

Prevention and Treatment of Flatulence From a Traditional Persian Medicine Perspective

Bagher Larijani,¹ Mohammad Medhi Esfahani,² Maryam Moghimi,^{3,*} Mohammad Reza Shams Ardakani,³ Mansoor Keshavarz,³ Gholamreza Kordafshari,³ Esmail Nazem,³ Shirin Hasani Ranjbar,¹ Hoorieh Mohammadi Kenari,³ and Arman Zargaran⁴

¹Endocrinology and Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, IR Iran

²Qoran, Hadis and Teb Sciences Research Center, Tehran University of Medical Sciences, Tehran, IR Iran

³School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, IR Iran

⁴Pharmaceutical Sciences Research Center and Department of Traditional Pharmacy, Shiraz University of Medical Sciences, Shiraz, IR Iran

*Corresponding Author: Maryam Moghimi, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, IR Iran. Tel: +98-9125135631, E-mail: mmoghimi60@yahoo.com

Received 2014 September 18; Revised 2014 October 6; Accepted 2014 October 20.

Abstract

Context: The feeling of abdominal fullness, bloating, and movement of gas in the abdomen is a very uncomfortable sensation termed flatulence. Since flatulence is one of the most common gastrointestinal symptoms that is bothersome to patients, it is important to identify effective methods to resolve this issue. In modern medicine, management of flatulence is often not satisfactory. On the other hand, traditional systems of medicine can be considered good potential sources to find new approaches for preventing and treating flatulence. The aim of this study is to review flatulence treatments from a traditional Persian medicine (TPM) viewpoint.

Evidence Acquisition: In this study, the reasons for flatulence and methods for its prevention and treatment are reviewed in traditional Persian medicine (TPM) texts and then related with evidence from modern medicine by searching in databases, including PubMed, Scopus, Google Scholar, and IranMedex.

Results: From a traditional Persian scholar viewpoint, one of the most important causes of flatulence is an incorrect manner of eating; valuable advice to correct bad eating habits will be illustrated. In addition, traditional practitioners describe some herbs and vegetables as well as herbal compounds that are effective food additives to relieve flatulence. The anti-flatulent effect of most of these herbs has been experimentally verified using modern medicine.

Conclusions: Attention to TPM can lead to the identification of new preventive and curative approaches to avoid and treat flatulence. In addition, Persian viewpoints from the medieval era regarding flatulence are historically important.

Keywords: Traditional Persian Medicine (TPM), Modern Medicine, Flatulence

1. Context

The feeling of abdominal fullness, tightness, and movement of gas in the abdomen is a very uncomfortable condition (1). Flatulence is the passage of excessive amounts of gas and the feeling of abdominal fullness and bloating. Flatulence is one of the most common complaints of patients (2). Approximately 15 - 23% of Asians and 15 - 30% of Americans suffer from flatulence (3). Community surveys have revealed that around 10 - 30% of individuals reported bloating during the previous year. The symptom is about twice as common in women as it is in men (4). According to the ROMEIII diagnostic criteria, for a diagnosis of flatulence, a feeling of gas and an observable recurrent distention of the abdomen must have occurred for the first time ≥ 6 months before the patient presents and must have been present ≥ 3 days a month during the last 3

months without any other causative underlying disease. In that case, the condition is called functional flatulence (4, 5). Unfortunately, according to modern medicine, the cause of flatulence cannot be determined in many cases. It may occur due to functional gastrointestinal disorders, irritable bowel syndrome, psychological disorders, or because of aerophagia (2, 6). Modern medicine offers a few methods to treat simple flatulence, such as the consumption of simethicone and its derivatives and some antibiotics (7).

On the other hand, today the world is moving toward integrating complementary and alternative medicine (CAM) into modern medicine. Traditional Persian medicine (TPM) is one of the richest branches of complementary medicine (8). TPM offers a holistic outlook

about health and disease, and its preventive approach precedes its curative one (9, 10). TPM has deep roots in the history of medicine. It dates back thousands of years to an ancient era (11). Persians have a well-developed system of medicine based on a humoral paradigm that existed before Islam (12). In the early Islamic era (9 - 12th century AD), Persian medicine flourished and became the main paradigm of medicine in the east and west (13). Some Persian manuscripts, such as the Canon of Avicenna and Liber continent of Razes, were still the main reference books in western universities until the 17th century AD (14, 15). This traditional system of medicine that has thousands of years of background can be considered a good potential source to find new approaches for the prevention and treatment of many conditions.

