



EFFICACY OF PLANTAGO OVATA (ASPAGHOL): A REVIEW

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ABSTRACT

Plantago ovata (*Aspaghhol*) the drug's botanical name is a member of the Plantaginaceae family. The Mediterranean region mainly Southern Europe, North Africa, and West Asia is home to this annual herb. Due to its top therapeutic qualities, *Plantago ovata* (*Aspaghhol*) has become more popular as a traditional medicine around the world. *Aspaghhol* (*Plantago ovata*) has different binding, dissolving, and sustaining properties that are useful in medicinal formulations, as well as pharmaceutical effects such as hypoglycemia, hypercholesterolemia, wound healing, anti-diarrheal, and anti-constipation. It is widely utilized in the pharmaceutical business, food preparation, Ayurvedic and Unani medicine, the manufacture of crude pharmaceuticals, and other fields because of these qualities. As a result, *Plantago ovata* can be used to make a variety of pharmaceutical products and as a reliable and effective ethnobotanical treatment for several illnesses.

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INTRODUCTION

The word '*Asapghol*' comes from the Persian lexicon 'asap' and 'ghol' which means horse ear, owing to the shape of the seed. Its seeds are widely used in medicine. The seeds when soaked in water become enormously swollen with an abundant coating of adhering mucilage which is free from odor. The mucilage of seeds is neutral in reaction and neither is altered by adding or precipitated by boiling with alcohol nor is it changed by iodine, borax, or perchloride of iron. It is only sparingly soluble in water. Its plant was used in ancient Greek and Roman medicine. Its preparations are given after colostomy to assist the production of smooth solid fecal mass. The seeds are considered cooling and diuretic, used in febrile conditions, and affections of the kidneys, bladder, and urethra. The plant is considered to be useful by tribals (Santhals) for pain and bronchitis (Fujita T, Sezik E, Tabata M, Yesilada E, Honda G, Takeda Y, 1995 (Eds), 1997).

Asapghol is a folk medicine in the northern part of Anatolia in Turkey. It is widely used as a wound-healing agent and for gastric disorders. *Plantago* has been authorized for use by the World Health Organization (WHO) as a laxative, to treat hypercholesterolemia, and to lower blood sugar. (Anonymous. 1999)(Pullaiah T, 2006).

Kingdom: Plantae

Subkingdom: Tracheobionta

Super division: Spermatophyta

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Asteridae

Order: Plantaginales

Family: Plantaginaceae

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Species: *Plantago ovata* Forsk: National Plant Data Center, (2000). (ITIS by the Flora (2007-2010),)

Vernacular Names and Etymology

Arabic: Bazre-Qutuna (ghani najmul, n.d.; kirtikar kr, n.d.; anonymous, 2007; Kabeeruddin, 2000)

Persian and Urdu: Aspghol, Aspiyoos, Shikamdarida(ghani najmul, n.d.) (anonymous, 2007) (Ibn-e-Baitar., 2003) (Kabeeruddin, 2000) (Naseer Tarique Ahmad., n.d.)

Hindi: Isbaghool (kirtikar kr, n.d.) (anonymous, 2007) (Ibn-e-Baitar., 2003)

English: Spogel seed husk (anonymous, 2007) (Kabeeruddin, 2000) (Naseer Tarique Ahmad., n.d.)

DESCRIPTION ACCORDING TO UNANI CLASSICAL LITERATURE

Isabgol is also called *Bazre-qatuna*. Its plant is about

one meter in height. (Fujita T, Sezik E, Tabata M, Yesilada E, Honda G, Takeda Y, 1995). the branches are narrow, tiny, and long, and the leaves resemble paddy (Dhan). *Isabgol* comes in three (3) different color varieties, including white, red, and black. Black is thought to be the worst color to employ among them, and white is thought to be the greatest. When placed in the mouth or water, the seeds swell. *Saboos-e-Aspghol*, the term for the seeds' outermost coating, is well-known. Seeds have a bland and mucilaginous flavor. (Hakim HMA., 2011) (Ghulam N. 2007)

In *Zakhira Khwarzam Shahi*, it is mentioned that *Isabgol* is effective in female diseases, such as warm-e-ahem and quruh-e-ahem (Jurjani I, 1878)

The parts of *Isabgol* used are seeds and husks mentioned in Unani classical literature.



