

## Review Article

# A Narrative Review on the Natural Remedies Used in the Prevention and Symptomatic Treatment of Constipation in the Middle East

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Received: 08.08.2021; Accepted: 03.03.2022

## Abstract

Constipation is a common issue in developed and developing countries. On account of the multifactorial nature of this bowel problem, it has been indicated that current conventional treatments have limited efficacy and a higher incidence of side effects. This article aims to review various natural remedies that have proved to be effective in the prevention and/or treatment of constipation and is an attempt to provide a framework for a better understanding of the pharmacology of these herbs. Treatments were identified from electronic databases such as ISI Web of Knowledge, PubMed, and Scopus. Out of 103 studies found via electronic search, 49 studies fulfilled the eligibility criteria and were included in this review. Anthraquinone, saponin, and fiber-rich plants may increase the frequency of defecation through their bulking and/or stimulant laxative effects. The intake of some herbs or their isolated purgative active constituents can be useful in constipated patients. However, if the patient has tried natural remedies for more than three days without success, it is preferred to refer to a physician to know the underlying cause of constipation.

**Keywords:** Bowel movements, Constipation, Herbal remedies, Natural treatments

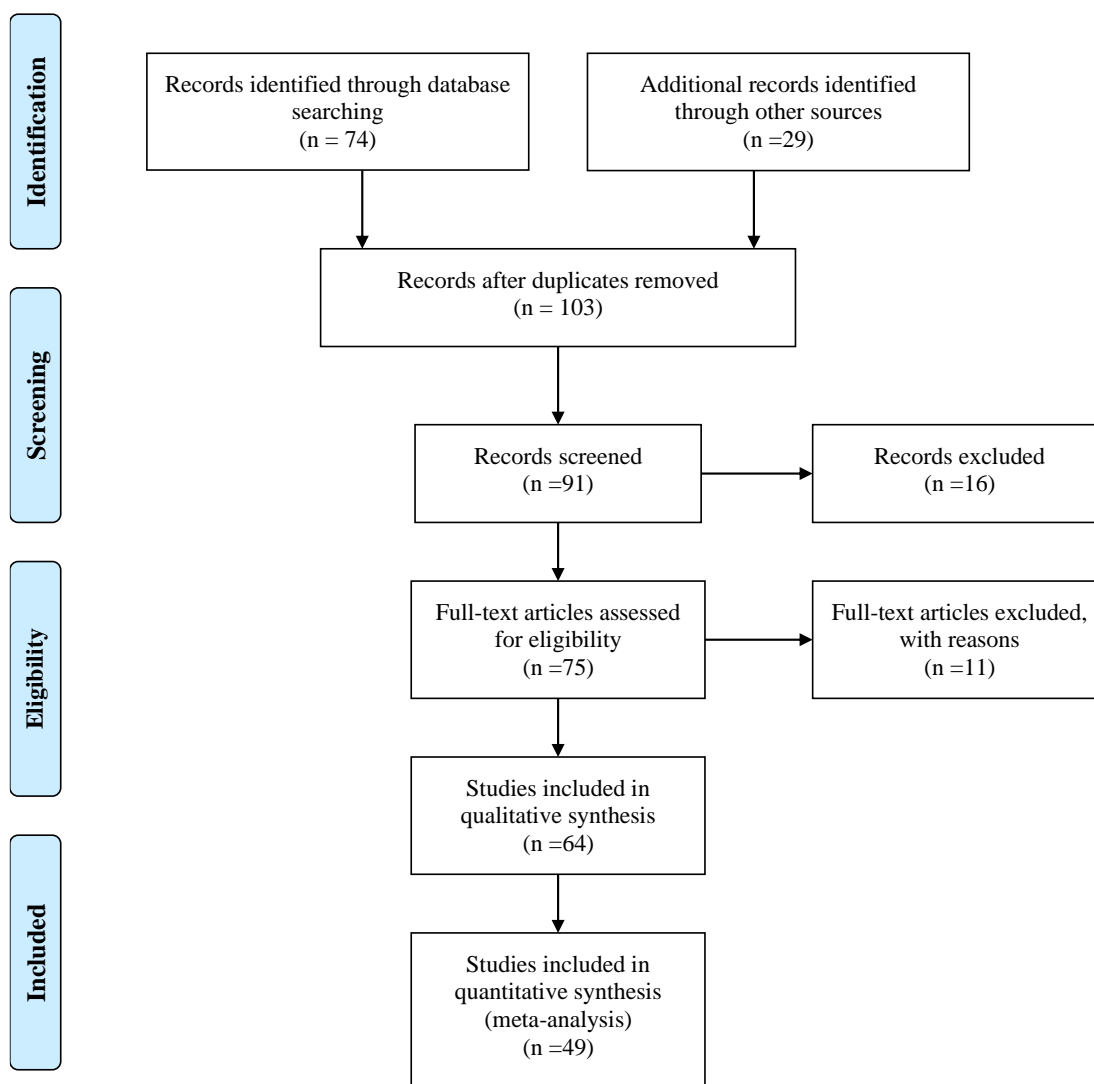
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**Please cite this article as:** Dortaj S. A Narrative Review on the Natural Remedies Used in the Prevention and Symptomatic Treatment of Constipation in the Middle East. *Herb. Med. J.* 2022;7(4):158-65.

