

The Golden Rice Bran: Red Rice and its Health Benefits

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Abstract: *A simple rice bran can be a good and nutritional health supplement??? YES, it is... a simple rice bran can be a good and effective health supplement. In India specially in coast region a red, non polished and comparatively bigger in shape rice is seeded. Which is highly nutritional. This red rice scientifically known as orzo sativa L. in most of south Asiatic countries rice is staple crop and important source of carbs. This rice is also an ingredient in medicinal and cosmetic preparations. This coloured rice is because of presence of anthocyanin pigment into the outer shell of grain. which is rich in antioxidants and photochemical. Rice is a most important and basic staple food in Asiatic region and most of the countries. India is the second largest rice cultivated country where thousands of varieties of rice seeded. In china this red rice taking as a health supplement because as per the ayurveda and shushruta gives useful aspects of this rice bran. This different looking but effective dietary rice bran not only in a medicinal use but also as a economical source for many farmers. as per the trend many people's are more attractive towards good and healthy food with that a fit physics this simple staple food can be a good and nutritional dietary supplement.*

Keywords: nutritional, oryza sativa L, anthocyanin, antioxidants, phytochemicals, etc

1. Introduction

A simple rice bran can be a good and nutritional dietary product, in this world large amount peoples consumes rice as a primary source of carbohydrate(1) in day to day life. Over 95% of rice production is done in Asiatic countries with thousands of variety which is again different in physicochemical characteristics (2). It contains several nutrients, like carbs, protein, fats, vitamins, minerals, and dietary fiber.(3)



Rice is rich in various chemical compounds like acids, phytosterols, phenolic compound, oryzanol, tocopherol, ferulic acid, etc.(4) Rice is genetically diverse and because of that different thousands are varieties are present now a days. (5)The cultivation of rice is the most common and largest production in India compare to other cereal. It is a predominant dietary energy source of many countries.

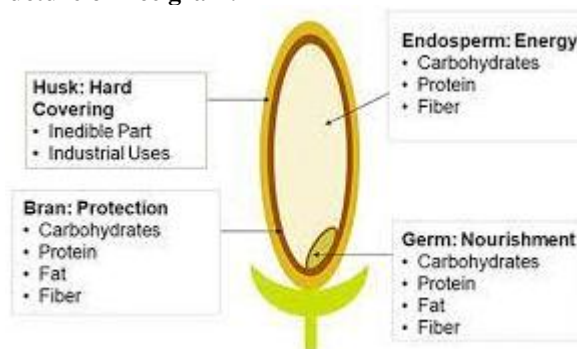
The difference between polished and unpolished rice is that unpolished rice bran has high nutrient value than polished rice (6). However most of peoples are prefer to consume polished white rice despite the fact red rice contains useful nutrients (7). This nutritional factors is depend upon the quality of strain and variety and quality of soil.(8) Rice is cultivated in abundant water and slushy places so that

production of rice bran is depend upon geographical factors also.(9)

Origin of rice:

Oryza sativa L. (10), the dominant rice species. Commonly known as Asian rice. It is a grass with a genome consist of 12 chromosomes, and because of that it can be genetically modify .(11) Oryza sativa L. is comes under kingdom: plantae, family: poaceae, order: poales, genus: orzo, and species: o.sativa. (12) Oryza sativa consist two major types one which is sticky, short grained (japonica) and other one is non sticky and long grained (indica)(13). Japonica is mainly cultivated in dry places. And indica rice is cultivated in water abundant places mostly in Asiatic countries(14). Rice is highly depend upon the environmental factor for its growth and this evident by many of coastal region cultivate rice as a primary economical source.(15)

Structure of rice grain:



The rice consist of the outer hull which is protective covering for fruit of rice. The polished white rice is refined version of a raw rice yeild after processing and milling of raw grain. by this processing all nutritional values of rice get demolished. and because of that white rice majorly contains carbohydrate other than nutrients.(16)

The germ is covered by endosperm layer which is highly rich in dietary fibre and nutrients which is beneficial for