Fig.1: Plantago ovata.



Fig. 2: Aspaghhol.

Habitat and distribution

This Persian herb is found also in North-West India, Punjab, and Sindh; cultivated to a small extent in Bengal, Mysore, and Coromandel Coast. The genus *Plantago* comprises about 50 species, of which ten are native to India (Nadkarni, 1982). *Ispaghula* is a native of Iran, is found in north Pakistan, Punjab, and Sindh, and is cultivated elsewhere in the subcontinent (Said, 1970). The *Ispaghula* is indigenous to the Mediterranean region and West Asia (Monographs on Herbal Drugs of Unani Medicine, 2003). Another literature review showed that *Ispaghula* is cultivated in India in the states of Gujarat, Maharashtra, Punjab, and parts of Rajasthan and Sindh Province of Pakistan. It is also cultivated in France and Spain for the European market. *Ispaghula* seeds are cultivated in Southern Europe, North Africa, and Pakistan

(Ashwini et al., 2015). India is the main producer of *Ispaghula* and it is extensively grown in different tropical regions of the world, such as Egypt, China, Iran, Japan, Korea, etc (Li, Dhanasikar, Abdul, Muhammad, Muhammad, Akhtar, et al., 2017).

Botanical Description

Ispaghula is a stem-less or sub-caulescent soft or woolly herb. Leaves narrowly linear or filiform, entire or distantly toothed, flowers in cylindrical or ovoid spikes; capsules ellipsoid, 8 mm long, obtuse, the upper half coming off as a blunt conical lid, membranous, glabrous; seeds ovoid oblong, 3 mm long, boat-shaped, smooth, yellowish-brown (Monographs on Herbal Drugs of Unani Medicine, 2003). It is an annual herb which attains a height of 30-45 cm. Leaves narrowly linear or filiform

appearing whorled due to the short terete stem. The spikes are 1.2-4 cm long and about 0.5 cm broad, cylindrical to ovoid in shape, and bear between 45-70 flowers. Flowers are bisexual, tetramerous, anemophilous, and protogynous and as such favoring outcrossing. The fruits are ellipsoid capsules, about 8 mm long, obtuse, membranous, and glabrous, the upper half coming off as a blunt conical lid and seeds are ovoid-oblong, boat-shaped, smooth, rosy-white being concave on one side and convex on the other. The concave side of the Review on Pharmacological Properties of Ispaghula 25 seed is covered with a thin white membrane produced by fusing the outer layer of the ovule with the inner epidermis, forming the seed coat (Anonymous, 1989)

Parts used

Whole seeds or husk of the seeds (Anonymous., n.d.) (Ibn-e-Baitar., 2003) (Naseer Tarique Ahmad., n.d.) (Ali Safiuddin syed, 1999).

Chemical constituents

Psyllium husk contains a high proportion of hemicelluloses, composed of a xylan backbone linked with arabinose rhamnose and galacturonic acid units (arabinoxylans). Carbohydrates, Protein, Tannin, Glycosides, Fixed oil, Linoleic acid, Palmitic acids, Iron, Zinc, Potassium, and Sodium (Voderholzer WA, Schalke W, Muhldorfer BE, 1997)

Temperament

Cold and Wet (Kabeeruddin Hkm. Mohd. Makhzanul Mufradat almaroof, 2000) Cold 2° and Wet or Dry (Moatadil)(Ibn-e-Baitar., 2003)

Cold 2° and Wet 2° (Shaikh) (Sina Ibne. Alqanoon-fit-Tibb., 2007) (Bugdadi Ibne-Hubal., 2007) Cold (Discoroids) (Ibn-e-Baitar., 2003)

Cold 3 and Wet 2 (Hakeem Abdul Mohd Hkm, n.d.)

Cold 3 and Wet (Little)(ghani najmul, n.d.)