## Introduction

Constipation is a bowel problem characterized by the hard or infrequent passage of stool, incomplete evacuation, and hard stool that will be associated with bloating or abdominal pain. Constipation is a major problem more commonly seen in females and the elderly negatively impacting their quality of life (1, 2). Etiologically, this bowel problem is divided into primary and secondary constipation. Primary constipation is due to colonic or anorectal

dysfunction, whereas secondary constipation is mostly associated with metabolic problems such as dehydration, systemic diseases, or the use of certain medications (3, 4). Some of the medications that are commonly associated with constipation are anticholinergics, analgesics, iron supplements, antihypertensives, diuretics, antidepressants, and antipsychotics. Moreover, diseases that cause constipation can be neurological, myopathic, or structural (3). The cellular and molecular bases of constipation have not been clearly described so far.



**Figure 1.** Schematic Diagram of Applied Studies for the Accomplishment of This Review.

However, some abnormalities in the enteric nervous system and colonic neurochemistry are seen in patients suffering from constipation. For instance, substance P and vasoactive intestinal peptides are decreased, thus there is less contractile response to these compounds. Furthermore, there is decreased cholinergic innervation in such patients. These will eventually result in decreased intestinal motility (5). Defecation in human beings is complex cooperation of sensorimotor functions that eventually act on the intact gastrointestinal tract. The normal rate of defecation varies from three times per day to three times per week depending on many factors, including age, gender, diet and fluid intake, psycho-behavioral

factors, posture, mobility, and many other influences (6). The process of defecation has four phases, i.e. the basal phase, pre-defecatory phase, expulsive phase, and termination phase (6, 7).

Normally in the defecation process, rectal filling and swelling result in a reflex relaxing the internal anal sphincter that will generate the urge to defecate; which is in the pre-defecatory phase (3). If defecation is not convenient, the pelvic floor and the external anal sphincter will contract thus defecation is delayed. However, if defecation is convenient, the diaphragm, pelvic floor, and the external anal sphincter will be relaxed opening the anus and causing expulsion (6). Any defect in these steps may result in constipation that

if untreated, may progress to chronic constipation. Therefore, it is important to find appropriate management for this condition. Since there is no standard recommended treatment for constipation, there are many treatment options available, including patient education, regular physical exercise, cognitive and behavioral therapy, dietary recommendations, and treatment with laxative medications or surgery only if the condition was not controlled using the other available options (8–10). In recent times, populations have been using natural and herbal remedies for the prevention and treatment of diseases. Studying and reviewing the roles of these remedies in preventing and treating constipation is of great concern and value. Popular examples that can ease constipation are senna, cascara, psyllium, flaxseed, prune, rhubarb, fig, aloe vera, and many other natural remedies (11, 12). These natural remedies can soften the stool due to the presence of certain constituents such as fiber. Fiber can have a beneficial effect on the treatment of constipation, particularly chronic constipation because of its impact on the stool water content and weight, GI transit time, production of short-chain fatty acids and many other proposed mechanisms (13–15). The main aim of this review is to introduce various

herbs and natural remedies that have proved to be effective in the prevention and/or treatment of constipation and to enable a better understanding of the pharmacology of these herbs.

Electronic databases, including ISI Web of Knowledge, PubMed, and Scopus were searched from 2000 to 2021. The search strategy involved a blend of medical subjects headings (MeSH), including constipation, laxative, purgative, herbs, middle east

On the whole, we managed to find 103 studies through an electronic search. Finally, 49 studies were found eligible and hence were included in the present review (Figure 1).

