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ISABGOL: A HERBAL REMEDY

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ABSTRACT

Isabgol husk (Plantago ovata) is a natural polymer of plant origin which is mainly composed of polysaccharide chain having (1>3) and (1>4)-ß– xylan system. Natural carbohydrates have been popularly used as a material for centuries in all kinds of pharmaceutical applications and physiochemical dietary fibres. It is world most abundant renewable and biodegradable polymer. It has been used as therapeutic agent for the treatment of home remedy in all cultures, in various kind of diseases, condition like chronic constipation, diarrhoea, Inflammation of mucous membrane of GI and genitourinary tracts, duodenal ulcers, gonorrhoea, piles etc., as a bulk forming, non-irritant laxative drugs, demulcent, as a cervical dilator etc. drugs are rarely administrated sole pure chemical substances, but are almost given in the form of drug delivery system (DDS). The function benefits of psyllium fibres consumption and explore the potential application of these fibre for dietary prevention of various diseases and disorder.The present review represents the applicability of Isabgol husk for human ailments.

KEYWORDS: psyllium, fibres, inflammation, chronic diseases.

INTRODUCTION

Isabgol husk (Psyllium), an indigenous natural dietary fiber, official in IP, BP and USP consisting of the epidermal and collapsed adjacent layers removed from the seeds of Plantago ovata Forsk. (P. ispaghula Roxb.), is particularly rich in alimentary fibers and mucilage. The husk mucilage is a clear, colorless gelling agent, able to increase in volume upon absorbing water up to 40 times its own weight. It consists of 85% water-soluble fiber; partly fermentable (in vitro 72% unfermentable residues) and acts by hydration in the bowel. Made

up of polysaccharides, it is popularly used as a bulk laxative. Biological experiments have confirmed its cytoprotective action.[1]

Whole plant as traditional plant known as 'Isabgol' is widely used as home remedy in all cultures, in various kinds of diseases, conditions like chronic constipation, diarrhoea, inflammation of mucous membrane of GI and genitourinary tracts, duodenal ulcer, gonorrhoea, piles, etc., as bulk forming, non-irritant laxative drug, demulcent, as a cervical dilator etc Drugs are rarely administered sole pure chemical substances, but are almost given in the form of drug delivery system (DDS).[2,3]

The DDS consist of active pharmaceutical ingredient in association with excipients or inert substances. Drugs are converted to dosage forms using one or more materials which are referred as excipients, basically these materials are Pharmacologically inert, used to achieving certain goals like modifying appearance, improving handling property, physical property, ability, packaging characteristics, etc. so, the drug delivery systems or pharmaceutical applications of Ispaghula Husk. Mucilage fiber supplement, primarily as a gentle bulk-forming laxative to promote the regulation of large bowel function Also, during the last decade, dietary supplementation with psyllium has been shown to lower blood cholesterol levels, and especially LDL cholesterol. A large numbers of carbohydrate containing excipients are available from natural sources have their own place. Due to variety of properties offers by them, as they are widely used as binding agents, coating materials, suspending agents, granulating agents, easily dispersible material, increasing viscosity of aqueous solution in pharmaceutical industry. Natural carbohydrates, polymers are hydrocolloids, used as gel forming components, sweetener, binder, flavouring agents, lubricants, taste masking agents to prepare easy to swallow compositions. One of the trends in this area is of study the useful substances of natural origin, for such substances tend to be biodegradable, biocompatible andnon-toxic.[4,5]

Chemical composition of isabgol husk: Isabgol contains ~15% of non-polysaccharide material 5 and the remaining 85% appears to consist of a single polysaccharide comprising D-xylose (~62%), L-arabinose (~20%), L-rhamnose (~9%) and D- galactouronic acid (~9%). The sugars present and their approximate proportions were first determined by Laidlaw and Percival. Out of two polysaccharide fractions separated from the husk mucilage; one (eq.wt.700; uronic acid 20%) is soluble in cold water while another (eq.wt.4000; uronic acid 3%) is soluble in hot water. The polysaccharide has a linear back bone of ß-D-xylose residues

in the pyranose ring form and disaccharide side chains with terminal a-D-galactouronic acid linked to O-2- of a-L-rhamnose. All the three side chains are attached to either O-2 or O-3 of xylose in the polymer back bone. The back bone has both (1>3) and (1>4) -ß- linkages but their sequence and the distribution of side chains, have not yet been determined.[6]

Physicochemical properties of dietary fibers

The physiological effects of fibers depend mainly on their physicochemical properties viz. water-holding capacity, viscosity, binding ability, bulking ability, and fermentability.[7]

Water-holding capacity: The terms water holding capacity (WHC) and water binding capacity are often used interchangeably to refer to the ability of the hydrocolloid to hold water under certain conditions.

In general, the polysaccharide constituents of dietary fibers are strongly hydrophilic. Water is held on the hydrophilic sites of the fiber itself or within void spaces in the molecular structure.[8]

Viscosity and gel formation: Viscosity, or gel-forming capacity, is related to a fibers ability to absorb water and form a gelatinous mass. Soluble fibers form gels, increasing the viscosity of the contents of the gastrointestinal tract. Because of their viscous nature, gels seem to respond more like solids than liquids in the gastrointestinal tract. This phenomenon may explain the delayed gastric emptying often associated with the ingestion of fiber. Gels may also provide lubrication to stool.[9]

Binding ability: Dietary fiber is capable of trapping bile acids in the small intestine (Story, 1981). The gel matrix formed by soluble fibers that are eventually excreted in the faces may entrap some of the bile acids released from the gallbladder. This physical entrapment appears to be more pronounced in the terminal ileum where bile acids are usually reabsorbed.[10]