Traditional Persian references have been repeatedly discussed; traditional scholars, such as Avicenna and Razes, have comprehensively explained flatulence, its etiology, and preventive and curative methods. They have illustrated exhaustive advice, especially in regards to diet and eating manner modification, to overcome flatulence. In this study, we will discuss the causes, prevention, and remedies of flatulence from a TPM point of view.

2. Evidence Acquisition

As the first step, TPM resources and books, such as Qanun fi al-Tib, Exir-e-Azam, Teb-e-Akbari, Mofarah al-Ghuloob, Makhzan-ol-Advieh, Al-Aghraz al-Tebbieh va al-Mabaheh al-Alayieh, Raz-e-Darman (Table 1), were carefully studied to identify the parts related to digestive and gastrointestinal diseases; flatulence was searched for manually using the terms Nafkh, Nafkhah, and Rih. Next, the definition, etiology, and treatment of this condition were deduced, summarized, and classified. Then, their practical and usable advice and suggestions were noted. The word "flatulence" and the associated medicinal herbs were used as search terms in modern medicine texts and articles via indexing sources such as PubMed, Scopus, Google Scholar, and IranMedex. Finally, experienced and practical advice from TPM for the treatment of flatulence was explained, and evidence of the same methods in modern medicine was illustrated.

3. Results

3.1. Definition of Flatulence From a Traditional Medicine Perspective

In TPM references, flatulence is called Nafkh (19), Nafkhah (20), and Rih (19). Mohammad Akbar Arzani (18th century) and Mohammad Hossein Aghili Khorasani (18th century) wrote that flatulence is the bloating of the abdomen (19, 20), and Mohammad Azam Khan (19th century) verified their statement (22). Seyed Ismaiel Jorjani (12th century) also believed that flatulence is abdominal flatus (17). In traditional scholars' opinion, Nafkh also can occur in the liver, uterus, eyelids, and even muscles and nerves (18); however, the purpose of this article is to discuss gastrointestinal flatulence.

3.2. Etiology of Flatulence From a Traditional Medicine Perspective

Traditional practitioners believed that flatulence had different causes:

1- Occurring cold abnormal temperament (Su-e-Mizaj) in the gastrointestinal tract, especially in the stomach, so that such coldness will weaken its function and digestion will be impaired. This maldigestion produces harmful gases, which will be concentrated in the cold gastrointestinal tract and therefore produce flatus.

2- The amount of food that is eaten can be involved in the production of flatulence. If more than the usual amount of food is eaten, the gastrointestinal system will be weakened. Therefore, it cannot digest food properly, and flatulence will result.

3- The type of food eaten can cause flatulence and bloating in several ways:

- The eaten food may have a wet and cold temperament, like squash and cucumber. Even when eaten in moderate amounts, such foods can produce dense gases as a result of the effect of the gastric temperature on them due to their high water content. In other words, the gastric temperature cannot impoverish these gases and thus, bloating and flatulence will occur.

- Food may have a flatulent nature, such as lentils and other beans.

Table 1. A List of the Persian Manuscripts Used in This Paper

Persian Name	Latin or English Name	Writer	Date Written	Reference
Qanun fi al-Teb	Canon of Medicine	Avicenna	1027	(16)
Al-Aghraz al-Tebbieh va al-Mabaheh al-Alayieh	Medical Pursuits	Jorjani	1131	(17)
Qarabadin-e-Kabir	Great Pharmacopeia	Aghili Khorasani Shirazi	c. 1770	(18)
Makhzan-ol-Advieh	Storehouse of Medicaments	Aghili Khorasani Shirazi	1771	(19)
Teb-e-Akbari	Akbari's Medicine	Arzani	18 th century	(20)
Mofarah al-Ghuloob	-	Arzani	18 th century	(21)
Exir-e-Azam	Great Elixir	Chashti (Azam Khan)	1810	(22)
Hefz-al- Sehat Naseri	-	Gilani	1861	(23)
Raz-e-Darman	Secret of Treatment	Abdollah Ahmadi	19 th century	(24)

- Food may be distasteful or malodorous. Traditional Persian scholars believed that the gastric sense is very strong, so the stomach will benefit from good-smelling substances and will suffer when malodorous edibles are consumed. It is obvious that if the stomach dislikes specific food, it cannot digest the food properly. Consequently, bloating and flatulence will emerge.

- Flatulence can be caused by the accumulation of improper humors (Khelt) in the gastrointestinal tract, such as phlegm or black bile (16, 17, 20, 22).

