

# Constipation and Laxative Herbs in Iranian Traditional Medicine

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## Abstract

**Context:** Constipation is one of the most prevalent gastrointestinal disorders and is characterized by stiffness of waste and difficult defecation. In modern medicine, different laxative drugs are used for the treatment of constipation, but they are not without side effects. Nonetheless, the appropriate use of herbal medicines can be beneficial for treating this disorder. Therefore, this study attempted to draw together some pharmacological and medical insights into the management of constipation through the use of Iranian traditional medicine (ITM).

**Evidence Acquisition:** In this review article, we initially researched constipation and laxative herbs using some of the most famous ancient medical and pharmacological textbooks pertaining to Iranian medicine written from the 10<sup>th</sup> to 18<sup>th</sup> century AD. This includes The canon of medicine by Avicenna (10<sup>th</sup> and 11<sup>th</sup> centuries, Beirut publication), Makhzan-ol-advie by Aghili (18<sup>th</sup> century, Tehran University of Medical Science Press), and Al-shamel by Gharashi (13<sup>th</sup> century, Cultural foundation Publication). Then we extracted the names and laxative mechanisms of some herbs prescribed for constipation through ITM. Finally, a search of scientific databases such as PubMed and Google Scholar was performed to find related works concerning laxative mechanisms.

**Results:** In ITM doctrine, laxatives are weak purgatives that lead to the defecation of waste from the gastrointestinal tract. From this perspective, laxative herbs can be classified into two groups based on their nature: laxative herbs with a hot nature cause the dilution and flowing of humors, but herbs with a cold nature function as laxatives due to their mucilage properties. Each of the laxatives was used in accordance with the primary reason for constipation.

**Conclusions:** This study presents medical and pharmacological approaches in ITM for dealing with complications arising from constipation. Considering the optimistic results, these herbs can be used as a means of constipation management and further investigation into this area can potentially lead to the formulation of new drugs.

**Keywords:** Constipation, Laxative, Humors, Herbs

## 1. Context

Constipation is a disorder of the gastrointestinal tract that causes waste stiffness, pain, and difficulty defecating (1). It is one of the most common afflictions, especially in industrial societies. It has been shown that almost 16 percent of adults and 12 percent of children suffer from constipation. The prevalence of constipation depends on how constipation is defined. Some individuals may experience restricted symptoms but do not accept that they actually suffer from constipation (2). Nowadays, various treatments are available for constipation. Different laxatives are used for constipation, such as bulk agents, emollient agents, and stimulant drugs. Laxatives are not without adverse effects because constipation is a chronic disorder and laxative drugs need to be used over a long period of time

(2, 3). Due to the high prevalence of constipation, an increasing people tendency to use herbal remedies, and side effects of long-term use of laxative drugs, we have decided to investigate constipation and laxative herbs in the context of traditional Iranian medicine.

Iranian traditional medicine, hereafter referred to as ITM, is an ancient temperamental medicine with a rich literature about constipation. In ITM, the major principle related to the treatment of any disease is the elimination of its primary cause and modifying the six principles of a healthy lifestyle accordingly (4). Due to the variety of causes of constipation, patient history and a physical examination can help to uncover the main reasons for this disease and offer a cure that is simple and cost effective.

This study is a survey that investigates different credible textbooks pertaining to ITM. It presents some of the

herbs that are used as laxatives for constipation treatment and expresses their laxity mechanisms. The aim of this study is to find new and safe solutions for treating and curing constipation through the recognition of a variety of herbs that are used in ITM

## 2. Evidence Acquisition

### 2.1. Methodology

In this review article, we studied printed versions of the three most important textbooks pertaining to ITM, namely The canon of medicine by Avicenna (10<sup>th</sup> and 11<sup>th</sup> centuries, Beirut Publication), Makhzan-ol-advie by Aghili (18<sup>th</sup> century, Tehran University of Medical Sciences Press), and Al-shamel by Gharashi (13<sup>th</sup> century, Cultural foundation Publication). The first book is the most important clinical textbook while the latter two are the most important pharmacological texts that have been taught in traditional medicine schools in Iran.

