



Black Rice - the “Forbidden Rice”

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Rice is the second most important cereals in the world and consumed as staple food for a large part of the world’s human population. Mostly, white or brown rice are consumed in the world but black rice has also its importance in nutrition content. Those days the black rice grain, also known as “Forbidden Rice” to the common people. The credit for black rice being proclaimed as a ‘Super food’ goes to Dr. Zhimin Xu. Black rice contains 18 different amino acids, copper, carotene and several other essential vitamins.

Introduction

Rice is the second most important cereals in the world and consumed as staple food for a large part of the world’s human population, especially in Asia, which provides energy and other nutrients compared to other staple grains. Mostly, white or brown rice are consumed in the world but black rice has also its importance in nutrition content. History says, in ancient China, black rice was considered so superior and rare; it was reserved exclusively for the emperor and elite personalities those days the grain, also known as “Forbidden Rice” to the common people. In India, glutinous black rice variety is cultivated in Manipur and the name “Chakhao Amubi” originates from the Manipuri language, “Chakhao” means delicious and “Amubi” means black, thus translating the name to ‘Delicious Black Rice’. It is believed that the cultivation of the grain started with the earliest people, particularly Meiteis, who settled in Manipur. Chakhao Amubi is now widely considered as a ‘Super Food’ by researchers and scientists. The term ‘Super Food’ is used to describe food items with extremely high nutritional value. Black rice contains 18 different amino acids, copper, carotene and several other essential vitamins.

Origin

The credit for black rice being proclaimed as a ‘Super food’ goes to Dr. Zhimin Xu. Modern domesticated varieties of rice have come in a range of colors, usually described as white, red and black. The wild rice from which it was domesticated has reddish grains, but the early farmers who created the rice we eat today selected for white grains. Collectors have never found black grains in more than a thousand samples of wild rice stored in gene banks. And yet black varieties are fairly widespread, albeit sporadically, across Asia — from India to Japan — with black varieties in each of the three subspecies of edible rice. This poses a bit of a problem for the origin

of black rice. The fact that it has never been found in wild rice means that it must have arisen after the start of domestication.

A team of researchers led by Takeshi Izawa of National Institute of Agrobiological Sciences in Tsukuba, Japan studied 21 different varieties of black rice that had been maintained by farmers. They found that changes to a single gene cause the black coloration, by restoring the chemical pathway that makes the pigments. That pathway is blocked in white rice. The researchers also found leftovers from one of the rice subspecies flanking the gene in the other subspecies. That suggests that black grains arose once and then spread by crossing with already domesticated varieties of the other subspecies, probably more than once.

According to Dorian Fuller, a professor of Archaeobotany at University College London and an authority on the domestication of rice, after accidental crossing, farmers highly selected rice for black grains just like colour, fragrance is often a target of post-domestication cultural selection like maize and potatoes.

Nutritional Content

Though we do not have clear idea about the origin of black rice but it possesses high nutritional value than brown or white rices. Dr. Zhimin Xu, in his research, he compared the super food quotient of Blueberries and Black rice. He stated "*A spoonful of black rice bran contains more health promoting anthocyanin antioxidants than in a spoonful of blueberries, but with less sugar, more fiber and Vitamin E antioxidants.*"

Black rice contains 18 different amino acids, copper, carotene and several other essential vitamins. It is believed that the ancient Chinese knew black rice was more nutritious and indeed, traditional Chinese medicine revealed of black rice as being good for old people and as a tonic. Farmers who grow black varieties also talk of medicinal effects. For example, according to Nepali hill farmers, black rice is good for "the maternal period." This exceptional grain has found a special place in the community feasts of Manipur where it is considered as a ceremonial food. When cooked, it loses the black colour and turns into a deep purple colour with a mild nutty taste. It is used for making porridge, bread, traditional Chinese black rice cake and even noodles. Modern nutritional science has shown that coloured rice is more nutritious than white rice, even after milling. In addition to beneficial pigments, they often contain higher amounts of minerals like iron and zinc and, sometimes, more protein, which could indeed improve the health of people who eat them. Black rice is fast finding its unique place in cuisines around the world and could very well find itself on the everyday menu of homes across India. The healths benefits are obtained by the black rice are as follows:

- 1. It contains a large amount of antioxidants:** Black rice is a good source of antioxidants - a substance known for helping individuals flush out body wastes on a regular basis. Antioxidants can be found in coffee and tea but is definitely more prevalent in black rice.
- 2. Heart attack preventive:** Studies showed that black rice contains a large amount of anthocyanins, an ingredient that is capable of lowering the risk of heart attack. It does this by preventing the buildup of plaques in the arteries which is the most common reason why heart attacks occur. Even better, it was revealed that anthocyanins are more capable of controlling cholesterol levels than any other food supplement available today.

3. Other possible health benefits: Aside from the two mentioned that have already been proven by science, black rice is also being looked at as possible prevention from serious illnesses. Some of the diseases it can prevent includes include Alzheimer's, diabetes and even cancer.

Comparison of Different Rice Types

There are currently different rice types available today with the most common one being the white variety. Out of all the types, however, black rice is found to be the one containing the highest amount of nutrition that helps with growth. Below tabulates are information on the different color of rice on their nutritional content per 100g.

Types of rice	Protein (g)	Iron (mg)	Zinc(mg)	Fiber(mg)
Polished rice	6.8	1.2	0.5	0.6
Brown	7.9	2.2	0.5	2.8
Purple	8.3	3.9	2.2	1.4
Red	7.0	5.5	3.3	2.0
Black	8.5	3.5	0.0	4.9

Economic Importance

Black rice sold in the local markets at about Rs. 325 per kg of rice. The black aromatic rice of Manipur is served in standard hotels as a top-rated variety. Rice flake prepared from black rice is becoming popular. As the black glutinous aromatic rice of Manipur are poor yielders (about 2,500 kg/ha as paddy), these rice cover less than 10% of the rain-fed wetland area under local cultivars, although there is a premium in the price of these rice.

Breeding Improvement

No systematic work on the improvement of black glutinous aromatic rice of Manipur has so far been taken up. However, germplasm collection, characterization and evaluation of these aromatic rice cultivars of have been made. The black glutinous aromatic rice of Manipur have been characterized for 34 morphological characters. These aromatic rice cultivars have been evaluated for eleven morpho-agronomic characters along with reaction to major diseases and pests of local importance.

As the domestic demand for the black glutinous aromatic rice of Manipur increases, efforts are to being made to develop high yield varieties without losing the grain's quality, cooking quality and aroma. The black glutinous aromatic rice of Manipur is in demand in the domestic market, as well as having possibilities for export.



Conclusion

Such nutritious and health beneficial black rice has been grown in India, particularly in Manipur state. It should not be limited to a particular region and needs to explore other parts of India. Therefore, there is urgent need to develop high yielding varieties of black rice without losing their colour, aroma, cooking qualities and grain qualities so that it may be helpful to fulfill the demand of Indian market as well as could have possibilities to export in foreign market.