3.3. Prevention of Flatulence From a Traditional Medicine Perspective

Modification of eating habits as follows can be used to prevent flatulence:

1- Food should be chewed thoroughly, soaked with saliva, and then taken down to the stomach.

2- Food should not be eaten before feeling hungry. In other words, only eat when you feel hungry. You should stop eating before feeling complete fullness.

3- Food should be eaten slowly and calmly.

4- Pleasurable and funny subjects should be talked about while sitting around the table to eat food.

5- Drinking beverages while eating food or immediately after should be avoided.

6- Eating salad, yogurt, and other side dishes along with the main food should be discouraged.

7- Beverages, vegetables, and fruits should be consumed at least 1-1.5 hours after the main food.

8- To prevent flatulence, some kinds of foods should be avoided:

Fatty and fried foods, very sour, spicy and chilly foods, coffee and cacao, strong tea, ice and beverages cooled by it, pasty foods, flatulent cereals, such as beans (*Phaseolus vulgaris* L.) and lentils (*Lens culinaris* Medikus) and vegetables including cabbage (*Brassica oleracea* L.), raw beets (*Beta vulgaris* L.), turnips (*Brassica rapa* var. *rapa* L.), garlic (*Allium sativum* L.) and onions (*Allium cepa* L.), and fruits like peaches (*Prunus persica* (L.) Stokes), plums (*Prunus* spp.), cucumbers (*Cucumis sativus* L.), and squash (*Cucurbita pepo* Mill.), oranges (*Citrus × sinensis* (L.) Osbeck), and tangerines (*Citrus tangerine* Tanaka) (21, 23, 24).

3.4. Treatment of Flatulence Through Diet From a Traditional Medicine Perspective

1- Drinking a cup of boiling water 30 minutes before breakfast is recommended (25).

2- At breakfast time, the consumption of citron (*Citrus medica* L.), apple (*Malus domestica* Borkh, 1803) or quince (*Cydonia oblonga* Mill.) jam or butter and honey with toasted bread is recommended without drinking any beverages, such as tea or milk (16, 17, 19, 20, 22).

3- It is better for patients who suffer from flatulence to consume easily digestible foods, such as roasted chicken and low-fat soups and stewed foods (24).

4- It is highly recommended that patients eat currants, dried figs, and whole grain bread to eliminate the constipation that follows the alleviation of flatulence (19).

5- In the case of rice consumption, adding some herbs and spices, such as dill (*Anethum graveolens* L.), coriander (*Coriandrum sativum* L.) and cumin (*Cuminum cyminum* L.), is useful (16-20, 22).

6- Adding some herbs, such as dill, parsley (*Petroselinum crispum* (Mill.) Fuss), basil (*Ocimum basilicum* L.), spearmint (*Mentha × spicata* L.), and savory (*Satureja hortensis* L.), to the daily diet is another recommendation (16-18, 20, 22, 24).

7- Using ginger (*Zingiber officinale* Roscoe 1807), celery (*Apium graveolens* L.) seed, thyme (*Thymus vulgaris* L.), fennel (*Foeniculum vulgare* Mill.), anise (*Pimpinella anisum* L.), and cumin as condiments in foods is beneficial to remove flatulence (16-18, 20, 22, 24).

8- When consuming yogurt, it is advised to add some thyme and salt to it (24).

3.5. Treatment of Flatulence on the Basis of Herbal Compounds From a Traditional Medicine Perspective

1- The combination of black cumin (*Nigella Sativa* L.) with ajwain (*Trachyspermum ammi* Sprague) is highly recommended in equal amounts (the same size tablespoon for each one) at the beginning and the end of the meal.

2- Grind 1 - 2 tablespoons of cow parsnip fruit (*Heracleum persicum* Bartram) softly and mix it with the same amount of rock candy powder and sour orange blossom extract and then use the mixture (24).

3- Mix a compound of 20 g ajwain, 5 g black cumin, 10 g celery seed, 15 g anise, and 20 g mastic (resin obtained from *Pistacia lentiscus* L) with a small amount of sugar and use it (24).

4- Imam Sadeq (the sixth Imam of Twelver Shi'ites) said: "Grind black cumin and mix the content with honey and then use it for treatment of abdominal flatulence." (25)

5- Elsewhere in his remarks, Imam Sadeq said: "When thyme and salt are mixed with each other, it wards off abdominal bloating and opens the obstructions. Mixture of thyme and salt improves the stomach" (25).