First, the definition of constipation was expressed from the perspective of traditional medicine by searching the terms constipation and ghulenge in gastrointestinal chapters within the textbooks. Then we collected texts appertaining to the definition of constipation as well as its etiology and treatment. Additionally, by using the pharmacological texts and searching the terms purgative and laxative, we found some of the well-known herbs prescribed for the treatment of this disease. Hereafter, the nature of these herbs and their laxative mechanisms from the perspective of traditional medicine were evaluated and collected in [Tables 1](#) and [2](#). The book Matching the old medicinal plant names with scientific terminology was studied for the nomenclature of medicinal plants. For these herbal remedies, a search of scientific databases, such as PubMed and Google Scholar, was performed between 2000 and 2013 in order to find related works concerning laxative effects, and the results were sorted alphabetically in [Tables 1](#) and [2](#).

### 2.2. Definition of Constipation in ITM

Constipation in the context of ITM is known as an abdominal block. It is one of the primary aspects of many diseases, such as intestinal colic and other types of colic. It is therefore known as mother of diseases. According to the characteristics of normal stool, constipation is defined according to three aspects 1, quantity: in constipation, stool volume is less than the volume of food consumed; 2, consistency: stool is firm and dry; and 3, time: it occurs more than 12 to 24 hours after consuming a meal (8).

### 2.3. Etiology of Constipation in ITM

From the perspectives of ITM scholars, there exist three causes for constipation: nutritional factors, intra-intestinal factors, and extra-intestinal factors.

Nutritional factors include eating dry food and fruit, like corn, rice, dried bread, and banana, and using drugs with a dry temperament, such as diuretics, as well as eating small amounts of food. Intra-intestinal factors include intestinal inflammations, invagination, intestinal hernia, the presence of parasitic worms, very dry stool, narcotic drugs, weak digestion, and dry or cold *dystemperament* of the bowel. Extra-intestinal factors include abdominal sphincter muscle weakness, cold weather leading to an increase in urination frequency and dried feces, and having jobs such as glass casting and forging. Additionally, intense sweating through heavy exercise or hot baths is among the factors that cause dryness and can lead to constipation. As a compensation mechanism for this dryness, water is gathered from the deeper organs, e.g., the intestines, which in turn leads to constipation (8).

### 2.4. Treatment of Constipation in ITM

According to the sages of ITM physicians, the following items are recommended before prescribing laxatives:

- 1, Avoid eating dry foods such as oak, rice, corn, and tart apples.
- 2, Avoid taking narcotic drugs.
- 3, Eat regular meals.
- 4, Drink extra fluid, especially during exercise and in hot weather.
- 5, Keep the body warm in cold weather.
- 6, Reduce black bile humor if it is high.
- 7, Regulate excretion and defecation.

It is also recommended to consume vegetables, such as spinach and lettuce, and slippery foods, like Iranian stews (9).

#### 2.4.1. Definition of Laxative in ITM

Before establishing a definition of laxative in the context of traditional medicine, it is necessary to present working definitions of humors and temperament. ITM physicians believe that after digestion, food is converted to a fluid called humor. The humor can be classified into four types: blood, phlegm, yellow bile, and black bile (9). The foundation of health holds the right ratio and specific balance of humors based on their quality and quantity (10). Temperament refers the dominant quality of the composite object, which is formed according the interaction of four basic elements (hot, cold, wet, and dry) (11). Temperament is an important function in maintaining the ideal

