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### An Over Review of Psyllium Husk (*Plant ago ovata*)

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**Abstract** Isabgol husk (*Plant ago ovata*) is a natural polymer of plant origin which is mainly composed of polysaccharide chain having (1>3) and (1>4)- $\beta$ -xylem system. Natural carbohydrates have been popularly used as a material for centuries in all kinds of pharmaceutical applications and physiochemical dietary fibers. It is the most prevalent renewable and biodegradable polymer in the world. In all cultures, it has been used as a therapeutic agent for the treatment of home remedies for a variety of conditions, including chronic constipation, diarrhea, duodenal ulcers, gonorrhea, piles, inflammation of the mucous membranes of the GI and genitourinary tracts, bulk-forming, non-irritating laxative medications, demulcent, cervical dilators, etc. Drugs are nearly always administered as drug delivery systems (DDS) rather than as pure chemical compounds. The advantages of consuming psyllium fibers and investigate how these fibers might be used to prevent a number of illnesses and disorders through diet. This review illustrates how isabgol husk can be used to treat human illnesses.

**Keywords:** Psyllium husk, constipation, Diabetes, *plant ago ovata*, Isabgol.

#### 1. INTRODUCTION

Isabgol, also known as Psyllium Husk (*Plantago ovata*), is a natural fiber supplement from the seeds of a plant native to India and the Mediterranean, valued as a traditional remedy for digestive health, especially constipation, due to its ability to form a gel and regulate bowel movements. It's rich in soluble fiber, helps control blood sugar, lowers cholesterol and aids weight management by increasing fullness. This tasteless, odorless husk is a major export for India, used globally for centuries in herbal medicine.<sup>[1]</sup> isabgol has 20 calories, 10 mg of salt and 0.2 proteins per tablespoon. In addition, the following are some of the nutritional advantages of Psyllium husk powder: Saturated fats,

potassium, calcium, iron, fat, sugar and total carbs.<sup>[2]</sup> One such fiber supplement is Bhusi, also referred to as Isabgol. It has long been a popular home treatment for laxation. Additionally, you can simply acquire a packet of Bhusi online due to the store websites' versatility. Isabgol is a superfood. Isabgol is a naturally occurring vegetable dietary fiber that is extracted from the seeds by grinding them. Isabgol is very important in Ayurveda. It improves constipation by acting as a wetting agent and increasing the stomach's bulk density. The psyllium leaf is referred to by the Latin word *Plantago*, which means "sole of the foot." The common name for boat-shaped seeds in Persian is isapghul, which is derived from the Persian words "isap" and "ghol," which indicate

horse vehicle. .Origin: *Plantago ovata* Forsk, a member of the Plantaginaceae family, can be used commercially and has significant export potential. Geographical distribution: It was brought to India and is grown there, especially in Gujarat and parts of Rajasthan. It can also be found in Sindh, Baluchistan and the low hills and plains of Punjab west of the Sutlej.<sup>[3]</sup>

## 2. PLANT PROFILE



**Fig 1:** structure of Isabgol <sup>[4]</sup>

**Kingdom :** Plantae

**Phylum :** Angiosperms

**Class :** Equisetopsida

**Sub class :** Magnoliidae

**Order :** Lamiales<sup>[6]</sup>

**Family :** Plantaginaceae<sup>[5]</sup>

**Genus :** *Plantago*<sup>[7]</sup>

**Species :** *P. ovata* Forsk

**Common name :** Ishagola, Isabghul, spongel seed, Ispghal, Psyllium seed, Flea Seed, Isabgol, Ishabgul spongel seed<sup>[8]</sup>, desert Indian wheat<sup>[9]</sup>

**English name :** Blond psyllium, Spongel seeds

**Indian name :** Isabgol, Isabgul (Hindi) Iskol, Isphogol (Tamil)<sup>[9]</sup>

**Parts used :** Seeds (Seeds are translucent and concavo-convex), Husk of spike

### 2.1 VARIETIES OF ISABGOL

- G1 (Gujarat 1)
- G2 (Gujarat 2)
- TS 1- 10
- EC 124345
- Niharika
- Haryana Isabgol - 5
- Jawahar Isabgol – 4<sup>[10]</sup>