6- Imam Sadeq also recommended a drug named Dava e Balgham for the treatment of flatulence. He said: Grind mastic, ajwain, thyme, and black cumin (equal amounts from each one) and mix them with honey. Then eat 3.5 g of that mixture two times daily: in the morning before breakfast and at night (18).

7- Mix a compound of ground ajwain, anise, cumin, and caraway (*Carum carvi* L.; 5 g from each) with a little rock candy powder and use three tablespoons of it a day (24).

8- Grind 10 g cumin, 10 g fennel, and 5 g anise and mix them. Pour them in one boiling glass of water and leave it for 20 minutes. Then, drink a cup of the mixture half an hour after the meal (24).

9- Grind 15 g thyme, 15 g ajwain, and 15 g cumin and mix

them with two cups of sugar. Use one dessertspoon of the mixture after the meal (24).

10- Pomegranate (*Punica granatum* L.) and spearmint syrup: Boil 600 total g of sour and sweet pomegranate juice with 300 g sugar and 12 g spearmint extract and mix them well (26).

11- Mix 30 g castor (*Ricinus communis* L.) oil with 180 g anise extract, and rub the mixture on the stomach twice daily (22).

12- Wrap warmed wheat bran and salt and/or dill leaves in a cloth and put it on the stomach (22).

13- Anointing dill oil or mastic oil on the stomach is recommended in TPM to treat abdominal flatulence (22, 27).

14- One of the treatment methods of disease in TPM is cupping therapy. Traditional scholars believed that hot cupping therapy of the stomach can eliminate flatulence (16, 22, 27).

The passing of intestinal gas is a normal process, but it can become unpleasant, uncomfortable, or embarrassing, in which case it is called flatulence. Since flatulence is one of the most common gastrointestinal symptoms that bothers patients, and management of this condition is often not satisfactory (28), it is important to search for more effective methods of treatment. In modern medicine, although the functional flatulence criteria require the absence of other disorders, most research has been done on patients who have irritable bowel syndrome (IBS) (4). On the other hand, TPM texts are valuable repositories of traditional medical information, and it is a pity that this resource is not used more often. In these texts, flatulence is called Nafkh, Nafkiah and Rih and is explained as bloating of the abdomen and the presence of flatus within it. Traditional Persian scholars believed that cold dyspepsia of the gastrointestinal system will weaken the stomach and intestines; their internal temperature, which is essential for good digestion and indigestion, can cause flatulence (16, 17, 19, 20, 22, 24).

They also explain essential schemes for health maintenance; one of the most important of them is a correct manner of eating. They believed that an improvement in eating habits will prevent most illnesses (16, 21, 23, 28, 29). As mentioned in the main causes for the creation of flatulence, eating food without chewing it well will weaken the stomach and consequently impair digestion. This issue is of paramount importance when the patient is very hungry, which will compel him to eat more food rapidly. From a TPM viewpoint, this manner of eating will extinguish the gastric internal temperature and weaken it, so gastric digestion will not be carried out properly. In addition, much air will be swallowed, which will consequently cause flatulence and other gastrointestinal tract discomforts and diseases (16, 24). In modern medicine, patients with flatulence, for example IBS patients, are advised to eat slowly, chew their food well, and not to chew gum (to avoid aerophagia) (28).

Drinking beverages along with food also weakens the internal gastric temperature, therefore impeding the act

of digestion (16, 17, 20, 22). It is suggested that digesting enzymes cannot operate well in a diluted gastric environment. This maldigestion can cause flatulence and produce gases in the abdomen (24).

It is mentioned in the results that talking about joyful subjects during meals is useful for the prevention of flatulence. It is obvious that happiness has a positive effect on health (30). In this respect, the late Dr. Abdollah Ahmadiyeh (1886 - 1959) wrote in his book, *Raz-e-Darman*: "laughter and mirthfulness stimulates the digestive tract and boosts its movement and consequently, will ease digestion and absorption of food in gastrointestinal system. Laughter and happiness will provoke intestines more and also will ease warding off redundant and waste substances" (24).

Eating any side dishes, such as yogurt and salad, along with the main food is forbidden. From a TPM point of view, digestion of side dishes in the stomach requires a shorter amount of time than the digestion of the main food. This difference may impair the function of digestion, and the food will therefore be spoiled in the stomach. Consequently, it may cause a stomachache and flatulence. Beverages, fruits, and other side dishes should be eaten 1 - 1.5 hours after the main food (16, 21, 23).