**Table 1.** Laxative Herbs With a Hot Nature

| Number | Scientific Name (5)               | Traditional Name (6, 7) | Nature (6, 7) | Part of Usage (6, 7) | Medication Form (6)                  | Mode of Application (6) <sup>a</sup> |
|--------|-----------------------------------|-------------------------|---------------|----------------------|--------------------------------------|--------------------------------------|
| 1      | <i>Alhagi mannifera</i>           | Taranjabin              | Hot and wet   | Oleo gum resin       | Infusion and Decoction               | Singular, Compound                   |
| 2      | <i>Aloe littoralis</i>            | Sabr                    | Hot and dry   | Mucilage of leaves   | Latex                                | Compound                             |
| 3      | <i>Althea officinalis</i>         | Khatmi                  | Hot and wet   | Flower               | Mucilage                             | Compound                             |
| 4      | <i>Carthamus lanatus</i>          | Ghortom                 | Hot and dry   | Seed kernel          | Seed                                 | Compound                             |
| 5      | <i>Cassia angostifolia</i>        | Senna                   | Hot and dry   | Leaves               | Powder, Decoction                    | Singular, Compound                   |
| 6      | <i>Cassia fistula</i>             | Floos                   | Hot and dry   | Fruit                | Latex, Syrup                         | Singular, Compound                   |
| 7      | <i>Commiphora mukul engle</i>     | Moghl                   | Hot and dry   | Oleo gum resin       | Gum resin                            | Compound                             |
| 8      | <i>Cotoneaster numularioides</i>  | Shirkhesht              | Hot and wet   | Oleo gum resin       | Infusion, Decoction                  | Singular, Compound                   |
| 9      | <i>Dorema ammoniacum</i>          | Oshagh                  | Hot and dry   | Oleo gum resin       | Gum                                  | Compound                             |
| 10     | <i>Ficus carica</i>               | Anjir                   | Hot and dry   | Fruit                | Ripe Fruit, Syrup                    | Singular, Compound                   |
| 11     | <i>Glycyrrhiza glabra</i>         | Shirinbayan             | Hot and dry   | Root                 | Root Powder, Decoction               | Compound                             |
| 12     | <i>Linum usitatissimum</i>        | Katan                   | Hot and dry   | Seed                 | Seed Oil, Seed                       | Singular, Compound                   |
| 13     | <i>Morus alba</i>                 | Toot                    | Hot and wet   | Fruit                | Ripe Fruit                           | Singular, Compound                   |
| 14     | <i>Olea europaea</i>              | Zeytoon                 | Hot and dry   | Fruit                | Fruit Oil                            | Singular, Compound                   |
| 15     | <i>Rosa damascena</i>             | Gol-e sorkh             | Hot and dry   | Flower               | Petals (Rose leaf), Syrup, Electuary | Singular, Compound                   |
| 16     | <i>Tripleurospermum disciform</i> | Babune                  | Hot and dry   | Airy organs          | Decoction                            | Compound                             |
| 17     | <i>Vitis venifera</i>             | Maviz                   | Hot and dry   | Fruit                | Dry fruit                            | Singular, Compound                   |

<sup>a</sup>Mode of application: some of these herbs are used alone, some in combination with other drugs, and some are applied in both manners.

**Table 2.** Laxative Herbs With a Cold Nature

| Number | Scientific Name (5)          | Traditional Name (6, 7) | Nature (6, 7) | Part of Usage (6, 7) | Medication Form (6)               | Mode of Application (6) |
|--------|------------------------------|-------------------------|---------------|----------------------|-----------------------------------|-------------------------|
| 1      | <i>Cordia myxa</i>           | Sepestan                | Cold and wet  | Fruit                | Decoction                         | Compound                |
| 2      | <i>Malva sylvestris</i>      | Khabbazi                | Cold and wet  | Flower               | Mucilage                          | Compound                |
| 3      | <i>Plantago ovate Forssk</i> | Bazreghatona            | Cold and wet  | Seed                 | Infusion and Mucilage             | Singular, Compound      |
| 4      | <i>Prunus domestica</i>      | Ejjas                   | Cold and wet  | Fruit                | Fruit, Syrup, Decoction, Infusion | Singular, Compound      |
| 5      | <i>Viola odorata</i>         | Banafsaj                | Cold and wet  | Flower               | Syrup, Electuary                  | Singular, Compound      |

healthy state of an individual; the vulnerability of temperament to alteration, which is called *dystemperament*, can lead to several different types of diseases (12). ITM scholars believe that each individual and drug has a temperament and that the appropriate drug must therefore be prescribed for each patient (9).

