



# **BLACK RICE: AN UNDERUTILIZED SUPERFOOD**

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# INTRODUCTION:

Black rice is a type of the rice species *Oryza sativa* L. which is black in colour, glutinous, with high position of nutrients and substantially grown in Asia. The reason they are termed “Black Rice” is the unusual black colour of the grains. The pericarp of kernel of the rice is black due to presence of high amount a pigment known as anthocyanins, a flavonoid that perform as powerful antioxidants in the body. Once cooked, the colour changes into deep purple/violet hence, also called “purple rice”. This rice is supposed to enhance the longevity of life, hence is also known as long life rice. In Homeric China, black rice was called “forbidden rice”, because of its high nutritive value could only be consumed by the emperor. Because of its high nutritive and medicinal values, black rice is now extensively considered as a ‘super food’. It is mostly grown in Southeast Asian countries where China accounts for 62 % of global production followed by Sri Lanka, Indonesia, Thailand, India etc. Several kinds of black rice are available in the market today. It is gradationally gaining preference especially among the health-conscious people of the world because of its high nutrition, better antioxidant exertion and anti-carcinogenic property.



## CULTIVATION IN INDIA

In India, black rice has been indigenous to the north-eastern state of Manipur for centuries. Manipuri black rice, popularly known as 'Chakhao-Amubi' by the locals, has bagged the Geographical Indication (GI) tag. However, better price realization and consumer demand has been encouraging the farmers in Assam, West Bengal, Jharkhand, Odisha, U.P to cultivate this nutrient-dense rice and boost their farm incomes considerably with exports to Australia, UK, USA and other countries.

## TYPES OF BLACK RICE

1. **Black Glutinous or sticky rice:** It is sticky textured with shorter grain size, mostly used to prepare sweet dishes in Asian countries.
2. **Black japonica rice:** It has a mild sweet and earthy flavor.
3. **Manipuri Black Rice:** In Manipur, it is locally called 'Chakhao-Amubi', whereas 'Chakho' means delicious and 'Ambui' means black.
4. **Black Jasmine Rice:** It is originated in Thailand. While cooking, the rice gives off an aroma, resembled a jasmine infusion.

# PHYTOCHEMICALS AND ANTIOXIDANT PROFILES

Black rice is rich source of multitudinous phytochemicals which give enormous health benefits. 23 secondary metabolites, conforming of anthocyanins, flavonoids, glycosides (Quercetin-3-O-glucoside, isorhamnetin-3-O-glucoside, and myricetin-7-O-Glucoside), carotenoids, vitamin E, y-oryzanols and many others have been qualitatively characterized in the husk of Japanese black rice and tagged the use of black rice as “super food”.

The black colour of this rice is due to the presence of a pigment called “anthocyanin”, a powerful antioxidant. The anthocyanin content in black rice is near about 26.3 %, and cyanidin-3-O-glucoside and peonidin-3-O-glucoside are the main effective factors.

Nutritive value of black rice is superior to any other rice. This rice is free of gluten, cholesterol, low in sugar, salt and fat. It is a rich source of fiber, antioxidants, vitamins B complex and E, iron, thiamine, magnesium, niacin and phosphorous. Quality and quantity of protein is superior than any other rice types. It contains 18 essential amino acids which are salutary to many of the human body functions, from helping repair skin and tissues to boosting energy levels and perfecting gut health. Being a naturally rich source of iron, it is excellent for those concerned about getting enough iron on a factory-grounded diet.



## Nutritional excellence of black rice over other types of rice (per 100 g of cooked rice)

Composition	White rice	Brown rice	Black rice
Protein (g)	6.67	3.33	8.89
Dietary fibre (g)	0	1.4	2.2
Iron (mg)	0.8	0.86	2.4

# HEALTH BENEFITS OF BLACK RICE

- 1. Rich source of anti-oxidants:** The bran and hull of black rice grains are incredibly rich in powerful antioxidant anthocyanin than any other food. Anthocyanin can help to circumscribe free radical movements that prevents cancer, improve brain function and reduce antipathetic inflammation. Black rice also contains another active antioxidant- vitamin E, which is very effective in supporting eye and skin health (Chang et al., 2010).
- 2. Detoxification:** High fiber content facilitates easy bowel movements and treat constipation and bloating. Through its antioxidant exertion, black rice cleanses the liver through binding and elimination of harmful compounds.
- 3. Anti-cancer property:** Black rice anthocyanins protect the body from free radical damage and have the potential to lower the risk of breast cancer (Hu C et al., 2003).
- 4. Improve heart health:** Anthocyanin of black rice is very effective in reducing blood cholesterol, therefore, dwindling the chances of heart attack, maintain blood pressure and keeps our heart healthy (Yao et al., 2013).
- 5. Anti diabetic role:** Low glycemic index value and high amounts of dietary fiber content of black rice helps maintain normal blood sugar levels and drop the situations of leptin hormone in body, responsible for appetite regulating.
- 6. Reduce allergy:** The bran or outer husk of the rice help to restrict the release of allergy incentive histamine in body and helps to soothe the irritation and swelling that occurs due to allergy and dermatitis.
- 7. Anaemia forestalment:** Black rice is rich source of iron. Thus, it is salutary for people who are anemic to ameliorate overall total iron requirement in their body.
- 8. Eye care:** Black rice contains a high amount of lutein and zeaxanthin, two carotenoids known for their part in guarding the cells in the eyes and to reduce the effects of ultraviolet (UV) radiation thus lowering the threats of developing cataracts.
- 9. Hair and skin care:** The antioxidants anthocyanins in black rice helps prevent premature skin ageing, maintain skin firmness, and promote healthy hair growth.



# CULINARY USES

Black rice for its unusual purple colour is very popular as desserts in many countries around the world. This rice is suitable for making porridge, black rice cake, sushi, pudding, etc. which are very popular in south east Asian countries. Some popular value-added products of black rice are black rice pasta, noodles, biscuits, wine, cookies, bread, chips etc. Black rice extracts are excellent natural food coloring agent which is used as an alternative to harmful artificial food color to different beverages and food items.



**Fig 1. Black rice plant**



**Fig 2. Black rice grains**



**Fig 3. Cooked rice**



# CONCLUSION

A promising prospect of black rice can be anticipated soon as it may earn much more net returns and benefit-cost ratio as compared to trending high yielding rice varieties. But the fissionability of black rice is in trend in western nations. Though in India it is still much less popular but the nutritional and medicinal superiorities of black rice over white or milled rice will makes its civilization popular in all over India in near future. By providing infrastructure, market support and financial incentives, black rice can be good stipulation for Indian rice growers and consumers, domestic as well as foreign requests. Awareness should be created among the people about full nutritional and remedial parcels of this underutilized “super food” so that more people can learn about its benefits and demand it.