Traditional scholars have prohibited flatulent patients from eating fried, spicy, and chilled foods because of their irritant effect on the stomach (16, 21, 23). Drinking iced beverages produces bad humors and a cold dyspepsia in the gastrointestinal tract according to TPM, and flatulence may result (16, 20, 22). Eating flatulent cereals should also be avoided unless anti-flatulent vegetables and condiments, which will be discussed later, are added to them (16, 17, 20, 22). Modern medicine also recommends avoiding the consumption of some types of foods, particularly junk food, fast foods, and other edibles that are full of irritating additives or preservatives, high cholesterol, highly spiced foods, caffeine, carbonated beverages is advised; most of these provoke gastric acid secretions and dyspepsia followed by indigestion, which may cause flatulence (4, 28, 31). In addition, eating flatogenic foods, such as legumes and cabbage, may aggravate the symptoms; these should be excluded from the diet (4, 28).

In regards to the treatment of flatulence, some dietary advice and tips are illustrated in TPM. Drinking a cup of boiling water 30 minutes before breakfast, eating easily digested foods, and consuming currants, dried figs, and whole grain bread alleviates the constipation and stomachache derived from flatulence (21, 24). It has been verified in modern medicine that bloating may decrease if the associated constipation is improved (4, 28).

Traditional Persian scholars believed that the consumption of citron, apple, or quince jam at breakfast time will strengthen the gastrointestinal system and restore the function of digestion. Therefore, flatulence may not occur provided that these foods are eaten with toasted bread and without tea, milk, or other beverages, as mentioned above (19, 21, 23). Quince is good for the stomach

and liver and cures halitosis. Citron also improves the gastrointestinal system; its jam helps to digest food and removes flatulence from the abdomen (19). In modern medicine, the gastroprotective and anti-flatulent effects of apple and quince have also been illustrated (32, 33).

Adding some vegetables and condiments to the ordinary diet is beneficial to remove flatulence. According to TPM, dill digests food well, improves stomachaches, and prevents stomach weakness as well as avoids spoilage of food in the body. Moreover, dill removes bad humors from the stomach and eliminates flatulence. If meat is cooked with dill, any bad odors are removed, and the meat is cooked quickly and is easily digested (19). In modern medicine, the anti-flatulent effects of dill have also been explained, particularly in babies and young children (34, 35). The carminative volatile oil in dill improves appetite, relieves gas, and aids in digestion (33, 35, 36). Dill water is believed to have a soothing effect and is given to babies to treat gripe and relieve hiccups and colic. Dill also can be advised for nursing mothers and will then be transferred to the baby in the milk to help prevent colic (37). According to TPM, parsley, basil, and spearmint are believed to clean spoiled humors from the stomach, prevent stomach weakness, and also remove flatulence (19). In modern medicine, the anti-flatulent effect of these three plants and their influence on improving the gastrointestinal tract have been explained (33, 38-40). Parsley is listed by the council of Europe as a natural source of food flavoring (41). Basil extract is now used as a carminative herbal drug. Spearmint contains 87% carvone, which offers effective anti-flatulent characteristics (33).

Traditional scholars believed that coriander improves gastric orifices and prevents the rising of harmful gases from the stomach towards the brain, which traditional scholars believed was the cause of headache (16, 17, 19, 20, 22). These scholars also advocated adding thyme to foods to facilitate digestion, remove flatus, and clean bad humors from the stomach. Moreover, thyme also prevents the rising of harmful gases from the stomach towards the brain and additionally relieves abdominal pain (19). Modern medicine has confirmed that coriander and its oils (containing 65 - 70% linalool) and thyme (containing thymol) are used as carminatives (33, 42).

Persian traditional scholars advised some herbal compounds to relieve flatulence. Ginger, cumin, celery seed, fennel, anise, black cumin, ajwain, cow parsnip fruit, mastic, and caraway are used for this purpose. From a TPM viewpoint, these herbs improve the digestive system, remove accumulated gases from the gastrointestinal tract, relieve abdominal pain, and cleanse the stomach from any bad humors that have adhered to it. Furthermore, ginger has a laxative effect (19). In the modern era, these plants are also used as a remedy against a variety of gastrointestinal disorders, e.g. indigestion, flatulence, colic pain, etc. and it is believed that their essential oils have aromatic, carminative, and stomachic properties (43). It is believed that compounds of ginger, like gingerols and