In ITM hypotheses, laxative drugs excrete humors only from the stomach and intestine, whereas purgative drugs are much stronger than laxative drugs and excrete humors from all other organs. On the other hand, laxative drugs are weaker and therefore safer to use than purgative drugs

(6).

#### 2.4.2. Functional Mechanism of Laxative Drugs in ITM

The quadratic elements, air, water, soil, and fire, are the foundation of ITM. Each element has a special quality: air is hot and wet, water is cold and wet, soil is cold and dry, and fire is hot and dry. The mixing of these four elements can cause different temperaments (6, 13). We used temperament for the expression of special qualities in different components (6). Based on this viewpoint, heat can cause a laxative effect in a drug. If the hotness in the components is high, its penetration becomes higher and the laxative

effect is increased until it eventually becomes a purgative drug. According to ITM, most herbs with a hot nature cause dilution of humors while most herbs with a cold nature cause mucilage production, which is used to cure constipation (7).

In ITM, different doses of laxative plants are used for constipation caused by different diseases. They are sometimes used as compound drugs, but generally these plants are prescribed in low doses as laxatives and in high doses as purgatives (6, 7).

### 3. Results

Following an evaluation of constipation and laxative herbs, this review found many causes to constipation, including eating dry food, cold or dry *dystemperament* of the bowel, using narcotic drugs, and having an unhealthy lifestyle. Many herbs were found to cure this disease and these can be divided into two groups based on their functions.

The first group are laxatives with a hot nature. ITM holds that hotness leads to the dilution of humors and causes the flowing of moisture (Table 1).

Those in the second group usually have a cold nature and are viscose or mucilage. This group softens the intestinal tract through moisturizing and leads to lubrication through their viscose and mucilage properties. Due to the high viscosity aspect of this group, care must be taken in terms of the adhesion properties of drugs. According to ITM, these herbs should be mixed with oil or be taken with water to prevent them sticking to the intestinal tract (Table 2).

### 4. Conclusions

Generally speaking, constipation can be viewed as a potential instigator of other diseases. ITM physicians believe that constipation, like any other disease, requires eradication of the major causes of the affliction for completion of treatment. The first step in treatment is a change in lifestyle, and the second step involves herbal drug therapy.

Because constipation is found in the presence of other diseases, ITM physicians use laxatives that are suitable to address the primary cause of the disease. Based on ITM theories, laxatives are light purgative drugs that lead to the defecation of waste from the GI system only while purgatives can excrete waste materials from the whole body.

Investigation of major texts in ITM highlights two dominant categories of laxatives. The first group is herbs with a hot temperament, in which their hotness leads to the flow of moisture (Table 1). The second group of herbs have a

cold nature and are viscous or mucilaginous (Table 2). ITM physicians believe that the defecation profile depends on three factors:

1, Feces.

2, The path of fecal movement (intestinal tract and its temperament).

3, Ability to defecate.

When one of these items is not normal, constipation occurs.

Broadly speaking, the most common etiology for constipation is intestinal cold *dystemperament*. Laxative herbs with hot natures cause hotness in the intestines and dilute feces; laxative herbs with cold natures reinforce defecation power.

Every category of laxative helps relieve constipation by its own mechanism. For diseases with a cold *dystemperament*, such as nervous disorders (multiple sclerosis), diabetes, and hypothyroidism, which are accompanied by constipation and intestinal cold *dystemperament*, laxative herbs with hot natures should be used. For diseases with hot *dystemperament*, such as hyperthyroidism, laxative herbs with cold natures are useful (9).