### Natural Remedies Used for Constipation

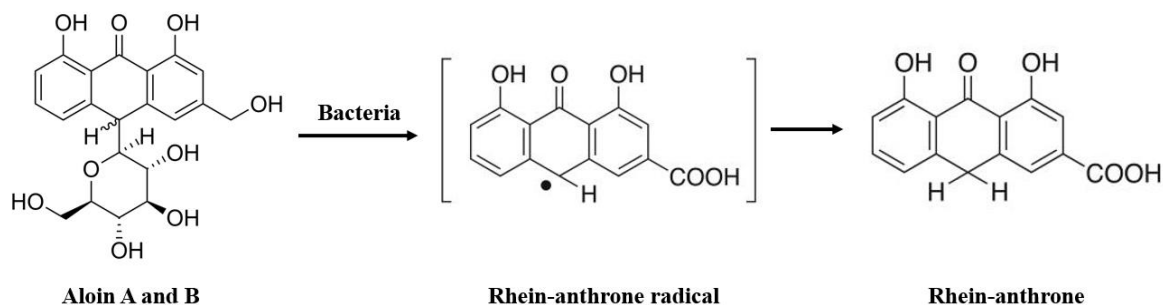
#### The Mechanism of Natural Remedies Used for the Prevention and/or Treatment of Constipation

##### *Prunus Domestica*

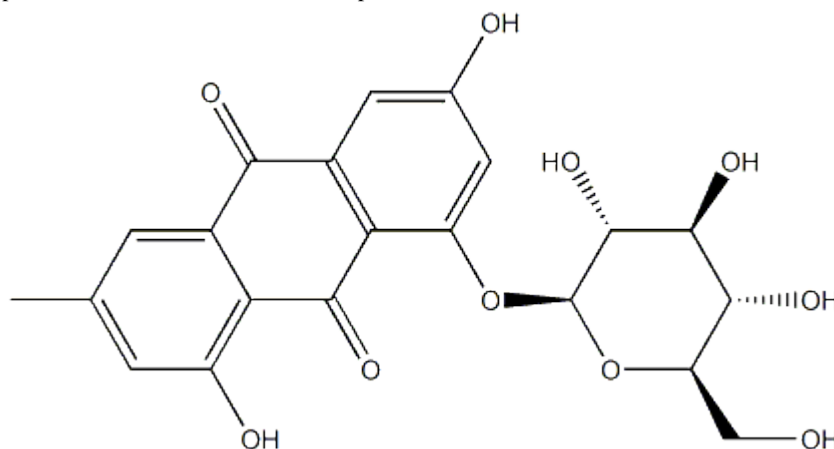
This fruit is rich in fibers, including insoluble and soluble fibers as well as other components that help treat constipation through their effects on gastrointestinal function by varying mechanisms (16). Insoluble fibers, also known as poorly fermented fibers, e.g. cellulose and hemicellulose, are known to withstand colonic fermentation and mechanically

**Table 1:** Common Natural Remedies Used for Preventing and/or Treating Constipation in the Middle East.

No	English name	Scientific name	Family	Part used	Origin
1.	Prune [16]	<i>Prunus domestica</i>	<i>Rosaceae</i>	Fruit	France and the United States (especially California)
2.	Common fig [17]	<i>Ficus carica</i>	<i>Moraceae</i>	Fruit	East Asian countries
3.	Amla or Indian gooseberry [18]	<i>Embllica Officinalis</i>	<i>Eurphorbiaceae</i>	Fruit	India
4.	Psyllium or ispaghula [19]	<i>Plantago ovata</i>	<i>Plantaginaceae</i>	Seeds	India
5.	Flaxseed or linseed [20]	<i>Linum usitatissimum</i>	<i>Linaceae</i>	Seeds	Northern hemisphere (especially Canada)
6.	Aloe vera [21]	<i>Aloe barbadensis miller</i>	<i>Asphodelaceae (Liliaceae)</i>	Latex	Arabian Peninsula
7.	Rhubarb [22]	<i>Rheum rhabarbarum</i>	<i>Polygonaceae</i>	Rhizome	Central Asia
8.	Frangula [22]	<i>Rhamnus frangula</i>	<i>Rhamnaceae</i>	Bark	Europe and western Asia



