. Research indicates that Mustic Gum act against different microorganisms specially *Helicobacter pylori* (19), urease activity and also has inflammatory features especially against Prostaglandin E2 and Nitric oxide (27, 28). In addition, it is a potent radical scavenging substance (28).

3.1.7. *Zingiber officinale* Roscoe

One medicinal plant used for FD treatment is rhizome of Ginger (*Zingiber officinale* Roscoe) which is called Zanjebil in TIM. According to TIM, this plant is stomach tonic and is effective for digestion problems, bloating, and nausea. Pharmacologically, this plant has free radical scavenging, antioxidant, antiulcer, antibacterial, antispasmodic and anti-inflammatory features (29, 30).

Hu et al. in their study on the effect of ginger on gastric motility showed that this plant increased the speed of gastric motility and gastric emptying more than the placebo. These effects could potentially be beneficial in symptomatic patient groups (20).

3.2. Traditional Iranian Medicine and Dyspepsia

Dyspepsia is with a wide range of symptoms that occurs in upper abdomen. In TIM, digestion insufficiency is seen as one of the stomach diseases. According to TIM, stomach plays an important role in gastric digestion (31).

Various digestive insufficiency causes have been suggested in TIM. These could be classified into two main groups of internal and external causes. Some examples of internal causes are congenital causes like a small size stomach, insufficiency of stomach tissue, stomach ulcer and inflammation, liver disorder, brain disorder, inefficient abdominal membrane lining, and stomach malfunction. Examples of external causes are wrong eating habits, air pollution, unhealthy drinking water, chronic mental disorders, and inappropriate posture or body movements (6, 7, 32).

From TIM perspective, medicinal plants affect pathophysiological causes of digestion disorder in a number of ways. Two major mechanisms are increased temperature in the stomach and facility of gastric motility.

Other mechanisms effective for dyspepsia symptoms in TIM are waste removal and stomach strengthening. From TIM perspectives, nourishing medicinal plants are those which both help remove waste from stomach and also strengthen its tissue against penetration of harmful substances. This could be done through increased gastric motility or the astringent features of the medicinal plant.

By TIM, certain medicinal plants help treat symptoms of dyspepsia due to their pain relieving characteristics. An example of such plants which is both pharmacologically and clinically tested is Mint (*Mentha spicata* L.) from Labiatae family. By TIM, mint induces a feeling of hap-

piness, strengthens stomach, removes waste, relieves pain and treats digestion disorder. Research has shown that besides anti-bacterial, anti-depressive, anti-soporific and analgesic features (33), mint is also antispasmodic. It seems peppermint oil with its calcium influx blocking feature can treat bloating through its antispasmodic effect on smooth muscles of digestive tract (13, 34).

Certain medicinal plants help relieve dyspepsia symptoms via their antidepressant properties. One example is Limon balm (*Melissa officinalis* L.) from Labiatae family. The leaf of this plant which is called *Badranj buye* in TIM has antidepressant and sedative features besides anti-inflammatory and radical scavenging properties (35).

4. Conclusions

Since pathophysiological causes for FD symptoms are varied, there seems to be no single treatment for all patients. Treatment with medicinal plants has attracted the attention of scientists in many countries. Traditional Iranian medicine has paid a great deal of attention to digestive disorders and particularly to digestion insufficiency. Regarding current evidence, it seems that TIM has always prescribed medicinal plants based on their characteristics and the patient's condition. In addition to digestive effects, these plants have had other effects such as effects on brain, cardiovascular, and liver functions. It appears that medicinal plants effective for digestion problem have been used to target more than one dyspepsia problem. Often to achieve multiple target therapies, combinations of medicinal plants have been used in TIM. The followings are the expected effects of medicinal plants in TIM:

They should increase gastric temperature necessary for gastric digestion, remove waste from stomach, relieve pain and bloating, increase gastric motility, be astringent, strengthen brain and cardio-vascular functions, and have sedative effects.

An awareness of various features and functional mechanisms of medicinal plants in treating FD symptoms, in addition to discovery of new medicinal products, will provide physicians with more reliable medicinal options at their disposal for the treatment of these patients who often are suffering from mental disorders, too.

This study is a great report of medicinal plants mentioning in TIM texts for digestive problems. Finding the medicinal plants effective on digestion insufficiency based on TIM could suggest a better strategy for relieving dyspepsia symptoms. Due to lack of enough papers and review articles on TIM viewpoints, searching was difficult.

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Footnote

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