More recent studies in modern medicine express the functional mechanisms of laxatives as:

having a stimulatory effect on the intestinal tract, preventing absorption of liquids from the gastrointestinal tract and increasing osmotic pressure, thereby increasing the volume of water remaining in the intestines to soften the stool and relieve constipation, and containing mucilage, which after entering the GI tract, absorb water and soften the stool (14).

A comparison of these approaches shows that mucilage laxatives have wet and cold temperaments, and laxatives with hot natures correspond to osmotic laxatives because of their diluting effect.

Based on new research, it was determined that some of these herbs have been studied in modern medicine as well, and their laxative effects have been confirmed. For some of these herbs, their pharmacological effects are explained in detail, such as *Ficus carica* (15), *Rosa damascena* (16), and *Viola odorata* (17); some have been used as a laxative in folklore medicine or other traditional medicine, such as those of the Greeks, Romans, and Egyptians, including *Alhagi mannifera* (18), *Linnium usitatissimum* (19), and *Malva sylvestris* (20). Some of these plants are mentioned as a laxative in different articles, such as Aloe species (21), *Cassia angustifolia* (22), *Cassia fistula* (23), *Cordia myxa* (24), *Olea europaea* (25), *Plantago ovate* (26), and *Prunus domestica* (27). Additionally, anthraquinone, which has a laxative effect, is considered to be a heating agent in plants with hot temperaments, such as *Cassia fistula* (23, 28).

Our study is an extensive research that investigated laxative plants in major ITM textbooks, and this is the first time that laxative herbs have been classified based on their natures.

Our investigation shows that the plants listed in Tables 1 and 2 can be used in the treatment of constipation, and investigations into this field can lead to the formulation of new drugs. As previously mentioned, the application of laxative drugs in ITM is based on the primary cause of constipation; it is better to focus future studies on classification of laxative drugs according to their effectiveness for removing constipation in the various diseases.

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## Footnote

**Authors' Contribution:** Traditional books were reviewed by three researchers, Fatemeh Masoomi, Zohre Feyzabadi, and Shokouhsadat Hamed; the selected papers and manuscripts were collected and reviewed twice by two researchers, Fatemeh Masoomi and Assie Jokar; discussion was done by supervisors and professors, Omid Sadeghpour, Tayebeh Toliyat, and Hafez Fakheri.