### 2.2 DESCRIPTION

Growing to a height of approximately 30 cm, the plant is a tiny herb with light-colored blooms and thin leaves. Due to its high soluble fiber content, the plant's seeds are the part most frequently employed for therapeutic purposes. *Plantago ovata* is often used as a natural laxative. Constipation is lessened and bowel motions are regulated by the soluble fiber in the seeds, which absorbs water to produce a gel-like substance. Psyllium has been demonstrated to help decrease cholesterol and control blood sugar levels in addition to its laxative properties<sup>[11]</sup>

### 3. *Plantago ovata* or PSYLLIUM PRODUCTS

*Plantago ovata* or the Psyllium plant are sources of psyllium. The psyllium plant develops in areas with good solar exposure and sandy, well-drained soils. This is an annual crop that is mostly grown in Gujarat, along with some areas of Madhya Pradesh and Rajasthan. *Plantago Ovata* is the botanical name for Psyllium husk; in India, it is more often known as Isabgol. Mucilage containing xylose, arabinose and semi-drying fatty oils is called psyllium. The dried, ripe seeds of *Plantago ovata* Forsk are used to remove psyllium husk made from bent layers.

After a thorough cleaning, the psyllium husks are separated from anti-farm fibers, mud, iron particles, dust, particles, stones and other waste materials. After that, their scientific values are taken into consideration while grading them. Psyllium husk powder is created by processing the psyllium husk seeds. These grades are used to sift psyllium husk powder. Eighty percent of the fiber in psyllium is soluble in water. The viscosity of psyllium mucilage is unaffected by temperatures between 68 and 122 degrees Fahrenheit, pH levels between 2 and 10 and sodium chloride concentrations up to 0.15 m.

### 3.1 PSYLLIUM SEEDS

The dried ripe seeds of *Plantago ovata* Forsk (fam. Plantaginaceae) are used to make psyllium seeds, an agri-farm product that has been thoroughly cleaned to remove all dust, agri-farm fibers, wastes, muck, stones and iron particles. Forty percent of the seed is composed of linoleic acid (LA), a significant fatty acid that is vital to good health. Psyllium seeds usually have a light brown to moderate brown color and a subtle smell. About 70% of the fiber is soluble,

and the remaining 30% is insoluble. It contains 19% fiber, 18.8% proteins, 10–20% triglycerides and 40% linoleic acid (LA), a crucial fatty acid for good health. Polysaccharides, a soluble fiber, make up the seed mucilage.



**Fig 2:** psyllium seeds <sup>[13]</sup>

**Table 1:** physical properties of seeds <sup>[14]</sup>

Length of seeds	2-3mm
Width of seeds	0.8-1.5mm
Density of seeds	1350.6kg/m <sup>3</sup>
Bulk density of seeds	647.4 kg /m <sup>3</sup>
Sphericity of seeds	51.1 %
Angle of repose	33.8%

**Table 2:** Nutrient provided by seeds <sup>[14]</sup>

Fat	7%
Ash	3%
Carbohydrate	49%
Dietary powder	25%
Protein	17%

### 3.2 PSYLLIUM HUSK

The actual mucilage covering the seed is called the husk of Psyllium. They are the only portion of the plant used to make psyllium products and are regarded as pure dietary fiber. Glycosides, proteins, polysaccharides, vitamin B1 and choline make up the majority of its nutritional value. more than 80% fiber, as opposed to less than 15% for oat bran and 10% for bran. Hemicellulose, a complex carbohydrate included in whole grains, fruits and vegetables, makes up the majority of the husk. Despite being indigestible, hemicellulose is partially broken down in the colon and provides nourishment for the beneficial intestinal flora. Psyllium seeds are processed to extract the husk by removing the seed's outer layer.

About 70% of the fiber in psyllium husk is soluble and the remaining 30% is insoluble. The food, cosmetic and pharmaceutical sectors use this white, fibrous substance. To meet the demands of each particular user, psyllium husk is offered in a variety of grades based on factors including purity and mesh size. It is primarily offered in four purity grades: 99%, 98%, 95% and 85%. Psyllium husk and seeds are evaluated based on the material's purity and quality.