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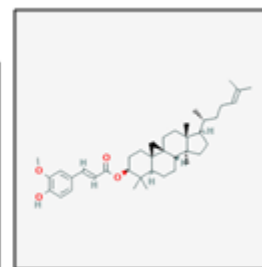
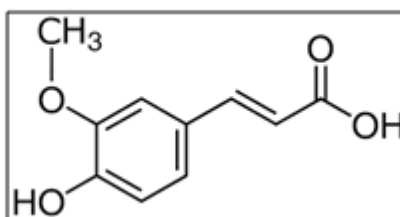
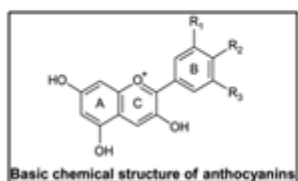
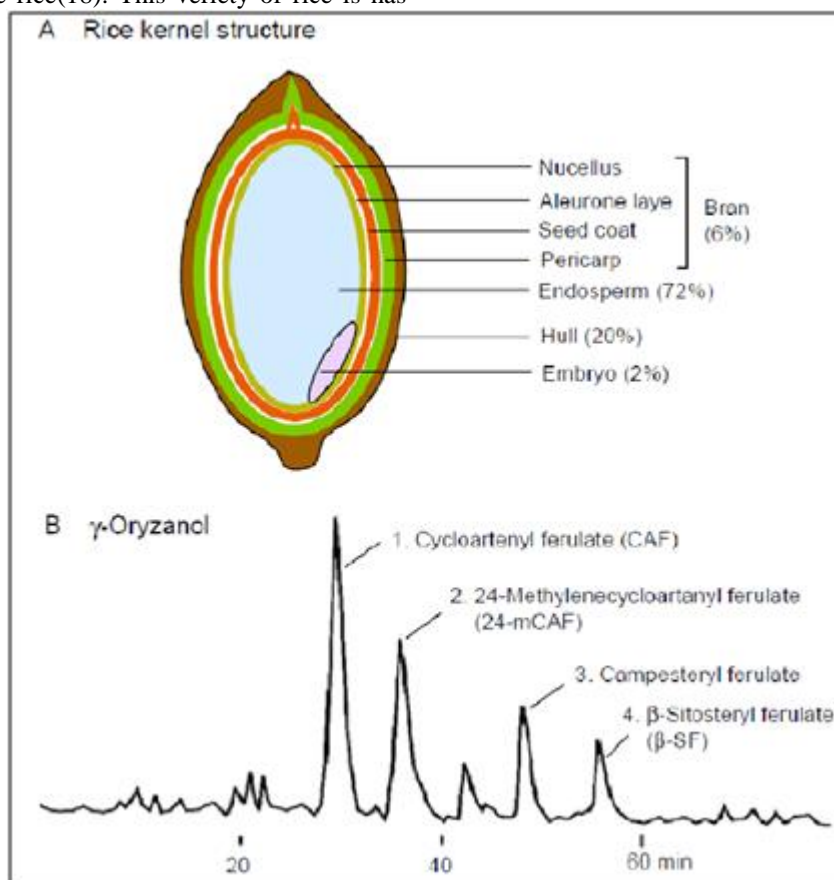
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health. aleurone layer gets removed by excess polishing and because of that the loss of nutrient content occurs. This aleurone layer is rich in vit. B, proteins, minerals and fats. (17)

The red unpolished rice finds advantage as healthier staple food alternate to white rice (18). This variety of rice is has

nutritional value because its unprocessed bran has the same harvesting cycle. After the husk is obtained red rice still consists of few layers like pericarp, seed coat endosperm, germ etc. endosperm consists of the aleurone layer enclosing the embryo which improves shelf life of rice. (19)



Rice processing

Rice is cultivated in water abundant places. After the production it undergoes processing which mainly involves milling of rice which will give bran layer. Milling of rice is very important step in rice processing through which removal of husk and bran layer to get white polished rice. Milling or processing of rice results in removal of nutrients such as vit. B, iron, phosphorus, and manganese, etc. (20)

Importance of rice in India:

India is the second largest rice production country next to China (21). In India rice is staple food consumed as a primary source of carbohydrate in eastern and southern parts of the country. In India rice has great spiritual and ritual importance other than medicinal uses. As per the Indian tradition rice is denoted as a auspiciousness prosperity and

fertility of life. Rice also plays an important role in the Indian tradition in so many festivals. (22)

In Maharashtra, specially in coastal area where most of the people harvest rice fields because of the suitable environmental condition and their soil fertility. Over 15 lakh hectare farm land yield various types of rice different by its biological and physical appearance. (23)

In the Konkan region due to heavy rain fall and soil fertility almost all farmers take production of rice crops. Over 16 lakh tones of rice production occur in Konkan region annually. (24)

This red rice has various varieties in different states of India. Having nutritional and medicinal importance. The **red gunja** is the type of crop usually used in making roti and

bread(25).in south region they prefer to eat glutinous rice for making puttu which is as served steam rice in south India. **matali** and **landhan** also known as pearl rice of Himalaya is the type of rice has medicinal importance.(26) in north India which helps in curing the blood pressure and fever. **kafalya** is a type of rice mainly seen in north India used to cure leucorrhea and abortion complication.(27)

atikaya and **kari kagga** is type of rice seemed in Karnataka known for its coolness and as tonic.(28) **neelamsamba** is type of rice used for increasing the lactation to mothers after preganancy this rice soup is given to the mother for her breakfast. (29)



