A review on impact of barley consumption in lifestyle diseases

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ABSTRACT

Lifestyle diseases have reached the epidemic proportion all over the world. Diseases like obesity, atherosclerosis and intestinal diseases have gained much popularity. Barley is one of the world's most important crops providing food and related products for millions of people. Diseases continue to pose a serious threat to barley production, despite the use of fungicides and resistant varieties, highlighting the impact of fungicide resistance and the breakdown of host plant resistance on the efficacy of control measures. One such important cereal grain not used mostly by youngsters is barley It is a good old grain with so many health benefits like weight reduction, decreasing blood pressure, blood cholesterol, blood glucose in Type 2 diabetes and preventing colon cancer. It is easily available and cheap grain. It contains both soluble and insoluble fiber, protein, vitamins B and E, minerals selenium, magnesium and iron, copper, flavonoids and anthocynins. Barley contains soluble fiber, beta glucan binds to bile acids in the intestines and thereby decreasing plasma cholesterol levels. Absorbed soluble fiber decreases cholesterol synthesis by liver and cleansing blood vessels. Insoluble fiber provides bulkiness in the intestines, thereby satiety. decreased appetite. It promotes intestinal movements relieving constipation, cleansing colonic harmful bacteria and reduced incidence of colonic cancer. It is a good source of niacin, reducing LDL levels and increasing HDL levels. Selenium and vitamin E providing beneficial antioxidant effects. Magnesium, a cofactor for many carbohydrate metabolism enzymes and high fiber content contributes for its blood glucose reducing effect in Type 2 diabetes. It is having good diuretic activity and is useful in urinary tract infections. Barley contains gluten, contraindicated in celiac disease.

INTRODUCTION

Barley originated in Ethiopia and Southeast Asia, where it has been cultivated for more than 10,000 years. Barley was used by ancient civilizations as a food for humans and animals, as well as to make alcoholic beverages; the first known recipe for barley wine dates back to 2800 BC in Babylonia. In addition, since ancient times, barley water has been used for various medicinal purposes.Barley played an important role in ancient Greek culture as a staple bread-making grain as well as an important food for athletes, who attributed much of their strength to their barley-containing training diets. Roman

athletes continued this tradition of honoring barley for the strength that it gave them. Gladiators were known as *hordearii*, which means "eaters of barley." Barley was also honored in ancient China as a symbol of male virility since the heads of barley are heavy and contain numerous seeds. Barley is a wonderfully versatile cereal grain with a rich nutlike flavor and an appealing chewy, pasta-like consistency. Its appearance resembles wheat berries, although it is slightly lighter in color. Sprouted barley is naturally high in maltose, a sugar that serves as the basis for both malt syrup sweetener. Today, the largest commercial producers of barley are Canada, the United States, the Russian Federation, Germany, France and Spain.

BENEFITS OF BARLEY CONSUMPTION

Consumption of soluble fiber improves risk factors for cardiovascular diseases and diabetes mellitus. It also provides satiety value. Soluble fiber reduces plasma cholesterol concentrations, lowers postprandial plasma glucose and insulin concentrations and ameliorates insulin resistance. Most research on soluble fiber has focused on oats. Barley, another excellent soluble fiber source, has received little attention. Many forms of barley or barley extracts have not been investigated in human subjects. Thus, research is needed to assess the health effects of human consumption of barley and barley products including germinated barley foodstuff, barley co-products, and barley Nutrim.

LIFE STYLE DISEASES

Barley's Fiber for Regularity, Lower Cholesterol, & Intestinal Protection

- In addition to providing bulk and decreasing the transit time of fecal matter, thus decreasing the risk of colon cancer and hemorrhoids, barley's dietary fiber also provides food for the "friendly" bacteria in the large intestine. When these helpful bacteria ferment barley's insoluble fiber, they produce a short-chain fatty acid called *butyric acid*, which serves as the primary fuel for the cells of the large intestine and helps maintain a healthy colon. These helpful bacteria also create two other short-chain fatty acids, *propionic* and *acetic acid*, which are used as fuel by the cells of the liver and muscles.

- barley's dietary fiber is high in *beta glucan*, which helps to lower cholesterol by binding to bile acids and removing them from the body via the feces. Bile acids are compounds used to digest fat that are manufactured by the liver from cholesterol. When they are excreted along with barley's fiber, the liver must manufacture new bile acids and uses up more cholesterol, thus lowering the amount of cholesterol in circulation. Soluble fiber may also reduce the amount of cholesterol manufactured by the liver. A study published in the *Archives of Internal Medicine* confirms that eating high fiber foods, such as barley, helps prevent heart disease. Almost 10,000 American adults participated in this study and were followed for 19 years. People eating the most fiber, 21 grams per day, had 12% less

coronary heart disease (CHD) and 11% less cardiovascular disease (CVD) compared to those eating the least, 5 grams daily. Those eating the most water-soluble dietary fiber fared even better with a 15% reduction in risk of CHD and a 10% risk reduction in CVD.