**Fig 3:** Psyllium husk <sup>[15]</sup>

### 3.3 PSYLLIUM HUSK POWDER:

The husk is ground into psyllium husk powder using a pulverize with different particle mesh sizes. The four purity ratings that are most often offered are 99% pure, 98% pure, 95% pure



and 85% pure. <sup>[12]</sup>

**Fig 4:** Psyllium husk powder <sup>[16]</sup>

### 4. CHEMICAL COMPOSITION OF PLANTO OVATA

A significant amount of hemicellulose, which is made up of a xylem backbone connected to arabinose, rhamnose and galacturonic acid units (arabinoxylans), is found in psyllium husk. Plantago species have a great potential to create a variety of secondary bioactive metabolites, such as iridoids, phenols, polysaccharides, sterols, alkaloids and cumatines, which have applications as The polysaccharides (cellulose, hemicellulose and lignin) that make up the seed are 35% soluble and 65% insoluble. Because of its potent capacity to gel in water, psyllium is categorized as a mucilaginous fiber. This capacity stems from its function as the *P. ovata* seed's

endosperm, which holds onto water to keep the seed from drying out.

The outer seed coat of psyllium seeds contains more than 30% hydrocolloidal polysaccharide (mucilage), fixed oils, tannin, aucubin glycoside (iridoid), sugars, sterols and protein-supplemented foods and medications used to cure human ailments. Two It mostly consists of xylose, arabinose and galacturonic acid together with glucose and rhamnosinose.

The mucilage has been divided into two polysaccharide parts. One of them is soluble in cold water and hydrolyzes to produce D-xylose (46%), an aldobiouronic acid (40%), L-arabinose (7%) and insoluble residue (2%); the other fraction is soluble in hot water and forms a very viscous solution that cools to a gel and hydrolyzes to produce D-xylose (80%), L-arabinose (14%), aldobiouronic acid (0.3%), and trace amounts of D-galactose. Along with mucilage, seeds also contain a brilliant yellow, semi-drying fatty oil (5%), trace levels of tannin and aucubin, and an active ingredient that functions similarly to acetylcholine.

The oil's constituent fatty acids are 0.2 linolenic, 47.9 linoleic, 36.7 oleic, 3.7 palmitic, 6.9 stearic and 0.8 lignoceric. Valine, alanine, glycine, glutamic acid, cystine, lysine, leucine and tyrosine are the amino acids found in the seed. There is a lot of starch in the dehusked seed. Additionally, different bases, carbohydrates, sterols and protein can be found in seeds. Compared to farmed species, wild collected seeds produce less mucilage. [17]

## 5. PHARMACOLOGICAL ACTION OF *P. OVATA*

One well-known medicinal plant used to treat inflammatory bowel disease (IBD) is *Plantago ovata*. By improving intestinal cytoarchitecture, significantly reducing certain pro-inflammatory mediators, and increasing the generation of short-chain fatty acids, *P. ovata* seeds reduced the development of colonic inflammation in transgenic rats. The seeds' alcoholic extract has cholinergic qualities. It has been shown to lower blood pressure in dogs and cats under anesthesia, inhibit the isolated and perfused hearts of frogs and rabbits and promote intestinal movement in rats, guinea pigs and rabbits. Atropine inhibits the extract's effect on smooth muscle. The ability of the seed oil to

lower serum cholesterol levels in rabbits has been demonstrated

It has been proposed to replace corn oil with linoleic acid-rich oil derived from embryos as a dietary hypo cholesterol emic treatment. In experimental animals, feeding embryo oil as a food supplement to lower serum cholesterol levels produced positive outcomes. The incidence of anginal attacks was significantly reduced in patients with atheromatous heart disease when isabgol husk was added to their diet. The seeds contain a glucoside called aucubin, which is physiologically inert. When present in significant amounts, tannins have minimal effect on bacteria or entamoeba. *P. ovata*'s ethanol and acetone extract shown strong antibacterial activity against *E. coli*. [18]

## 6. DIEASE / CONDITION TREATMENT WITH ISABGOL



Fig 5: Benefits of isabgol [19]

### 6.1 CONSTIPATION

Constipation and other gastrointestinal issues are frequently treated with medicinal plants. Because of its many active ingredients, which increase its efficacy while reducing adverse effects and make it safe for long-term usage, isabgol is regarded as a first-line treatment for bowel irregularities. . Because of its high fiber content, psyllium husk is especially well known for its effectiveness in treating persistent constipation.