In Maharashtra specially in Sindhudurg district is known for rice production due to climatic condition heavy rain falls and sticky slushy soil is very much suitable for rice farming. Ratnagiri, Raigad, Thane, Palghar district are very much known for rice farming for so many years. Specially in this region **patni, munga bela, kala rata, bura rata, varangal** etc.(30) this varieties of crops are produce. This red rice physically different in shape have bold grain type tall and grassy structure, sparse plant type and seed dormancy.(31)

age peoples , pregnant women’s etc. also it’s a homemade remedy for fever and sleekness. Now a days many of peoples are attracted towards healthy and fit lifestyle in this time people in India took a fresh and indigenous red rice. There is need to get viral of this type of rice in India, also there is need to improve the clinical validation and medicinal value of red rice reported in ayurveda and shrushruta. (33)



This varieties of rice has high nutritional and medicinal values . this rice has high zinc iron content and low amylase and because of that its shows antioxidant properties.(32) In this region this rice soup is taken in the breakfast for its nutritive benefits. In Maharashtra this rata rice soup has many beneficial importance and served to the children’s old

Nutritional aspects:

The structure of red rice contains various layers such as bran, husk, hull, etc. the bran layer contains vitamins , minerals, and fibre. After the processing the red rice this nutritional content get loses. This red rice varieties are either semi polished or unpolished. This red rice varieties are rich in zinc and iron content. Presence of anthrocynin pigment gets red colour to this rice. Which ultimately gives antioxidant effect. (34)

Now a days peoples are taking care about calorie count in the body and according to this they manage there diet. This red rice has nutritional benefits and comparatively low calorie count and high amount of fibre which also useful for stay energetic in daily routine. As per the identification tests in red rice it’s contains magnesium, phosphorus, selenium, vitamin B6 , thiamine, niacin and abundant source of

manganese and also rich in vitamins and minerals.(35) This high amount of zinc , calcium, and iron.(36) constituents present in bran layer and husk which contains



Table 1: Nutritional content and difference between white rice and red rice

Rice fraction	Zinc (mg)	Iron (mg)	Thiamine (mg)	Calcium (mg)	Phosphorus (g)	Niacin (mg)	Tocopherol (mg)	Phytin (g)	Riboflavin (mg)
Rice bran	4.3-26.1	8.6-42.8	1.20-2.40	30-120	1.1-2.5	26.7-50.0	2.60-13.3	0.9-2.2	0.18-0.43
White rice	0.6-2.3	0.2-2.8	0.02-0.11	10-30	0.08-0.15	1.3-2.4	0.075-0.30	0.02-0.07	0.02-0.06

Red rice is medicinally used from ancient decades as health supplement. which contains high amount of fat , proteins, fibres, carbohydrates etc.

Carbohydrates:

Rice is well known source of starch. The abundant amount of starch is present in the rice and most of peoples taking rice is primary source of rice.

Proteins:

The second major component next to carbohydrates is proteins increases nutritional value of rice .in India a common man taking avg 209 gm of rice in daily meal red rice provide 24.1% protein . and balanced amino acid level due to presence of lysine.(37)

Fat:

The fat is good source of linoleic acid and other essential fatty acids which is present in red rice. due to this its does not contains cholesterol. Lipids are present in aleurone layer of rice bran . lipids are major sources of various fatty acid.(38)

Fibre:

Fibre increases metabolism into the body presence of fibre into the diet plays important role . rice contains sufficient amount of fibre which is again beneficial to the body.(39)

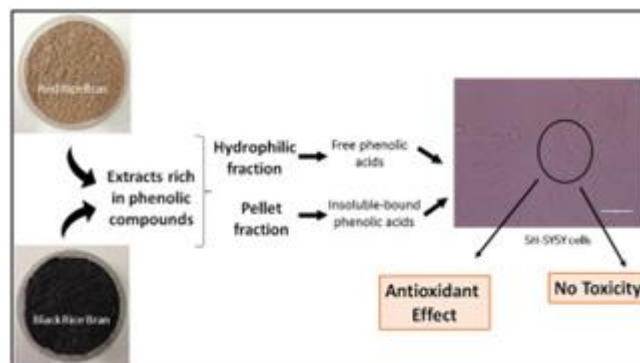
Ash:

Ash content is usually depends upon the soil fertility and mineral content. the zinc and iron content in red rice is higher than milled rice. (40)