## References

1. Chatoor D, Emmnauel A. Constipation and evacuation disorders. *Best Pract Res Clin Gastroenterol*. 2009;**23**(4):517-30. doi: [10.1016/j.bpg.2009.05.001](https://doi.org/10.1016/j.bpg.2009.05.001). [PubMed: [19647687](https://pubmed.ncbi.nlm.nih.gov/19647687/)].
2. Mugie SM, Benninga MA, Di Lorenzo C. Epidemiology of constipation in children and adults: a systematic review. *Best Pract Res Clin Gastroenterol*. 2011;**25**(1):3-18. doi: [10.1016/j.bpg.2010.12.010](https://doi.org/10.1016/j.bpg.2010.12.010). [PubMed: [21382575](https://pubmed.ncbi.nlm.nih.gov/21382575/)].
3. Andromanakos N, Skandalakis P, Troupis T, Filippou D. Constipation of anorectal outlet obstruction: pathophysiology, evaluation and management. *J Gastroenterol Hepatol*. 2006;**21**(4):638-46. doi: [10.1111/j.1440-1746.2006.04333.x](https://doi.org/10.1111/j.1440-1746.2006.04333.x). [PubMed: [16677147](https://pubmed.ncbi.nlm.nih.gov/16677147/)].
4. Feyzabadi Z, Jafari F, Feizabadi PS, Ashayeri H, Esfahani MM, Badiee Aval S. Insomnia in Iranian traditional medicine. *Iran Red Crescent Med J*. 2014;**16**(3):15981. doi: [10.5812/ircmj.15981](https://doi.org/10.5812/ircmj.15981). [PubMed: [24829786](https://pubmed.ncbi.nlm.nih.gov/24829786/)].
5. Ghahraman A, Okhovvat A. Matching the old medicinal plant name with scientific terminology [in Persian]. Tehran: Tehran University Publisher; 2004.
6. Aghili M. Makhzan-O-L Advieh [in Persian]. Iran: Tehran University of Medical Science Press; 2011.
7. Gharashi A. Al-shamel [in Arabic]. Abu Dhabi: Cultural Foundation; 2000.
8. Hamed SH, Jokar A, Abbasian A. Viewpoints of Iranian Traditional Medicine (ITM) about Etiology of Constipation. *J Gastrointest Dig Syst*. 2013;**58**.
9. Avicenna H. The Canon in Medicine. Beirut: Institute Al-A'jami Li Al-Matbooat; 2005.
10. Chooapani R, Mosaddegh M, Gir AA, Emtiazy M. Avicenna (Ibn Sina) aspect of atherosclerosis. *Int J Cardiol*. 2012;**156**(3):330. doi: [10.1016/j.ijcard.2012.01.094](https://doi.org/10.1016/j.ijcard.2012.01.094). [PubMed: [22357428](https://pubmed.ncbi.nlm.nih.gov/22357428/)].
11. Moradi H, Minaai B, Nikbakht Nasrabadi A, Siahpoosh MB. Avicenna Viewpoint about Health Preservation through Healthy Nutrition Principles. *Iran J Public Health*. 2013;**42**(2):220-1. [PubMed: [23513187](https://pubmed.ncbi.nlm.nih.gov/23513187/)].
12. Emtiazy M, Keshavarz M, Khodadoost M, Kamalinejad M, Gooshah-gir SA, Shahradsaj H, et al. Relation between Body Humors and Hypercholesterolemia: An Iranian Traditional Medicine Perspective Based on the Teaching of Avicenna. *Iran Red Crescent Med J*. 2012;**14**(3):133-8. [PubMed: [22737569](https://pubmed.ncbi.nlm.nih.gov/22737569/)].
13. Jackson WA. A short guide to humoral medicine. *Trends Pharmacol Sci*. 2001;**22**(9):487-9. [PubMed: [11543877](https://pubmed.ncbi.nlm.nih.gov/11543877/)].
14. Gattuso JM, Kamm MA. Adverse effects of drugs used in the management of constipation and diarrhoea. *Drug Saf*. 1994;**10**(1):47-65. [PubMed: [8136086](https://pubmed.ncbi.nlm.nih.gov/8136086/)].
15. Oh HG, Lee HY, Seo MY, Kang YR, Kim JH, Park JW, et al. Effects of Ficus carica paste on constipation induced by a high-protein feed and movement restriction in beagles. *Lab Anim Res*. 2011;**27**(4):275-81. doi: [10.5625/lar.2011.27.4.275](https://doi.org/10.5625/lar.2011.27.4.275). [PubMed: [22232635](https://pubmed.ncbi.nlm.nih.gov/22232635/)].
16. Dolati K, Rakhshandeh H, Shafei MN. Effect of aqueous fraction of Rosa damascena on ileum contractile response of guinea pigs. *Avicenna J Phytomed*. 2013;**3**(3):248-53. [PubMed: [25050281](https://pubmed.ncbi.nlm.nih.gov/25050281/)].