Psyllium is widely used as a natural laxative, according to extensive study. Only 15% of individuals with poor bowel transit responded well to psyllium, whereas 80% of participants in a study comprising 50 patients and 70 research articles on chronic constipation experienced bowel relief after taking 10–30 grams of psyllium seeds daily. Twenty Psyllium husk and the seeds are commonly used as fiber supplements to relieve constipation. [20]

### 6.2 WEIGHT MANAGEMENT

Weight gain frequently results from inadequate digestion, which causes the body to accumulate extra fat or toxins. Isabgol's Pichhila (smooth) and Mutral (diuretic) qualities can help



with weight loss. It encourages increased urine output, which aids in the body's removal of extra fat, and facilitates the simple passage of waste through the intestines. Twenty Isabgol's soluble fiber can reduce hunger in between meals and lower the chance of overindulging by making you feel full after eating.

Supplementing with psyllium may help regulate hunger by delaying stomach emptying and decreasing total appetite, even if there has been no discernible link between it and weight control. Weight management may be aided by this lowered hunger and calorie consumption.

### 6.3 DIARRHEA

In impoverished nations, diarrhea is a leading cause of death. Isabgol's absorbing qualities make it useful for controlling loose movements, particularly when taken with curd. It prevents loose stools and makes the stool thicker by absorbing extra water from the digestive tract. The ratio of fecal water to the retention capacity of insoluble particles determines how loose the stools are in diarrhea.

Psyllium decreases the frequency of watery stools while increasing the frequency of regular stools. Psyllium and calcium together provide a cost-effective and efficient substitute for conventional therapies for persistent diarrhea. Because of its Guru (heavy) quality, isabgol helps prevent diarrhea by absorbing water from the digestive system and giving the stool more volume.

Tip: for diarrhea take isabgol with curd

### 6.4 DIABETES MELLITUS

Psyllium is acknowledged as a naturally occurring polysaccharide with glucose-reducing qualities that has a beneficial impact on human health. Elevated blood glucose levels are the result of inadequate insulin synthesis or decreased insulin efficacy in diabetes mellitus.

The effects of psyllium husk were examined in a study including 34 males with high cholesterol and insulin resistance. 5.1 grams of psyllium were given twice a day for eight weeks to 80 participants and an inactive control. The findings revealed an 8.9% improvement in the lipid profile, which included a 1.0% drop in LDL cholesterol and a decrease in total cholesterol. Furthermore, there was a significant decrease in the postprandial rise in glucose levels.

Isabgol reduces the abrupt postprandial glucose surge, which is beneficial for glucose management. Moreover, isabgol improves the glucose-lowering action and absorption of other antidiabetic drugs like metformin.

### 6.5 IRRITABLE BOWEL SYNDROME

Psyllium's high fiber content makes it useful for treating irritable bowel syndrome (IBS). Psyllium's fiber serves as a bulking agent, making it a crucial part of IBS main and secondary therapy. Both dissolvable and non-dissolvable fiber are present. While insoluble fiber may occasionally worsen clinical outcomes, soluble fiber has been demonstrated to dramatically improve symptoms. For those who have IB Consuming too much psyllium can exacerbate symptoms. Psyllium supplementation can lower C-reactive protein (CRP) levels in people with irritable bowel syndrome, according to epidemiological studies. <sup>[20]</sup>