Cold 3 and Wet and Dry (Razi Abu Bakar Mohammad Bin Zakariya., 1991)

Pharmacological actions (Rafael-o-has)

Daf-e-Humma (Antipyretic) (Nadkarni KM. Indian Mate, 1992)

Mulayyin (Laxative) (Khare CP, 2007)

Mudirr-e-Baul (Diuretic) (Nasir *et al.*, 2014)

Muqavvi-e-Medah (Stomachic) (Ali Safiuddin Syed, 1999)

Naf-e-Quroohe Meda wa Isna Ashari (Anti-peptic

ulcer)(Hakeem Abdul Mohd Hkm, n.d.)

Mugharri wa Muzliq (Glutinous and Demulcent) (Ali Safiuddin syed, 1999)

Daf-e-Zaheer (Antidysentric)(Nasir *et al.*, 2014)

Qabiz (Astringent)(Bugdadi Ibne-Hubal., 2007)

Mudammil Sahaj wa Qurooh-e-Ama (Cicatrigen) (Sina Ibne. Alqanoon-fit-Tibb., 2007)

Musakkin-e-Atash, Musakkin-e-Hararat (Hypothermic) (Hakeem Abdul Mohd Hkm, n.d.) Hypocholestromaemic Agent (Anonymous, 2007)

Therapeutic Uses (Mawaq-e-istemaal)

Qabz (Constipation) (ghani najmul, n.d.) Zaheer (Dysentry) (Anonymous, 2007)

Su'ale yabis (Dry Cough) (Naseer Tarique Ahmad., n.d.)

Zatu-l-Janb (Pleural Effusion) (anonymous, 2007)

Wajau-l-mafasil (Arthralgia) (Nadkarni, 1982)

Atash or peas (Thirst) (Sina Ibne. Alqanoon-fit-Tibb., 2007)

Hummiyat (Fever) (Bugdadi Ibne-Hubal., 2007)

Aanton ki kharash (Intestinal ulcers) (Ibn-e-Baitar., 2003)

Qurooh-e-Meda wa Isna Ashari (Peptic ulcers) (Ali Safiuddin Syed, 1999)

Amraz-e-Kulliyya wa Masana (Kidney and Bladder disease) (Ali Safiuddin Syed, 1999)

Ishal wa Pechish (Diarrhoea) (ghani najmul, n.d.)

Maror and Anton ke zakhm (Intestinal cramps and wounds) (Ali Safiuddin Syed, 1999)

PHARMACOLOGICAL ACTION AND THERAPEUTIC USES

Ispaghula has gained worldwide popularity due to its versatile medicinal properties. It has been used as a safe and effective remedy for various health conditions such as constipation, diarrhea, dysentery, and piles since ancient times. Recent scientific studies have also confirmed its benefits for patients with diabetes, hypertension, hypercholesterolemia, hyperlipidemia, liver disease, and rheumatism. The pharmacological activities of Ispaghula are listed below.

Constipation (Qabz)

Ispaghula mucilage can alleviate constipation by mechanically stimulating intestinal peristalsis. This mucilage remains mostly unaffected by digestive

enzymes and bacteria, passing through the intestine unchanged. As it makes its way through the intestine, it lines the mucous membrane and has a demulcent, emollient, and lubricating effect, soothing and protecting the area. (Monographs on Herbal Drugs of Unani Medicine, 2003) The husk is commonly utilized as a bulking agent for treating constipation, acting as a stool softener due to its ability to form a gel in water. Additionally, it is employed as a demulcent and bulk laxative for various intestinal issues such as dysentery, providing a soothing and regulatory effect on the body. (Meena et al., 2015). Ispaghula husk can modify the effects of medication, gut movement, and transit rate by mechanically stimulating the gut wall. This is due to an increase in intestinal bulk and a decrease in viscosity of the luminal contents when it is taken with an adequate amount of liquid. The result is an increase in the volume of intestinal contents which triggers defecation by stretching the gut. Additionally, the mucilage from the swollen mass forms a lubricating layer that makes the transit of intestinal contents smoother. Ispaghula husks are also effective in increasing stool moisture as well as wet and dry stool weight. (Vipin & Bhattacharya, 2009)

Diarrhoea (Ishal wa Pechish)

When ispaghula is used to treat diarrhea, it absorbs water which increases the viscosity of bowel content and slows down gastric emptying. (PDR for Herbal Medicines, 2007).). When used as an anti-diarrheal, it works by making the intestinal content thicker by binding to fluid. This helps to slow down the passage of stool and reduce the number of times one needs to defecate. (Indian Herbal Pharmacopoeia, 2002).