shogaol, produce enhanced gastrointestinal activity; ginger is used as a carminative (33, 42). New medical articles have explained the carminative effect and the effectiveness of fennel and anise in improving the gastrointestinal tract (33, 42, 44, 45). *Nigella sativa* contains alkaloids and volatile oils and has also been used as a carminative; the carminative and antispasmodic properties of caraway have been experimentally verified. Mastic is a protective agent for the stomach, and investigations at the University of Nottingham medical school indicated success in the treatment of gastric ulcers using mastic. Recent studies have shown that mastic can kill *Helicobacter pylori* (28, 46). Cumin (containing 25 - 35% cuminaldehyde pinene and alpha terpinol) improves gastrointestinal function and is effective in the removal of flatulence (33, 42, 46). The ajwain seed possess stimulant, antispasmodic, and carminative properties. Thymol is the main component of its seed (about 50% of the essential oil of seed) that is used for gastrointestinal ailments. It is an important remedial agent for flatulence (33, 47). Hexyl butyrate (56.5%), octyl acetate (16.5%), hexyl 2-methylbutanoate (5.2%), and hexyl isobutyrate (3.4%) were identified as major constituents of the *Heracleom persicum* essential oil. Due to the presence of these components, the plant is used medicinally to relieve flatulence and stomachaches, and is also a flavoring agent (48, 49).

4. Conclusions

One of the most important causes of flatulence is an incorrect manner of eating. TPM suggested that modifications and corrections of eating habits are the best solutions for the treatment of flatulence. They proposed some valuable advice, such as eating simple and easy-to-digest foods, and some effective additives and herbal compounds to take to overcome flatulence. Paying greater attention to TPM may lead to the discovery of new preventive and curative approaches to avoid and treat flatulence. In addition, the Persian point of view in the medieval era about flatulence is historically important. This review shed light on some parts of the history of medicine in medieval Persia and suggested potential remedies to manage flatulence supported by current findings and evidences. However, further investigations will be needed to evaluate these suggestions in experimental and human studies to approve new natural remedies based on traditional knowledge.

Footnote

Authors' Contribution: Study concept and design: Maryam Moghimi, Hoorieh Mohammadi Kenari; acquisition of data: Maryam Moghimi; analysis and interpretation of data: Maryam Moghimi, Arman Zargaran; drafting of the manuscript: Maryam Moghimi, Hoorieh Mohammadi Kenari; critical revision of the manuscript for important intellectual content: Gholamraza Kordafshari, Shirin Hasani Ranjbar, Arman Zargaran, Esmail Nazem;

study supervision: Bagher Larijani, Mohammad Mehdi Esfahani, Mansoor Keshavarz, Mohammad Reza Shams Ardakani.

