

# BLACK WHEAT: A POTENTIAL INNOVATION FOR FUTURE AGRICULTURE

Aanchal Kapoor\* and Saurabh Thakur

Ph.D Scholar, Department of Soil Science, CSKHPKV, Palampur

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## INTRODUCTION

Wheat is a vital source of nutrition and one of the oldest cereals that have been grown and consumed for millennia. Its cultivation is an important monetary source, in addition to providing nutrition. Black wheat, which was developed at NABI (National Agro-Food Biotechnology Institute University, Mohali, Punjab) using a standard plant breeding approach, has recently acquired popularity among farmers. When compared to brown wheat, black wheat is a healthier choice. In every way except grain colour and nutritional makeup, it morphologically resembles white wheat. It has a lot of biological value and can be used as a health supplement. It has the power to battle and address malnutrition on a global and national scale. Furthermore, this new variety of wheat has a slew of health benefits, including the ability to avoid diseases like diabetes and cancer, which are notoriously tough to treat with modern research.



(Figure 1: Spikelets of black wheat crop)

## WHAT IS BLACK WHEAT?



Black wheat is a coloured or pigmented wheat type that was created by crossing purple and blue wheat. The black colour of wheat grain is due to anthocyanin, which is found on the outer layer. It contains phenolic compounds, anthocyanins, carotenoids, phytic acid necessary amino acids, dietary fibres, vitamins, and minerals, among other nutritious and functional elements. Black wheat has more protein, dietary fibre, calcium, Vitamin K, total flavonoid, total phenolic content, and antioxidant activity than traditional yellow wheat. Black Wheat has a greater total phenolic content than yellow wheat, with ferulic acid being the most prevalent phenolic acid. The colour variation between black and yellow wheat is due to 225 metabolites, the majority of which belong to the flavonoids group (Dhua *et al.*, 2021).

### **HOW BLACK WHEAT WAS INTRODUCED?**

A few years ago, a social media post went viral claiming that a new type of wheat had been developed after seven years of research and that it could treat diseases including cancer and diabetes. Some farmers in the Neemuch region, Malwa, and Indore districts sowed this unique strain of wheat. While the farmers were intrigued by the development of black wheat, the final results revealed that it is produced in the same manner as regular wheat. Mr. Govind Nagda, a progressive farmer from Kanakheri village in the Neemuch district, said he received 40 kg of black wheat seed from the Nabi Research Center in Mohali with the help of a friend, which he sowed on three bighas of land. After harvesting and cleaning, the weight of this wheat was determined to be 36 quintals. However, production remained the same as it had been with regular wheat. On an average bigha, normal wheat yields 10-12 quintals.

Exotic germplasm (EC866732) obtained from Japan was crossed with a normal high yielding and disease resistant wheat cultivar (PBW621), and after selection, black wheat was developed in India at NABI, Mohali, under the leadership of pioneer scientist Dr. Monika Garg, after seven years of research in various seasons and regions to check its adaptability and yield potential to India's environmental conditions. The National Agro-Food Biotechnology Institute University in Mohali, Punjab, developed black wheat. The institute currently has a patented Black Wheat. This wheat is known as 'Nabi MG,' and it comes in black, blue, and purple colours, as well as being considerably more nutritious than regular wheat. Furthermore, black wheat can aid with stress, obesity, cancer, diabetes, and heart disease prevention.



(Figure 2: Black wheat (a) Spike (b) Grains)

### THE REASON OF COLOUR

The pigment "Anthocyanin," which also influences the colour of fruits and vegetables, is what gives black wheat its distinctive appearance. These Anthocyanins are naturally occurring antioxidants that form in a field during grain filling, providing the wheat with a high nutritional value. Anthocyanin content in regular wheat is 5 ppm (parts per million); however, anthocyanin concentration in black wheat grain is estimated to be around 100-200 ppm. As a result, black wheat is a healthier alternative from a scientific standpoint. Buckwheat is also available in purple and blue colours, in addition to black. The reason for this is that, in addition to the colour difference, black wheat has higher nutritional benefits than regular wheat.