Ulcerative colitis

Ispaghula husk is derived from the outer layer of the seed, while the seed itself contains more fermentable fiber. This type of fiber is slow to degrade and results in the production of significant amounts of butyrate and acetate. Butyric acid is the preferred substrate for colonocytes, and it may help in the treatment of ulcerative colitis and have antineoplastic activity against colorectal cancer. A study of colorectal cancer patients revealed that taking 20 grams of Ispaghula seed daily for three months increased butyric acid production by an average of 42%. However, this effect disappeared within two months of stopping the supplementation. An open-label, randomized, multicenter trial also found that taking 10 grams of Ispaghula seed twice daily was as effective as mesalamine in maintaining remission in individuals

with ulcerative colitis. (Vipin & Bhattacharya, 2009).

Irritable bowel syndrome

Consuming Ispaghula can help relieve chronic constipation in patients who do not have slow colonic transit or disordered constipation. In contrast, lactulose fiber may improve stool consistency in patients with IBS and constipation. The relief of bowel discomfort seems to be a significant factor in the effective use of Ispaghula for IBS treatment. (Ashwini et al., 2015) Patients with irritable bowel syndrome who took Ispaghula experienced an improvement in stool frequency and consistency, as well as a reduction in abdominal pain and distention. (PDR for Herbal Medicines, 2007).

Fecal incontinence

Ispaghula is known for its water retention properties and can be helpful for individuals experiencing fecal incontinence from liquid stools. In a study where participants with liquid stool fecal incontinence were given either gum Arabic or Ispaghula supplements, both groups showed a 50% decrease in the occurrence of incontinent stools. The Ispaghula group had the highest capacity for holding water among water-insoluble solids and in total stool water holding capacity. (Alternative Medicine Review, 2001).

Diabetes

Ispaghula may potentially be used to treat high blood sugar levels. Human studies indicate that a single dose of Ispaghula can lead to moderate reductions in blood sugar levels, but its long-term effects are uncertain. Initial studies that were not fully controlled showed that Ispaghula could enhance glycemic and lipid control in people with type 2 diabetes. (Majmudar et al., 2013) For two months, Ispaghula was used to improve metabolic control and lipoprotein profiles, as well as examine its postprandial effects on lipids in patients with type 2 diabetes. These patients were taking sulfonylureas and following a controlled diet and were randomly assigned either to receive Ispaghula treatment (3.5 gm t.i.d.) or to be part of a control group. After two months, both groups saw significant reductions in body mass index, waist circumference, HbA1c, and fasting plasma glucose levels. (European Medicines Agency, 2013).

Hyperlipidemia

Ispaghula demonstrated a 3.5% reduction in total cholesterol and a 5.1% reduction in LDL levels after consuming 5.1 gm of Ispaghula husk twice daily for eight weeks. Another study began with individuals on the American Heart Association Step-1 diet, and then

added eight weeks of Ispaghula, resulting in decreased total cholesterol- 4.8% & LDL- 8.8% (Sprecher, Harris & Goldberg, 1993). It has been observed in various studies that Ispaghula can potentially lower serum cholesterol levels by replacing dietary fats. This leads to a decrease in the amount of dietary fats available for absorption, which indirectly impacts cholesterol levels. Many studies have reported a decrease in LDL cholesterol levels and total cholesterol with the use of this herb. (PDR for Herbal Medicines, 2007).

Hemorrhoids

A study was conducted on 51 individuals with hemorrhoids who were given an Ispaghula preparation. Results showed that 84% experienced improvement in pain, itching, bleeding, and discomfort during bowel movements (James, 1997). Ispaghula has been known to benefit both constipation and loose stools, so it is not surprising that it can also be beneficial for hemorrhoids. In another study, 50 individuals with internal bleeding hemorrhoids were given either a placebo of B vitamins or 11.6 gm of Metamucil daily for 40 days. The Ispaghula group showed significant improvement in the reduction of bleeding and a dramatic reduction of congested hemorrhoidal cushions. Bleeding on contact stopped after treatment in the Ispaghula group, while there was no difference in the control group. It is important to note that Ispaghula treatment for hemorrhoids should be done for a minimum of one month, as a study of 30 days of fiber supplementation did not show improvement, whereas significant improvement was noted when taken for 40 days. (Alternative Medicine Review, 2001).