- **Additional Protection Against Atherosclerosis**
- Yet another reason to increase your intake of barley is that, in addition to its fiber, barley is also a good source of niacin, a B vitamin that provides numerous protective actions against cardiovascular risk factors. Niacin can help reduce total cholesterol and *lipoprotein (a)* levels. (*Lipoprotein (a)* or Lp(a) is a molecule composed of protein and fat that is found in blood plasma and is very similar to LDL cholesterol, but is even more dangerous as it has an additional molecule of adhesive protein called *apolioprotein (a)*, which renders Lp(a) more capable of attaching to blood vessel walls.)
- Niacin may also help prevent free radicals from oxidizing LDL, which only becomes potentially harmful to blood vessel walls after oxidation. Lastly, niacin can help reduce platelet aggregation, the clumping together of platelets that can result in the formation of blood clots. One cup of barley will supply you with 14.2% of the daily value for niacin.

- **Significant Cardiovascular Benefits for Postmenopausal Women**
- Eating a serving of whole grains, such as barley, at least 6 times each week is a good idea, especially for postmenopausal women with high cholesterol, high blood pressure or other signs of cardiovascular disease (CVD).
- A 3-year prospective study of over 220 postmenopausal women with CVD, published in the *American Heart Journal*, shows that those eating at least 6 servings of whole grains each week experienced both:
- Slowed progression of atherosclerosis, the build-up of plaque that narrows the vessels through which blood flows, and
- Less progression in stenosis, the narrowing of the diameter of arterial passageways.
- **Lower Risk of Type 2 Diabetes**
- Barley and other whole grains are rich sources of magnesium, a mineral that acts as a co-factor for more than 300 enzymes, including enzymes involved in the body's use of glucose and insulin secretion.
- The FDA permits foods that contain at least 51% whole grains by weight (and are also low in fat, saturated fat, and cholesterol) to display a health claim stating consumption is

linked to lower risk of heart disease and certain cancers. Now, research suggests regular consumption of whole grains also reduces risk of type 2 diabetes.

- Barley may be an even better breakfast choice than oats for persons with Type 2 diabetes. In a study conducted by the Agricultural Research Service at the Diet and Human Performance Laboratory in Beltsville, MD, barley was much more effective in reducing both glucose and insulin responses than oats.

- **Barley Can Help Prevent Gallstones**

- Eating foods high in insoluble fiber, such as barley, can help women avoid gallstones, shows a study published in the *American Journal of Gastroenterology*.

- Studying the overall fiber intake and types of fiber consumed over a 16 year period by almost 70,000 women in the Nurses Health Study, researchers found that those consuming the most fiber overall (both soluble and insoluble) had a 13% lower risk of developing gallstones compared to women consuming the fewest fiber-rich foods.

- Researchers think insoluble fiber not only speeds intestinal transit time (how quickly food moves through the intestines), but reduces the secretion of bile acids (excessive amounts contribute to gallstone formation), increases insulin sensitivity and lowers triglycerides (blood fats). Abundant in all whole grains, insoluble fiber is also found in nuts and the edible skin of fruits and vegetables including tomatoes, cucumbers, many squash, apples, berries, and pears. In addition, beans provide insoluble as well as soluble fiber.

- **Barley's Copper Can Benefit Arthritis Sufferers**

- Copper, another trace mineral supplied by barley, may also be helpful in reducing the symptoms of rheumatoid arthritis. Copper is an essential cofactor of a key oxidative enzyme called *superoxide dismutase*. *Superoxide dismutase* disarms free radicals produced within the *mitochondria* (the energy production factories within our cells). Copper is also necessary for the activity of *lysyl oxidase*, an enzyme involved in cross-linking collagen and elastin, both of which provide the ground substance and flexibility in blood vessels, bones and joints. One cup of cooked barley provides 32.0% of the daily value for copper.

- **Development and Repair of Body Tissue**
  The phosphorus provided by barley plays a role in the structure of every cell in the body. In addition to its role in forming the mineral matrix of bone, phosphorus is an essential component of numerous other life-critical compounds including *adenosine triphosphate* or ATP, the molecule that is the energy currency of the body. Phosphorus is an important component of nucleic acids, the building blocks of the genetic code. In addition, the metabolism of lipids (fats) relies on phosphorus, and phosphorus is an essential component of lipid-containing structures such as cell

membranes and nervous system structures. A cup of cooked barley will give you 23.0% of the daily value for phosphorus.

CONCLUSION

Consumption of soluble fiber improves risk factors for cardiovascular diseases and diabetes mellitus and many other diseases like gall stone and intestinal protection, copper in barley helps in reducing the symptoms of rheumatoid arthritis. It also provides satiety value. Soluble fiber reduces plasma cholesterol concentrations, lowers postprandial plasma glucose and insulin concentrations and ameliorates insulin resistance. Most research on soluble fiber has focused on oats. Barley, another excellent soluble fiber source, has received little attention. Many forms of barley or barley extracts have not been investigated in human subjects. Thus, research is needed to assess the health effects of human consumption of barley and barley products including germinated barley foodstuff, barley co-products, and barley Nutrim.

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