Article ID 240205-S-07

Barley: A Potential Cereal for Healthy Food

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Barley has been cultivated on approximately 6.95 lakh acres of land in India yielding 17.43 at a productivity rate of 2508 kilograms per hectare since ancient times. Rajasthan, Uttar Pradesh, Haryana, Punjab, Madhya Pradesh, Uttrakhand, Himachal Pradesh, Bihar, Jammu and Kashmir, West Bengal, Chhattisgarh and Sikkim are the main states where Barley is grown. Among cereals, Barley hold significant importance in terms of output volume and global cultivation area. It is categorized as either spring or winter, two row or six row and hulless or hulled. Barley can also be classified based on its grain composition as normal, waxy, high amylose starch, high lysine, high beta-glucan or proanthocyanidin free.

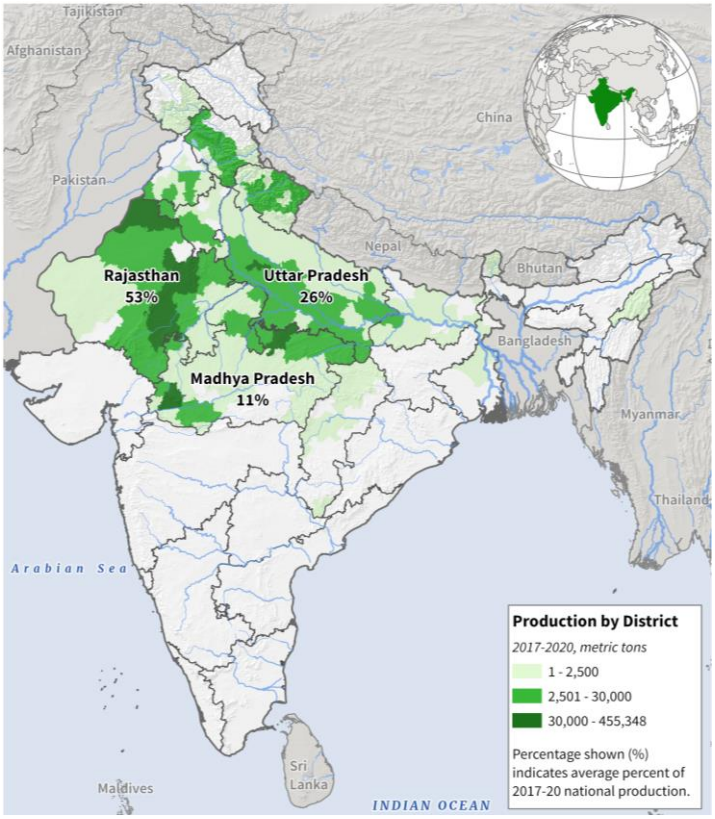

Fig 1. Barley production in India

Source- Ministry of Agriculture and Farmers Welfare, India.

Historically, Barley has been associated with various health benefits due to its higher beta-glucan content compared to other cereals. Beta-glucans are known to reduce blood cholesterol and glucose levels, a fact supported by clinical evidence. Regular consumption of Barley and oats promote better colon health and reduces the risk of cardiovascular disease among other health benefits. Given that cereals constitute staple diet for a majority of the Indian population, there is a growing need to incorporate Barley into multigrain product to promote a healthier diet. Barley holds the distinction of being one of the earliest domesticated cereals worldwide and in our country, it has been revered as a sacred grain since ancient times.

However, from the mid 60's to the early 90s both the cultivation area and the production of Barley experienced a significant decline. This decline can be attributed to the introduction of dwarf wheat varieties, consistent irrigation practices and shift in human dietary preferences. Over the past two decades, there has been a stabilization in Barley cultivation largely due to increased demand from the Barley malt industry. Presently, Barley is experiencing a resurgence in the food sector, offering a new ray of hope due to its numerous beneficial properties.