17. Vishal A, Parveen K, Pooja S, Kannappan N, Kumar S. Diuretic, laxative and toxicity Studies of Viola odorata aerial parts. *Pharmacol online*. 2009;**1**:739-48.
18. Atta AH, Abo EK. The antinociceptive effect of some Egyptian medicinal plant extracts. *J Ethnopharmacol*. 2004;**95**(2-3):235-8. doi: [10.1016/j.jep.2004.07.006](https://doi.org/10.1016/j.jep.2004.07.006). [PubMed: [15507342](https://pubmed.ncbi.nlm.nih.gov/15507342/)].
19. Xu J, Zhou X, Chen C, Deng Q, Huang Q, Yang J, et al. Laxative effects of partially defatted flaxseed meal on normal and experimental constipated mice. *BMC Complement Altern Med*. 2012;**12**:14. doi: [10.1186/1472-6882-12-14](https://doi.org/10.1186/1472-6882-12-14). [PubMed: [22400899](https://pubmed.ncbi.nlm.nih.gov/22400899/)].
20. Barros L, Carvalho AM, Ferreira IC. Leaves, flowers, immature fruits and leafy flowered stems of Malva sylvestris: a comparative study of the nutraceutical potential and composition. *Food Chem Toxicol*. 2010;**48**(6):1466-72. doi: [10.1016/j.fct.2010.03.012](https://doi.org/10.1016/j.fct.2010.03.012). [PubMed: [20233600](https://pubmed.ncbi.nlm.nih.gov/20233600/)].
21. Capasso R, Laudato M, Borrelli F. Meeting report: First National Meeting on Aloe, April 20-21, 2013, Isernia, Italy. New perspectives in Aloe research: from basic science to clinical application. *Nat Prod Commun*. 2013;**8**(9):1333-4. [PubMed: [24273879](https://pubmed.ncbi.nlm.nih.gov/24273879/)].
22. Picon PD, Picon RV, Costa AF, Sander GB, Amaral KM, Aboy AL, et al. Randomized clinical trial of a phytotherapeutic compound containing Pimpinella anisum, Foeniculum vulgare, Sambucus nigra, and Cassia augustifolia for chronic constipation. *BMC Complement Altern Med*. 2010;**10**:17. doi: [10.1186/1472-6882-10-17](https://doi.org/10.1186/1472-6882-10-17). [PubMed: [20433751](https://pubmed.ncbi.nlm.nih.gov/20433751/)].
23. Mozaffarpur SA, Naseri M, Esmaeilidooki MR, Kamalinejad M, Bijani A. The effect of cassia fistula emulsion on pediatric functional constipation in comparison with mineral oil: a randomized, clinical trial. *Daru*. 2012;**20**(1):83. doi: [10.1186/2008-2231-20-83](https://doi.org/10.1186/2008-2231-20-83). [PubMed: [23351337](https://pubmed.ncbi.nlm.nih.gov/23351337/)].
24. Bouby L, Bouchette A, Figueiral I. Sebesten fruits (Cordia myxa L.) in Gallia Narbonensis (Southern France): a trade item from the Eastern Mediterranean?. *Vege Hist Archaeobotany*. 2011;**20**(5):397-404. doi: [10.1007/s00334-011-0285-3](https://doi.org/10.1007/s00334-011-0285-3).
25. Ghanbari R, Anwar F, Alkharfy KM, Gilani AH, Saari N. Valuable nutrients and functional bioactives in different parts of olive (Olea europaea L.)-a review. *Int J Mol Sci*. 2012;**13**(3):3291-340. doi: [10.3390/ijms13033291](https://doi.org/10.3390/ijms13033291). [PubMed: [22489153](https://pubmed.ncbi.nlm.nih.gov/22489153/)].
26. Ramkumar D, Rao SS. Efficacy and safety of traditional medical therapies for chronic constipation: systematic review. *Am J Gastroenterol*. 2005;**100**(4):936-71. doi: [10.1111/j.1572-0241.2005.40925.x](https://doi.org/10.1111/j.1572-0241.2005.40925.x). [PubMed: [15784043](https://pubmed.ncbi.nlm.nih.gov/15784043/)].

27. Jabeen Q, Aslam N. The pharmacological activities of prunes: The dried plums. *Res J Med Plant*. 2011;**5**:1508-11.
28. Ardekani MR, Rahimi R, Javadi B, Abdi L, Khanavi M. Relationship between temperaments of medicinal plants and their major chemical compounds. *J Tradit Chin Med*. 2011;**31**(1):27-31. [PubMed: [21563502](#)].