**Figure 2.** Chemical Representations of the Bacterial Decomposition of Aloin A and B to Rhein-Anthrone.



**Figure 3.** General Chemical Structure of Glucofrangulin.

**Table 2:** The Main Mechanism of Action of the Reviewed Plants.

	Bulk forming effects (affecting stool consistency and water content)	Alteration of the bacterial flora	Stimulant effects (increasing intestinal motility and/or GI transit time)
<i>Prunus domestica</i>	√	√	√
<i>Plantago ovata</i>	√		
<i>Linum usitatissimum</i>	√		√
<i>Ficus carica</i>	√		√
<i>Aloe barbadensis miller</i>	√		√
<i>Rheum rhabarbarum</i>	√	√	√
<i>Emblca Officinal</i>	√		√
<i>Rhamnus frangula</i>	√		√

stimulate intra-luminal peristaltic movements. This will result in the formation of a bulk affecting stool volume and increasing stool water content which will affect its consistency (23). On the other hand, soluble fibers, also called fermentable fibers, e.g. pectin, are

fibers that easily and rapidly get fermented by the colonic microbiota. This results in bacterial proliferation and production of short-chain fatty acids (SCFA) thus increasing stool weight (16, 23). *P. domestica* also contains cholinergic phenolic acids and

sugar alcohols such as sorbitol. These constituents are poorly absorbed from the small intestine; therefore, they pass undigested to the colon and are eventually fermented by the colonic microbiota (24). Sorbitol is known to produce osmotic effects that will increase the intestinal water content resulting in a laxative action improving stool weight and consistency, as well as increasing the frequency of bowel movements (24, 25). It was also suggested that prune has a prebiotic effect on inulin-stimulating fecal bacteria and improves gastrointestinal function that will subsequently improve stool weight, frequency, consistency, and GI transit time (13, 26).

#### ***Plantago Ovata***

Psyllium husk or seed is used as a bulking agent for the treatment of constipation owing to its high soluble fiber content. The major soluble fiber in psyllium is hydrophilic mucilage (27, 28). As a bulking fiber laxative, mucilage facilitates the defecatory process by absorbing excess water leading to the formation of a viscous gel that will increase the water content of stool and stool volume which are proportional to stool consistency (29). Furthermore, as stool consistency is decreased, pain at defecation is reduced (30). However, unlike many other herbs easing constipation, *P. ovata* does not show any effect on GI transit time or anorectal motility (14).

#### ***Linum Usitatissimum***

Flaxseed is rich in insoluble fibers, and soluble fibers; mainly mucilage, as well as lignan precursors and alpha-linolenic acid; a polyunsaturated fatty acid (19). This seed is known to treat constipation owing to its bulk laxative and lubricant action. The lubricant action is mainly due to the oil content (31). Gut stimulant's effects after the ingestion of *L. usitatissimum* are mainly mediated through cholinergic pathways and the activation of the muscarinic acetylcholine receptors (32). As a highly hydrophilic gel-forming fiber, mucilage undergoes fermentation by the microflora in the intestine. Then the viscous fermented fiber binds to water and swells causing luminal bulking. The process of fermentation also enhances the production of anions called short-chain fatty acids (SCFA) such as propionate, butyrate, and acetate. The SCFA produced can notably increase intestinal motility and stimulate colonic transit (33). However, insoluble fibers in flaxseed remain

unfermented and help chyme have bulk in the intestine. Consequently, there will be an increase in stool water content as well as an improvement in stool consistency and stool softening, thus easing constipation (34).

#### ***Ficus Carica***

This fruit eases constipation through its bulk laxative action because it is a good source of flavonoids, phenols, anthocyanins, and fibers such as cellulose in both soluble and insoluble forms (17, 35). These primary substances are known to activate chloride channel and/or serotonin signaling leading to increased secretion of water, electrolytes, and mucin from the colon. Moreover, they enhance the activity of the intestinal smooth muscles causing intestinal tension and increased intestinal motility (35). Also, soluble cellulose gets fermented by *coliform bacilli* resulting in acid production, whereas insoluble cellulose forms a bulk because it is not decomposed by *coliform bacilli* (17). Therefore, the large intestine transit time gets accelerated, and fecal water content, viscosity, quantity, and consistency are improved eventually resulting in enhanced fecal excretion (36, 37).

#### ***Aloe barbadensis miller***

The latex of aloe vera contains fibers and anthraquinone glycosides such as barbaloin, also called aloin A and B (28). Aloin A and B can pass through the small intestine unchanged and get decomposed by the colonic microbiota to the active ingredient rhein-anthrone (Figure 2) which produces a stimulant laxative effect (38). Rhein-anthrone will stimulate the Auerbach plexus and myenteric plexus leading to increased intestinal water content, and enhancing the intestinal mucus secretion as well as intestinal motility. This stimulation will also decrease water absorption at the bowel lumen (39, 40).