References

- Di Stefano M, Miceli E, Missanelli A, Mazzocchi S, Tana P, Corazza GR. Role of colonic fermentation in the perception of colonic distention in irritable bowel syndrome and functional bloating. *Clin Gastroenterol Hepatol*. 2006;**4**(10):1242-7. doi: 10.1016/j.cgh.2006.07.004. [PubMed: 16979386]
- Venero Nazario B. [Evaluation of the effect of nitazoxanide compared with placebo in patients with flatulence at the ambulatory consultation of the Central Clinic of Inppares-Lima]. *Rev Gastroenterol Peru*. 2008;**28**(1):30-6. [PubMed: 18418454]
- Lacy BE, Gabbard SL, Crowell MD. Pathophysiology, evaluation, and treatment of bloating: hope, hype, or hot air? *Gastroenterol Hepatol (NY)*. 2011;**7**(11):729-39. [PubMed: 22298969]
- Longstreth GF, Thompson WG, Chey WD, Houghton LA, Mearin F, Spiller RC. Functional bowel disorders. *Gastroenterology*. 2006;**130**(5):1480-91. doi: 10.1053/j.gastro.2005.11.061. [PubMed: 16678561]
- Douglas A, Drossman MD. *The Functional Gastrointestinal Disorders*. Virginia: McLean; 2006. pp. 2-4. 509-19.
- Sharifi Alon Abadi AR, Elsagh M, Haji Heydari MR, Borhani M, Yavari M, Babaiean M, et al. Flatulence; from Traditional Persian Medicine to Modern medicine. *Islam Iran Trad Med J*. 2012;**2**(4):353-61.
- Walsh D, Caraceni AT, Fainsinger R, Foley K. *Palliative Medicine*. Philadelphia: Saunders Elsevier; 2008. p. 453.
- Jafari F, Zafarhandi N, Alizadeh F, Alizadeh M, Karimi M, Moradi F. A Study on The Frequency of Signs And Symptoms of Dystemperament in Retention and Infrequent Uterine Hemorrhage From Viewpoint of Traditional Iranian Medicine. *Daneshvar Med J*. 2012;**19**(95):55.
- Shams Ardakani MR. *A review on history and principles of Islamic and Traditional Persian Medicine*. Tehran: Sahbaye Danesh Press; 2010. p. 67. 84.
- Zargaran A, Azizi A, Kordafshari G, Borhani-Haghighi A. Rhazes contribution to the role of nutrition in preventive medicine and public health. *Iran J Public Health*. 2014;**43**(10):1461. [PubMed: 26056653]
- Mohagheghzadeh A, Zargaran A, Daneshamuz S. Cosmetic sciences from ancient Persia. *Pharm Hist (Lond)*. 2011;**41**(2):18-23. [PubMed: 21879676]
- Zargaran A. Ancient Persian medical views on the heart and blood in the Sassanid era (224-637 AD). *Int J Cardiol*. 2014;**172**(2):307-12. doi: 10.1016/j.ijcard.2014.01.035. [PubMed: 24495650]
- Zargaran A, Zarshenas MM, Karimi A, Yarmohammadi H, Borhani-Haghighi A. Management of stroke as described by Ibn Sina (Avicenna) in the Canon of Medicine. *Int J Cardiol*. 2013;**169**(4):233-7. doi: 10.1016/j.ijcard.2013.08.115. [PubMed: 24063916]
- Zargaran A, Mehdizadeh A, Zarshenas MM, Mohagheghzadeh A. Avicenna (980-1037 AD). *J Neurol*. 2012;**259**(2):389-90. doi: 10.1007/s00415-011-6219-2. [PubMed: 21887514]
- Zarshenas MM, Mehdizadeh A, Zargaran A, Mohagheghzadeh A. Rhazes (865-925 AD). *J Neurol*. 2012;**259**(5):1001-2. doi: 10.1007/s00415-011-6398-x. [PubMed: 22302275]
- Avicenna. *Qanun fi al Tib [Canon of Medicine]*. Beirut: Ehyaol Toras al-Arabi Press; 2010. pp. 126-35. 310.
- Jorjani SI. *Al-Aghraz al-Tebbieh va al-Mabahas al-Alayieh [Medical Pursuits]*. Tehran: Tehran University Press; 2005. p. 631.
- Aghili Khorasani Shirazi MH. *Qarabadin-e-Kabir [Great Pharmacopeia] (Lithograph in Persian)*. Tehran: Mahmoudi Press; 1970. p. 550. 942.
- Aghili Khorasani MH. In: *Makhzan-ol-Adviyah [Storehouse of Medicaments]*. Shams Ardakani MR, Rahimi R, Farjadmand F, editors. Tehran: Tehran University of Medical Sciences; 2009.
- Arzani MA. In: *Teb-e-Akbari [Akbari's Medicine]*. Ehya Teb e Tabiee O, editor. Tehran: Jalaleddin Press; 2008. pp. 641-2.
- Arzani MA. *Mofarah al-Gholoob (lithograph in Persian)*. Lahore: Es-lamiah Press; 1915. pp. 297-325.
- Chashti MA. *Exir-e-Azam [Great Elixir]*. Tehran: Research Institute for Islamic and Complementary Medicine; 2008. p. Vol2.
- Gilani MK. In: Hefz al-Sehat Naseri. Chooapani R, editor. Tehran: Almaee Press; 2009.
- Ahmadih A. *Raz-e-Darman [Secret of Treatment]*. Tehran.. Eqbal Publications; 2010.
- Daryae M. *Daneshnameh Teb-e-Ahl-e-Beyt*. Tehran: Payam Kitab Press; 2009. p. 467. 768.