### 6.6 BENEFITS OF MALE

The benefits of isabgol for men are associated with the prostate gland. By controlling bowel motions and avoiding constipation, isabgol helps preserve and enhance the health of the male prostate. <sup>[21]</sup> Indeed, isabgol, also known as psyllium husk, has been demonstrated to offer a number of advantages that support male reproductive health, especially in terms of improving the amount and quality of sperm. According to research, Isabgol's high fiber content can enhance overall nutrient absorption and digestion, which is essential for preserving ideal hormonal balance and reproductive function. In particular, Isabgol may boost sperm counts by supplying vital nutrients and fostering a more favorable environment for sperm development. It is also thought to improve sexual performance by thickening semen and possibly prolonging ejaculation. These results imply that adding isabgol to the diet may be a natural way to promote male fertility and improve sexual health. <sup>[22]</sup>

### 6.7 BENEFITS OF FEMALE

Benefits of isabgol for women include advantages during pregnancy. Constipation is brought on by the expanding uterus's increasing strain on the intestines. This problem can be lessened, healed, and pain alleviated by isabgol.

<sup>[29]</sup>

Isabgol can be especially helpful for women in a number of ways. Due to hormonal changes and the strain of the expanding uterus on the intestines, many pregnant women suffer from constipation. Because of its inherent laxative qualities, isabgol can safely treat constipation during pregnancy. Additionally, Isabgol's high fiber content may help with weight management, which is a common problem for women both before and after pregnancy. Isabgol can help control weight gain and improve postpartum weight loss by encouraging feelings of fullness and improving digestion. Finally, although further research is required in this area, some initial findings indicate that the soluble fiber in Isabgol may help lessen the intensity of symptoms related to premenstrual syndrome (PMS).<sup>[21]</sup>

**Table 3:** Isabgol for different health condition: Who can and can't take it? <sup>[23]</sup>

Condition	Can take isabgol	Notes
constipation	yes	Best with warm milk at night
Type 2 diabetes	yes	Helps regulate blood sugar
diarrhea	no	Can worsen syndrome
Irritable bowel syndrome	May be	Start with small dose observe effect
Pregnancy	Yes ( with caution )	Consult your gynecologist before use

## 7. USES OF ISABGOL

### 7.1. Natural laxative

Isabgol's high fiber content absorbs water in the colon and softens the stool, which facilitates easy bowel movements. It is a popular treatment for digestive discomfort because of its natural laxative quality, which relieves constipation.

### 7.2. Pre biotic

Isabgol functions as a prebiotic in addition to its laxative qualities. Prebiotics are compounds that stimulate the growth or activity of good microorganisms, especially gut bacteria. It helps maintain a balanced and healthy

digestive tract by encouraging the growth of these helpful bacteria.

### 7.3. Dietary supplement

Because of its high fiber content, isabgol is frequently used as an ingredient in dietary supplements that aim to enhance gut health and digestion. This natural fiber supplement can help you manage your weight by making you feel fuller for longer. It is a beneficial addition to a balanced diet because of its capacity to control blood sugar and cholesterol levels, which also promotes general wellness.

### 7.4. Herbal remedy

Isabgol is a reliable herbal cure in the field of traditional medicine. It works well to cure ailments like dysentery, diarrhea, and irritable bowel syndrome because of its calming qualities. It helps control bowel motions and offers mild, natural relief from gastrointestinal ailments by absorbing extra fluid in the gut.

### 7.5. Skin care

In the skincare industry, Isabgol is also becoming well-known. It is a useful addition to face masks and other skincare products due to its hydrating and moisturizing qualities. It can support a healthy complexion and relieve dry skin.<sup>[24]</sup>

## 8. HOW CONSUMING ISABGOL OR PSYLLIUM HUSK

It is strongly advised that isabgol be used sparingly. See your doctor and follow their recommendations if you are not sure whether to include Isabgol in your regular diet. Isabgol in powdered form is one of the most popular and practical methods to take it. You only need to take one or two tablespoons with warm water each day. Additionally, the powdered form is added to curd and consumed following a meal. The ground version of isabgol, known as isabgol bhusi, is also frequently used to cure various ailments. The collapsed layers that are extracted from the seeds are known as isabgol bhusi.

This form should ideally be taken twice a day, with a maximum of 5–10 grams added to milk, water, or even fruit juice. Sat Isabgol is reported to be useful in helping people lose weight. To lose those extra pounds, just one or two isabgol seeds combined with 240 milliliters of warm water and lemon can be very beneficial.