The creation of various Barley based products such as multigrain flour for chapattis, biscuits, bread, flakes, porridge, noodles and Sattu has captured the attention of Indian food manufacturers. These products require standardization and flavour enhancement to ensure their palatability. For instance, Sattu which serves as a flavoured ready to drink beverage, highlights this need. With the availability of barley-based products and their associated health benefits and urgent necessity for a robust media campaign to raise awareness about the health advantages of barley. Policy makers might also contemplate raising the support price of barley to incentivize resource-poor farmers to cultivate Barley as a Rabi crop. This, in turn, could boost food Barley production, thereby providing a healthy alternative for all individuals.

Essential components of barley

Barley grains are high in glucons to call resistant starch proteins amylos content arabino

xylems and other Essential elements which are all beneficial to our health.

Beta-glucans

Beta-glucans rare a significant constituent of endosperm cell walls typically contributing 72-75% to their composition. Studies have demonstrated that beta-glucans can lower LDL cholesterol and triglyceride levels without affecting HDL cholesterol. Incorporating Pearl barley which is rich in beta glucsns into one's diet can lead to reductions in both LDL cholesterol and visceral fat area. Furthermore, Barley has a lower glycemic index compared to other series like rice. The incorporation of Barley beta-glucans aids in lowering the glycemic index of chapattis. A comparison between chapattis with and without beta-glucan revealed that those with 4 and 8 gram of beta-glucan per serving had glycemic index values 43% to 47% lower respectively. Several studies have demonstrated that consuming barley helps regulate blood sugar levels and improves insulin response due to the intake of Beta-glucan. In a study, comparing oat and Barley based meals for their glycemic impact, Barley based meals yielded superior results owing to their higher soluble fibre content.

Protein content

When utilizing Barley for food whether in its raw, roasted or malted state, it should ideally possess a higher protein content. However, there exists an Inverse relationship between starch and protein content in barley. This is because starch is a primary component of Barley grains. Grains with lower starch content typically exhibit signs of withering, leading to reduced yield.

Amylose content

Beta-glucans and insoluble fibres are primary contributors to decreasing the glycemic index while amylose content also plays a role in its reduction. Barley's amylose content varies ranging from 24% in normal Barley to exceptionally high levels such as 45% in Glacier barley. The amylose molecules serve as a high fibre source with a low glycemic index. Higher amylose content corresponds to a lower glycemic index.

Arabinoxylans

Due to its immune-modulatory potential, Arabinoxylans have attracted attention of people in our country.

Essential minerals

Barley boasts a rich array of nutrients including various mineral such as calcium, zinc, iron, potassium and phosphorus. Magnesium found in Barley contributes to maintaining robust bones and regulating muscle and nerve function. Phosphorus is essential for tissue and cell growth and maintenance in our bodies. Zinc supports wound healing and boost the immune system's ability to fight infection. Barley serves as a valuable source of iron, crucial for the production of harmoglobin, the protein responsible for oxygen transport in red blood cells. Potassium in barley plays a vital role in preserving healthy neuron and muscle function, as well as in regulating blood pressure. Though present in smaller amounts, barley also contains calcium, which promote the strength of bones and teeth. This grain offers a cost effective, well -storing and nutrient rich dietary option.

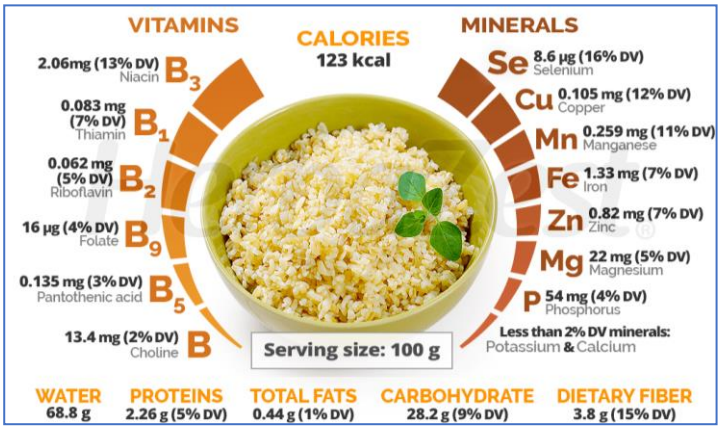

Fig. 2. Nutritional components of barley grain (Source-https://www.herbazest.com/herbs/barley)

Phytochemicals

In addition to being a nutritious food source, Barley serves as a Reservoir for a diverse array of phytochemicals which are known as bioactive compounds due to their various biological functions. among these phytochemicals, phenolics, carotenoids, Vitamin E compounds, lignans, and beta-glucan stand out as imperative groups with significant nutritional and health benefits.