- Kermani MK. In: *Daqaq-al Alaj*. Zia Ebrahimi I, editor. Kerman: Saadat Press; 1983. p. 237.
- Razes. *Al Havi [Liber Continent]*. Beirut: Ehyaol Toras al-Arabi Press; 2001.
- Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J. *Harrison's Principles of Internal Medicine 18E Vol 2 EB*. New York: McGraw Hill Professional; 2012.
- Zarshenas MM, Khademian S, Moein M. Diabetes and related remedies in medieval Persian medicine. *Indian J Endocrinol Metab*. 2014;**18**(2):142-9. doi: 10.4103/2230-8210.129103. [PubMed: 24741508]
- Sabatini F. The relationship between happiness and health: evidence from Italy. *Soc Sci Med*. 2014;**114**:178-87. doi: 10.1016/j.socscimed.2014.05.024. [PubMed: 24934667]
- Nneli RO, Nwafia WC, Orji JO. Diets/dietary habits and certain gastrointestinal disorders in the tropics: a review. *Niger J Physiol Sci*. 2007;**22**(1-2):1-13. [PubMed: 18379611]
- Hamauzu Y, Inno T, Kume C, Irie M, Hiramatsu K. Antioxidant and antiulcerative properties of phenolics from Chinese quince, quince, and apple fruits. *J Agric Food Chem*. 2006;**54**(3):765-72. doi: 10.1021/jf052236y. [PubMed: 16448180]
- Salehi Sourmaghi MH. *Giahan-e-darooie va giah darmani (Medical herbs and herbal therapy)*. Tehran: donyaye taghzieh press; 2010.
- Pullaiah T. *Medicinal plants in India*. New delhi: Regency publications; 2002.
- Jana S, Shekhawat GS. Anethum graveolens: An Indian traditional medicinal herb and spice. *Pharmacogn Rev*. 2010;**4**(8):179-84. doi: 10.4103/0973-7847.70915. [PubMed: 22228959]
- Rathish NAIR, Sumitra VC. Antibacterial activities of some medicinal plants of the western region of India. *Turk J Biol*. 2007;**31**:231-6.
- Kaur GJ, Arora DS. Bioactive potential of Anethum graveolens, Foeniculum vulgare and Trachyspermum ammi belonging to the family Umbelliferae-Current status. *J Med Plants Res*. 2010;**4**(2):087-94.
- Spirling LI, Daniels IR. Botanical perspectives on health peppermint: more than just an after-dinner mint. *J R Soc Promot Health*. 2001;**121**(1):62-3. [PubMed: 11329700]
- Sidhu K, Kaur J, Kaur G, Pannu K. Prevention and cure of digestive disorders through the use of medicinal plants. *J. Hum. Ecol*. 2007;**21**(2):113-6.
- Kligler B, Chaudhary S. Peppermint oil. *Am Fam Physician*. 2007;**75**(7):1027-30. [PubMed: 17427617]
- Gbolade AA, Lockwood GB. *Petroselinum crispum (Mill.) Nyman (Parsley): In Vitro Culture, Production and Metabolism of Volatile Constituents. Medicinal and Aromatic Plants XI.. Berlin Heidelberg: Springer; 1999. pp. 324-36.*
- Evans WC. *Trease and Evans pharmacognosy*. China: Harcourt publishers; 2002.
- Kaur GJ, Arora DS. Antibacterial and phytochemical screening of Anethum graveolens, Foeniculum vulgare and Trachyspermum ammi. *BMC Complement Altern Med*. 2009;**9**:30. doi: 10.1186/1472-6882-9-30. [PubMed: 19656417]
- Turkyilmaz Z, Karabulut R, Sonmez K, Can Basaklar A. A striking and frequent cause of premature thelarche in children: Foeniculum vulgare. *J Pediatr Surg*. 2008;**43**(11):2109-11. doi: 10.1016/j.jpedsurg.2008.07.027. [PubMed: 18970951]
- Kreydiyyeh SI, Usta J, Knio K, Markossian S, Dagher S. Aniseed oil increases glucose absorption and reduces urine output in the rat. *Life Sci*. 2003;**74**(5):663-73. [PubMed: 14623036]
- Koppula S, Choi DK. Cuminum cyminum extract attenuates scopolamine-induced memory loss and stress-induced urinary biochemical changes in rats: a noninvasive biochemical approach.

- Pharm Biol.* 2011;**49**(7):702-8. doi: 10.3109/13880209.2010.541923. [PubMed: 21639683]
47. Bairwa R, Sodha RS, Rajawat BS. *Trachyspermum ammi*. *Pharmacogn Rev.* 2012;**6**(11):56-60. doi: 10.4103/0973-7847.95871. [PubMed: 22654405]
48. Hemati A, Azarnia M, Angaji AH. Medicinal effects of *Heracleum persicum* (Golpar). *Middle-East J. Sci. Res.* 2010;**5**(3):174-6.
49. Asgarpanah J, Dadashzadeh Mehrabani G, Ahmadi M, Ranjbar R, Safi-Aldin Ardebili M. Chemistry, pharmacology and medicinal properties of *Heracleum persicum* Desf. Ex Fischer: A review. *J Med Plants Res.* 2012;**6**(10):1813-20.

Archive of SID