### HOW IT IS GROWN

Black wheat is grown in the same way as regular wheat. The plant and panicle of black wheat are green, but when the seed matures, a blackish tinge appears on the glume of the wheat spikelets. It takes 130-135 days to mature, and the seeds are smaller. However, because of its various nutraceutical qualities, it is able to fetch higher market pricing (Rs. 100-120 kg<sup>-1</sup>) despite its lower availability and productivity (20 q acre<sup>-1</sup>) than conventional wheat (24 q acre<sup>-1</sup>) (Kumari and Tzudir, 2021).

### PROPERTIES OF BLACK WHEAT

गोधूम मधुरः शीतो वातपित्तहरो गुरुः । कफशुक्रप्रदो बल्यः स्निग्धः सन्धानकृत्सरः ॥३३॥  
 जीवनो बृंहणो वषर्यो व्रणयो रुच्यः स्थिरत्वकृत् ॥३४॥

(Source: Bhavapraksha / Dhanyavarga / Chapter no. 9 / Shloka no 33, 34)

### The meaning of this shloka is as follows:

The qualities of wheat (Godhuma) are sweet in taste, cold in potency, heavy to digest, subsides Vata-Kapha dosha, increases strength, unites fractured bones, rejuvenates the whole

body, enhances complexion, increases appetite, and provides firmness to the body. It has high nutritional value as shown in table 1.

- It is a gluten-free cereal that is beneficial to persons who are gluten-intolerant.
- Rich in vitamin B, which implies it has more vitamin B6, B12, and folic acid.
- Zinc, iron, copper, magnesium, phosphorus, and potassium are all found in minerals.
- Amino acids and lipids are the major components that make up human tissue.

**Table Comparative nutritional composition analysis of colored wheat**

Parameters	Black wheat	Blue wheat	Purple wheat	White wheat
Anthocyanins (ppm)	100-140	80	40	5
Energy (Kcal)	318	318	318	322
Carbohydrates(g)	64.8	65.8	65.8	67.8
Protein (g)	12	11	11	10
Dietary Fibers (g)	12	12	12	11
Fat (g)	1.2	1.2	1.2	1.2
Moisture (%)	10	10	10	10
Iron (mg)	45	45	45	38
Zinc (mg)	35	38	36	28

Source: NABI (Mohali), 2020

(Table 1: Comparative nutritional composition analysis of coloured wheat)

## HEALTH BENEFITS

- Black wheat helps fight many diseases like high blood pressure, cold, urinary tract infections, and heart diseases.
- It also contains more antioxidants than regular wheat, which helps in controlling the antibodies and free-radicals in our body.
- Black wheat is useful in protecting eyes from vision loss and any damage because of the presence of free radicals.
- Apart from avoiding cancer, black wheat heals a variety of disorders such as obesity, eye diseases, and increases immunity.
- Black wheat is a superior food supplement that helps to slow down the ageing process and lower blood pressure and cholesterol levels. Its chapattis aid in the relief of constipation and other digestive disorders.
- The presence of unsaturated fatty acids in black wheat reduces the risk of diabetes and cardiovascular disorders (hypertension, stroke, peripheral vascular disease, and coronary artery disease etc).



- Black wheat is a boon for people who suffer from stress, as studies have shown that it can help us cope with stress if we include it in our daily diet.
- At this point of Covid pandemic, it's critical to boost immunity by eating nutrient-dense, low-carb, and protein-dense foods. Supplementing your diet with black wheat products may help you improve body resilience and boost your immune system against illnesses.

## CONCLUSION

Due to its numerous health benefits, black wheat is gaining popularity among health-conscious people. Apart from anthocyanin, there is a distinction in the nutritional value of regular and black wheat. Bio-fortified black wheat contains a lot of biological value and can be used as a health supplement. It can aid to some extent in eradicating a serious and universal problem of 'malnutrition,' with modest care on a global and national scale. In terms of health, black wheat is clearly a victor and its cultivation will surely benefit farmers.

## FUTURE THRUST

1. Need to popularize the product
2. Good research and extension work is required

## References:

- Dhua, S., Kumar, K., Kumar, Y., Singh, L. and Sharanagat, V. S. (2021). Composition, characteristics and health promising prospects of black wheat: a review. *Trends in Food Science & Technology*. 112: 780-794.
- Kumari, S. and Tzudir, L. (2021). Black Wheat: Next Big Thing in India's Agricultural Landscape. *Biotica Research Today*. 3(4):240-242.