

# Effects of Supplementation with Barley Flour on Bread Quality

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**Abstract:** *The present study was conducted to formulated bread using barley flour. Barley rich a source of  $\beta$ -glucans the diet contained 3 or 6 g  $\beta$ -glucans from barley than when it contained no  $\beta$ -glucans. Bread prepared without the incorporation of barley was kept as control. The nutrient composition, sensory evaluation and shelf life of the products were determined.*

**Keywords:**  $\beta$ -glucan, Bread

## 1. Introduction

Health is the level of functional or metabolic efficiency of a living organism. In Humans, it is general condition of a person's mind and body, usually meaning to be free from illness, injury or pain [1]. Dietary fiber is a carbohydrate that is incompletely absorbed in humans and in some animals. Like all carbohydrates, when it is metabolized it can produce four Calories (kilocalories) of energy per gram. However, in most circumstances it accounts for less than that because of its limited absorption and digestibility [2].

Barley *Hordeum vulgare*, botanical name for barley is a cereal grain that has been in use since ancient times and was one of the first cultivated grains. It forms the staple diet of certain cuisines and is used extensively by several other cuisines [3].

The exact origin of barley is debatable, possibly originating in Egypt, Ethiopia, the Near East or Tibet [4]. However, the certain that barley was among the earliest cultivated grains, around the same time as domestication of wheat. Barley was grown in the Middle East prior to 1000 BC, but barley cultivation in China and India probably occurred later. Barley was grown on the Korean Peninsula by 1500 to 850 BC along with millet, wheat and legumes [5].

Barley is a great source of dietary fiber and actually contains both soluble and insoluble fiber. Soluble fiber is effective in lowering blood cholesterol and can reduce the risk of heart disease. Soluble fiber is also beneficial in slowing the absorption of sugar and reducing the risk for developing type 2 or non-insulin-dependent diabetes. The insoluble fiber found in barley may be beneficial in helping the body maintain regular bowel function. Insoluble fiber may also help lower the risk for colon cancer [6].

Per 100 g the barley flour contains of energy 332.5 kcals, protein 12.24 g, fat 1.03 g, carbohydrate 68.66 g, fibre 3.66 g and vitamins 5.5 mg [7]. Provided the composition of Amino acids contents as per 100 g Cysteine 3.5 g, Leucine 5.5g, Phenylalanine 6.0 g, Valine 5.5 g (Shewry, 1969). Provided the composition of mineral contents containing calcium 29 mg, iron 2.5 mg, magnesium 79 mg, phosphorus 221 mg, potassium 28 mg and zinc 2.1mg. The health

benefits of barley are mainly attributed to presence of high percentage of fiber and negligible amount of saturated fat, including vitamins, minerals and antioxidants. The high fiber content helps maintain the intestinal health, thus minimizing risks of digestion problems, hemorrhoids and other intestine disorders. Being very low in sodium and cholesterol content, most physicians recommend barley for heart patients. It is claimed that consuming barley regularly is effective for lowering cholesterol and maintaining blood sugar levels [8].

Barley is a powerhouse of phytonutrients that can guard the body against the risks of breast and prostate cancer. This is due to the production of estrogen like effects. The trace mineral such as selenium, is present in the body and it is necessary for cell protection and hormone efficacy. This element acts as an antioxidant, thereby protecting the male reproductive system by producing a protein that protects sperms from oxidative damage. Selenium is also helpful in preserving elasticity of the skin by protecting it against free radical damage. The heart, immune system, pancreas and tissues are protected and reduction in the risk of cancers of the skin, colon, stomach, liver and breast [9].

Barley distributes the amino acid, tryptophan throughout the body, thereby inducing sleep, regulating moods and helping the body to relax. Manganese and B-complex vitamins, found in barley are essential for the overall well being of an individual. Barley is known to improve the circulatory system and protect it against chronic diseases like arteriosclerosis. The amino acids and antioxidant enzymes present in barley reduce toxins in the body by supporting its gentle detoxication [10].

## 2. Materials and Methods

Barley was bought from department store, India barley flour. Barley were initially cleaned, removed foreign materials and grinded by electrical mill to obtain the barley flour. Barley flour was incorporated into bread at three different levels of variations. The treatments for preparation of barley flour incorporated in bread were as follows.

## 3. Treatment

Volume 4 Issue 4, April 2015

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- T1- Maida flour (control)
- T2- Maida flour + 20% barley flour
- T3- Maida flour + 30% barley flour
- T4- Maida flour + 40% barley flour

Barley bread was prepared by mixing barley flour and refined flour with specified amount of barley flour as mentioned treatment. All the ingredients such as maida, barley flour, soft margarine, sugar, salt, yeast and water were used and set for 30 minutes fermentation

The sensory evaluation of the incorporated products were carried out by 10 am among the semi-trained (n=30) of Mother Teresa Women's University, Chennai, Tamilnadu, India, belonging the Department of Home Science were included as semi-trained (n=30) panel judges. The evaluation of criteria includes organoleptic characteristics such as appearance, aroma, tenderness, taste, texture, form of symmetry, softness, evenness of bake, sponginess, chewiness, overall acceptability. The panelists were explained about each quality attribute to avoid judgment variability. The mean scores given by thirty members were used for statistical analysis.

#### 4. Result and Discussion

The evaluation of criteria includes organoleptic characteristics such as appearance, aroma, tenderness, taste, texture, form of symmetry, softness, evenness of bake, sponginess, chewiness, overall acceptability. The data pertaining to the organoleptic evaluation was influenced by different treatments were presented in Table I. The overall acceptability and rating scale score was higher for the 30% level of incorporation of barley flour. The data reveals that there were significant differences at the level of 1% significances among 30%.

#### 5. Conclusion

Barley has a distinct advantage over other grains since beta-glucans soluble fiber is found throughout the entire barley kernel. Consumption of barley containing foods, and its associated soluble fiber, insoluble fiber and beta-glucans significantly cure the type II diabetics and obesity. Storage of bread negatively affected the volume aroma, mastication, texture and taste of bread. Results of this present study indicate that  $\beta$ -glucans has a great potential to be used in bread industry as an alternative to commercial available gums and hydrocolloids. Among the three different variations 30 per cent of barley flour incorporation into bread was record the highest scores for overall accepeclity and thus it can be popularized among the community.

**NS- Not Significant**

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**Table 1:** Scores of organoleptic evaluation of formulated barley bread

Level of variations of barley flour (%)	Mean $\pm$ S.D	t-value	Level of significance
Control (0)	48.56 $\pm$ 2.30	1.67	1%
20	34.7 $\pm$ 9.74	7.38	NS
30	47.13 $\pm$ 4.85	0.10	1%
40	40.86 $\pm$ 6.85	4.10	NS