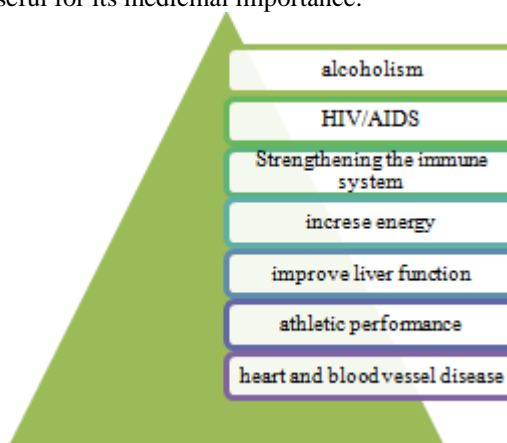
Phytochemical composition:

Phytochemicals defined as a non nutritive chemical component which have disease preventing property. This phytochemicals are mainly present in the outermost layer of rice bran. They protects the food and also beneficial of biological activities. In this rice mainly carotenoids, phenolics, alkaloids, nitrogen, flavonoids, coumarine , tannins, anthocynins this phytochemicals present.(41)

This anthocynin pigment inhibits reductase enzyme which cause anti diabetic activity. Reductase inhibitor posses anti androgen effect which cure benign prostatic hyperplasia and lower urinary tract infection. Due to absence of cholesterol effect it improves fertility and heals colon cancer.(42)



Health benefits: As per the above discussion its prove that red rice has some beneficiary aspects in it. Depending upon the soil and environmental conditions its changed in different variety. Rice has ability to produce energy. This red rice is having source of iron minerals, fibres, vitamins etc. also has tremendous amount of phytochemicals which are useful for its medicinal importance.



Antioxidant property: Antioxidants are essential component helps to deactivate the by-product of the oxidative metabolism which is known as free radicals. Red rice is known for its high amount of antioxidant property from past decades, Gamma oryzanol, phytosterols, has the antioxidant properties and also the stabilizing properties present into the bran layer of rice which also cause the antioxidative effect to the body.

Cancer: Red rice plays an important role in to inhibit the power of cancer causing agent because of its has high level of manganese, dietary fibre and selenium which plays against free radical. In the treatment of colon cancer whole grain of red rice is also beneficial. Dietary fibre are get attached to the carcinogenic factor and toxins substance helps to eliminate from the body. Proanthocyanins is pigment present in the red rice which causes anti-inflammatory action.

Cholesterol: Red rice contains bran layer through which bran oil can be obtained which helps to reducing the LDL level from cholesterol. Anthocyanin plays an important role in reduces the cholesterol level from the body. It is also prove that whole grain can lower the chances of arterial plaque and reduces the cardiac disease.(43)

Diabetes mellitus: Any type of rice slower the release of blood sugar level in to the body. This red rice can be a better health supplement to the diabetes patient for sustain the sugar level. Consumption of white rice can cause type 2 diabetes. Dietary fibre reduces the absorption of carbohydrates. Anthocyanin is the pigment cause the hypoglycemic effect.(44)

Cardiovascular disease: High amount of dietary fibre and anthocyanin pigment cause the lowering of cholesterol level into the body ultimately there is lowering the chances of cardiovascular disease. Red rice also contains magnesium which prevent the risk of heart attack.(45)

Allergy: Red rice contains approx 24% of proteins which is also a hypoallergenic in nature. Which lowering the allergic condition into the body.(46)

Cosmetics and personal care: Oryzanol is well known component present in the red rice which helps in protection against UV light hence it can be used in the preparation in sunscreens. Due to presence of fatty acids which helps to reduce the ageing on the face. Also having antioxidant property its heal the damage skin.(47)

2. Conclusion

This review paper shows the benefits of simple staple food can be a good health supplement. In India is the largest country depend upon the farming. And many of people doing rice farming if we get this type of beneficial rice production and used it into day to day life which is also helpful as economically to the farmers and has health benefits also then why not! There is need to promote this type of rice variety to the most of the peoples so that its helpful for healthy and fit lifestyles.

This bran is rich in phytoconstituents like anthocyanin, phenols, tocopherols, oryzanols and dietary fibres. Intake of this constituents on daily basis can be a helpful for healthy life with no side effect because of its natural properties. This kind of rice was underestimate for the several years because of the presence of impurities like arsenic, silica etc due to its present into the soil.

This type of health promoting products need to established to the market, in China this red rice variety used in their day to day life. Which is also gives this tremendous response in medicinal aspects also. As pharmacist we should aware of this naturally occurring products which has this much medicinal advantages and used into the novel drug production.

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