Dysentery

Extensive trials have been conducted on the seeds of Ispaghula for the treatment of chronic dysenteries caused by amoebas and bacteria, which have shown excellent results. (Nadkarni, 1982 Ispaghula is an effective treatment for dysentery. (Monographs on Herbal Drugs of Unani Medicine, 2003).

Other Benefits

The seeds of Ispaghula are known for their cooling and diuretic properties. They are recommended for febrile conditions, as well as issues with the kidneys, bladder, and urethra. To treat coughs and colds, a decoction of the seeds is often prescribed. Crushed seeds can also be made into a poultice and applied to rheumatic and glandular swellings. Furthermore, an infusion made from the seeds is effective in treating specific urethritis, as it relieves the burning and irritation that

often accompany the disease. (Said, 1996) Some believe these have diuretic effects and are used to treat conditions affecting the kidneys, bladder, and urethra. (Said, 1970). Ispaghula is also effective in Crohn's disease, autointoxication, and obesity (Brigitte, 2007). This substance has various beneficial properties, including bacteriostatic, resolvent, sedative, glutinous, anti-gonorrhoeal, antihypertensive, antibilious, anti-rheumatic, astringent, anti-inflammatory, demulcent, tonic, antiulcer, and refrigerant properties

Therapeutic Dosage (Miqdar-e-khurak)

4.5 – 10.5 Masha (g) (Kabeeruddin, 2000)
4.5 – 7 g (anonymous, 2007)

Therapeutic Effect of Husk

Effect on sterol metabolism. (Ingrid C, 1994)
Effect on plasma lipids and lipoprotein. (Rosa Sola, 2007; MacMahon, 1998)
Effect on cardiovascular system. (Galisteo, 2005)
Effect in constipation. (Dettmar PW, 1998)
Effect in Diabetes mellitus. (Anderson JW, Allgood LD, Turner J, 2002) (Monograph, Plantago 2002)

Adverse effect (Muzirat)

Adverse effects on nerves and appetite. (Naseer Tarique Ahmad., n.d.)

Corrective (Musleh)

The use of some drugs has been recommended along with Ispaghula to avoid its adverse effects. Shahad (Honey) and Sikanjabeen Asli (Hakeem Abdul Mohd Hkm, n.d.)

Badal (Substitute)

Following drugs are mentioned as a substitute for Ispaghula in the Unani textbook: Behdana (Talaen) and Tukhm-e-Khurfa (Tabreed) (Ibn-e-Baitar., 2003)

Formulations (Murakkabat)

Sufoof-e-Teen (anonymous, 2007)
Sufoof-e-Moya (Ali Safiuddin Syed, 1999)
Qurs-e-Tabasheer Kafoori (Kabeeruddin, 2000)
Qurs-e-Ziyabetus Khas
Laoq-e-Behdana (anonymous, 2007)

CONCLUSION

Unani medicine is a conventional medical system that has been used on the Indian subcontinent. Many examples of the use of Unani medications that are documented in the traditional Unani literature are supported by experience. The pharmaceutical and cosmetic industries make extensive use of Ispaghula or

Bazre-e-Futuna. As is clear from the Unani classical literature, three varieties of *Aspaghhol* were thoroughly detailed by Unani scholars. As of right now, *Aspaghhol* has been the subject of phytochemical, pharmacological, pharmaceutical, and clinical studies. Several investigations have discovered that it has powerful laxative, astringent, carminative, lubricating, diuretic, anti-inflammatory, and analgesic properties. Consequently, more study might be done to leverage the untapped potentials of *Isabgol* which have already been stated in the Unani traditional literature. Using the great resource of traditional medicine which have a long and established history of treating a variety of disease, has become a focus of research in recent years. additional research must be conducted.

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