Powdered isabgol is one of the most popular and practical methods to take it.

You only need to take one or two tablespoons with warm water each day. Additionally, the powdered form is added to curd and consumed following a meal. The ground version of isabgol, known as isabgol bhusi, is also frequently used to cure various ailments. The collapsed layers that are extracted from the seeds are known as isabgol bhusi. This form should ideally be taken twice a day, with a maximum of 5–10 grams added to milk, water, or even fruit juice. Sat Isabgol is reported to be useful for promoting weight loss.

To lose those extra pounds, just one or two isabgol seeds combined with 240 milliliters of warm water and lemon can be very beneficial. Adding isabgol to milk and drinking it before bed is one of the best ways to relieve constipation. [25]

## 9. SIDE EFFECTS OF ISABGOL

Although isabgol is generally safe, some people may experience negative consequences if they take too much of it. These are a few typical adverse effects:

- **Gastrointestinal Discomfort:** When using isabgol, some people may have gas, bloating, or cramping in their abdomens. If the dosage is too high or it is not taken with enough water, these symptoms may manifest.
- **Allergic Reactions:** Although uncommon, allergic reactions to isabgol can occur. Itching, skin rashes, swelling, and breathing difficulties are some of the symptoms. Stop using the product and get medical help if you think you may be experiencing an allergic reaction.
- **Obstruction:** If isabgol is taken without enough water, it may occasionally result in intestinal or esophageal obstruction. Drinking lots of water is essential when taking isabgol.
- **Interactions with Medications:** It's crucial to speak with a healthcare provider, particularly if you are taking prescription drugs, as isabgol may interact with the absorption of some medications. [26]



Fig 6: Benefits and effects of isabgol [19]

## 10. PRECAUTION TO TAKE WITH ISABGOL

It is recommended to take isabgol with a sufficient amount of water or another liquid. If a person has any throat issues or difficulty swallowing, they should not use isabgol. If you have chest pain, breathing problems, difficulty swallowing, congestion, or vomiting after taking isabgol, you need to get medical help right away. It is recommended that prescription medications be taken apart from isabgol in order to minimize potential interactions. Long-term consumption of isabgol husk may decrease the absorption of copper, zinc, iron, magnesium and vitamin B12. It might also impact the absorption of calcium. It might reduce the absorption of carbohydrates from food. Since there may be potential interactions, it is advised to take medications at different times (ideally, an hour before) from isabgol husk. [27]

## 11. HEALTH INSURANCE AND PREVENTIVE CARE PSYLLIUM HUSK

In today's world, preventive health practices are encouraged, with many health insurance providers supporting wellness programs and nutrient counselling some health insurance plans cover dietary and fiber supplement as part of preventive care or wellness packages, especially if recommended by health care. Adding psyllium husk to a daily wellness routine can aid in managing cholesterol, blood sugar and digestion potentially reducing long term health costs. Exploring insurance options that promotes a holistic approach to health can offer both immediate benefits and long term savings.

Psyllium husk or isabgol is natural remedy with a range of health benefits, from aiding digestion and weight management to supporting heart health. For individuals seeking a versatile, natural fiber source, psyllium husk offer benefits that extend across various areas of wellness. When considering preventive care options, health insurance providers may cover nutritional supplements as part of a comprehensive health plan, making psyllium

husk a valuable addition. As always consult with a health care provider before adding a new supplement to your regimen to ensure it aligns with your specific health needs.<sup>[28]</sup>

## CONCLUSION

Since ancient times, isabgol, a potent natural laxative, has been used to treat diarrhea, constipation, blood pressure and diabetes. To get the benefits of this fantastic fiber supplement, incorporate it into your normal food plan. Isabgol is a naturally occurring substance with a number of inherent qualities. Additionally, isabgol provides a number of health advantages. In addition to helping with digestion, it also supports heart health and blood sugar regulation. It is a useful and adaptable complement to your everyday routine and well-being. However, remember how crucial it is to take the right amount. Before drinking it, you should undoubtedly speak with a healthcare provider if you have any health issues or ailments, or if you are taking any drugs.

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