#### ***Rheum Rhabarbarum***

Rhubarb is one of traditional Chinese medicines used for the treatment of constipation. The rhizome of this plant contains a combination of tannins and anthraquinones such as sennosides A to F, rheinosides and aglyconesa that have proved to exert a purgative activity (22). Sennoside A, aloe-emodin, emodin, chrysophanol, and physcion, as the major anthraquinones in rhubarb, are poorly absorbed. Hence, they are metabolized in the intestinal canal into free compounds such as rhein and rhein anthrone which are absorbed causing laxation by numerous mechanisms

(41). One of the suggestive mechanisms is stimulating the nerve plexus in intestinal mucosa and smooth muscle, enhancing acetylcholine release, and stimulating mast cells to release calcium ions that will result in increased intestinal peristaltic movements due to intestinal smooth muscle contraction (42). Another mechanism is inhibiting the reabsorption of water and electrolytes such as sodium through blockage of the intestinal  $\text{Na}^+\text{-K}^+\text{-ATPase}$ . This increases the intestinal osmotic pressure that will eventually stimulate the intestinal goblet cells to secrete mucus and thus increase fecal water content (43). It has also been observed that rhubarb anthraquinones can alter the intestinal flora and the short-chain fatty acids. All these mechanisms will finally improve constipation symptoms (44).

#### ***Emblia Officinal***

As one of the fruits in the combination of Triphala in Ayurvedic medicine, Amla is used for the long-term treatment of constipation (45). This fruit contains gut stimulant and acetylcholine such as components that activate the muscarinic acetylcholine receptors resulting in the contraction of the circular and longitudinal smooth muscles in the gut (46). Namely, these constituents are saponins, pectin, norsesquiterpenoid glycosides, tannins such as glucogallia, corilagin, emblicanins A and B (18). Producing a gut stimulant effect and controlling the intestinal smooth muscle tone, *E. Officinal* helps improve the volume and consistency of stool as well as the frequency of defecation (47).

#### ***Rhamnus Frangula***

The bark of this plant is known to contain anthranol glycosides and anthraquinones such as glucofrangulin A and B (Figure 3). These agents increase fecal frequency owing to their stimulant as well as the bulk laxative effect (48). The glycosides present in *R. frangula* bark are inactive. They are activated into aglycones by bacterial glycosidase in the colon. Then, these aglycones block  $\text{Na}^+\text{-K}^+\text{-ATPase}$  in the colon to inhibit the absorption of sodium chloride and induce chloride secretion. This will eventually aid in water absorption, and increase water content and fecal bulking (22). However, the stimulant laxative action is due to aglycones acting on myenteric plexis of the intestinal smooth muscles leading to the promotion of peristalsis (48).

The multifactorial nature of constipation has limited the clinical efficacy of the present conventional treatment strategies that act through a defined pathway to treat the discomforting symptoms of constipation. Moreover, the available therapies may not be well tolerated due to the possible side effects and fear of the treatment method. Therefore, patients seek more convenient and cost-effective alternatives (12). To increase the efficacy of the treatment, combinational methods may be required. In recent times, populations have been using natural and herbal remedies for the prevention and treatment of diseases. As a result, scientists are aiming to find novel treatment options by studying and reviewing the role of natural remedies for the treatment and/or prevention of constipation and its discomforting symptoms. In traditional medicine, a variety of medicinal plants have been used to ease constipation due to their laxative properties and their action on different sites of the gastrointestinal tract (8,22). This review was conducted to report the herbal remedies effective for constipation and explain their underlying mechanism. According to this review, anthraquinone, saponin, and fiber-rich plants may increase the frequency of defecation through their bulking or stimulant laxative effect. Nowadays, some physicians prescribe standardized and approved herbal supplements for their patients suffering from constipation. However, many of the herbal remedies used in traditional medicine have not been under clinical trials. To get a deeper insight into the safety and efficacy of these herbal remedies, clinical trials can be designed and conducted to open the door for the formulation of plant-based medications to prevent or treat constipation shortly (49).

## **Conclusion**

Constipation, defined as abnormal bowel movements, can be due to many factors. An important factor is having a diet low in fluids, fiber, and certain nutrients. A person suffering from constipation does not always need medications. To prevent or treat the discomforting symptoms of constipation, it is recommended to have a diet rich in fibers and other purgative constituents. The intake of some herbs or supplements containing purgative active constituents isolated from those herbs can be useful in many constipated patients. However, if the patient has tried natural remedies for more than

three days without success, it is preferred to refer to a physician to know the underlying cause/causes of constipation.

## Acknowledgments

This review did not receive financial support. The author would like to thank Prof. Naglaa Gamil Shehab, Clinical Pharmacy and Pharmacotherapeutics Department, Dubai Pharmacy College, Dubai, UAE for her useful comments.

## Conflict of Interest

The authors declare that they have no conflict of interest.

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