Antioxidant activity

Multiple studies have revealed that Barley exhibits higher antioxidant activity compared to other cereals such as wheat and maize, primarily due to its elevated levels of phenolic compounds. The content of these phenolic compounds and the overall antioxidant activity in Barley are significantly influenced by factor such as growing location, the year of growth and the genotype.

Health-conscious products from barley

Multigrain Atta: Hulled barley can be added to wheat flour to enhance both soluble and insoluble fiber content. This addition lowers the glycemic index of chapatis which is staple food for many in Northern India.

Multigrain biscuits and bread: Including hulls Barley and Hans is the health benefits of both bread and biscuits. Initial trials conducted at ICAR IIWBR have shown the feasibility of producing Barley based biscuits. Similarly, barley malt can also be utilised to create flavoured biscuits.

Barley flakes: Hulless Barley can be processed into breakfast cereals like flakes all though flavouring maybe necessary to improve taste.

Ready to drink, Sattu: Sattu a traditional beverage made from Barley or gram flour could see a rise in popularity if ready to drink flavoured Barley based versions are developed offering a healthy alternative in the beverage market.

Health benefits from consumption of barley

Consuming whole Barley flour on a regular basis can help people avoid chronic conditions including diabetes colon cancer hyperlipidemia high blood pressure and gold stones. Whole green barley contains phytochemical such as beta glucan phenolic acids flavonoids ligands to call phytostea rolls and folite. When we consume the barley, it decreases the risk of cardiovascular and chronic disease such as diabetes, cancer and obesity.

Cardiovascular health

Cholesterol reduction: consumption of Barley in diet helps to lower LDL cholesterol levels reducing the risk of cardiovascular disease due to presence of Beta glucans.

Blood pressure: Regular consumption also helps in managing blood pressure because of its potassium and magnesium content.

Digestive health

Fibre content: When we consume Barley, it prevents constipation comma aids in digestion comma promote regular bowel movements due to presence of high fibre content.

Gut health: The presence of prebiotic fibre in barley supports the growth of beneficial gut bacteria.

Weight management

Consumption of Barley in diet helps in weight management by reducing overall calorie intake because of the fibre content which is present in barley enhance the feeling of fullness in body.

Blood sugar control: Barley is a suitable food for people with diabetes. It helps to regulate blood sugar level due to its low glycemic index.

Although barley's direct use as a food is limited, it has recently been incorporated into various multigrain products for its significant health benefits. Research indicates that adding barley to different food preparations increases the levels of phenolics and other bioactive compounds. Integrating barley into wheat flour can enhance the nutritional value and health benefits of wheat-based products like chapatti and biscuits. The use of food barley presents a valuable opportunity for research and development, benefiting farmers, the industry, and consumers. Increased consumption of food barley could lead to better prices for farmers, requiring fewer inputs compared to other similar seasonal crops. Currently, industries are promoting barley-based products with detailed information on their health benefits. Therefore, there is a need to develop hulless or naked barley varieties with yields comparable to hulled barley, offering better quality traits and resistance to biotic and abiotic stresses. Global barley markets are influenced by factors such as consumer preferences, trade policies, and economic conditions.

In current year the demand for Barley remains steady, with growth opportunities amazing in traditional as well as emerging markets. Increasing disposable incomes urbanization and the rising popularity of craft beverages contributes to the demand for Barley based products. However, market dynamics including trade tensions supply chain disruptions and price volatility pose challenges to Barley producer's requiring strategic planning and risk management strategies to navigate. Barley continues to be a vital crop with use applications and significance in global agriculture and food industries. The developments in 2024, the ongoing efforts to enhance Barley production utilization and sustainability in response to evolving challenges and opportunities. Through collaborative research Innovation and strategic partnerships, the Barley community remains committed to advancing the crops potential and ensuring its continued contribution to food security nutrition and economic prosperity worldwide.

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