Bulking ability: Insoluble fibers, such as cellulose and lignin, are mostly unfermentable by colonic micro flora and increase fecal bulk by their particle formation and water holding capacity. Wheat bran is among the best bulking agents. Some fermentable hemicellulose fibers, including cabbage, increase fecal bulk by increasing fecal flora. In contrast, highly fermentable fibers, such as pectin, have little effect on fecal bulk.[10]

Fermentability: The extent to which fibers ferment is highly variable, ranging from not at all with lignins to almost complete fermentation with pectins. Soluble fibers are fermented to a much greater extent by colonic bacteria than are insoluble fibers. Fermentation of soluble fibers may play an important role in some physiologic effects of fiber. Plants contain varying proportions of rapidly fermented, slowly fermented, and unfermentable dietary fibers. Fruits (such as apples and bananas) and vegetables (such as potatoes, eggplant, and beans) are thought to ferment rapidly and may contribute less to fecal bulking than other fibers. Psyllium and wheat bran are thought to ferment slowly and help build up the fecal mass through fermentation, which takes place along the entire length of the colon.[11]

Pharmaceutical application: During the last decades, much interest has been shown by the scientific community in naturally occurring swell-able biomaterial of Plantago ovata and Ocimumbasilicum. These biomaterials are being used as folk medicines. Isabgol has not only traditionally application in life of people but also currently it is utilized in pharmaceutical industry because it was found to be most effective to lower blood cholesterol levels, thereby reducing the risk factors of cardiovascular system diseases which affects more than 80 million people in the world and are the leading cause of mortality in United States. It was found from the previous literature that extract of P. ovata seeds significantly affected the immune system of rabbits. It caused a reduction in anti-HD antibodies as well as an increase in the number of white blood cells and spleen leukocytes. Moreover, aqueous extract of P. ovata seeds reduced hyperglycaemia in type 1 and 2 diabetes in rats. These properties showed that this extract can be used in diabetes treatment. Nowadays it gained attention to use as a as a dietary fiber supplement to promote the regulation of bowel function. In pharmaceutical industry, psyllium is used as thickening agent during capsule formulation. Many health benefits are related to dietary fiber obtained from seed husk. For example a sufficient intake of dietary fiber may reduce risk of developing the diseases such as obesity, diabetes and certain gastrointestinal disorders[6]. According to results published in the scientific literature mentioned above clearly stated that organic psyllium has much more advantageous for healthy life. Because it was widely considered in medical as safe and effective for certain type of diseases when taken in recommended dose.[12]

Functional benefits of Psyllium fiber supplementation

Constipation and diarrhoea: Most dietary fiber sources promote laxation by increasing colonic contents, which stimulate propulsion. Unfermented or incompletely fermented fiber

and the accompanying moisture it holds contribute to increase stool mass. These fibers also provide substrate for microbial growth and induce therefore a greater bacterial mass, another factor for increased colonic content.[8] Another benefit is that psyllium containing stools contains an unfermented gel which functions as an emollient and lubricant leading to a greater ease of passage of the stools. Psyllium fiber is widely used as a fiber supplement for the treatment of constipation and has in clinical trials repeatedly reported significantly increased levels of stool moisture, as well as wet and dry stool weight in healthy subjects and in patients with gastrointestinal disease (It has been proposed that each gram of Psyllium fiber increases stool weight an average of 5.9-6.1 g compared with 4.9 - 5.4g and 3.4 - 4.5 g for consumed wheat bran fiber or oat bran fiber, respectively On the opposite of the desired effect against constipation, and because of its great ability to retain water, Psyllium has also been shown to slow down the gastric emptying time and colon transit, this being of benefit for individuals with fecal incontinence from liquid stools or diarrhoea.[13]

Bowel diseases: Psyllium supplementation may be helpful in the treatment of irritable bowel diseases, inflammatory bowel disease and ulcerative colitis. While the beneficial effects of Psyllium in treatment of irritable bowel syndrome is most probably associated with its anti constipation activity, the beneficial effects on ulcerative colitis and inflammatory bowel disease seem to be due to anti constipation activity together with increased levels of the short-chain fatty acid butyrate (anaerobic fermentation of Psyllium fiber in the intestines results in a considerable production of the short-chain fatty acids acetate, propionate, and butyrate) which have anti inflammatory and anti-oxidant properties as well as being an important source of energy-yielding substrates to the colonic mucosa Psyllium supplementation is widely used also for haemorrhoids and diverticulitis, although evidence has been questioned its consumption has been shown to be beneficial for hemorrhoids with improvement in reduction of bleeding on contact and of congested hemorrhoidal cushions. The treatment should, however, last more than a month as no amelioration was noted in another trial of 30 days. Less evidence is available for the effectiveness of fiber in the treatment of uncomplicated diverticulitis yet widely used among patients to relieve overall symptoms.[14,15]

CONCLUSION

Isabgol husk, a natural edible polymer has been reported to be used in hemorrhoids, constipation, diabetes, ulcerative colitis. Besides its traditional use in constipation, husk can

lower down the abnormal LDL level up to the normal which is the causative factor for different problems eg. Hypercholesterolemia, hypertension, low body working efficiency etc. Also, it has shown its cancer protective effect in different studies. All of the therapeutic applications of Isabgol husk are with negligible side effects/ or adverse effects. But the benefits in certain cases as on reducing the glucose level are still controversial and has not been totally studied or appropriately shown in type II diabetes. Hence, advanced research is essentially required in different proposed mechanism of husk for human health.

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