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Rice-Traditional Medicinal Plant in India

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Rice is rich in genetic diversity, with thousands of varieties grown throughout the world. Rice cultivation is the principal activity and source of income for about 100 million households in Asia and Africa. Rice has potential in a wide range of food categories. Besides having nutritional and medicinal benefits, the by-products of rice are equally important and beneficial. By-products from growing rice create many valuable and worthwhile products. The un-edible parts, that are discarded through the milling process, and the edible part could be transformed into some of the following suggested products. Rice can be used to treat skin conditions. The rice is boiled, drained and allowed to cool and mashed. The rice is made into a paste or moulded into balls and these can be applied to boils, sores, swellings and skin blemishes. Other herbs are sometimes added to the rice balls to increase their medicinal effects. Sticky glutinous rice is often taken to treat stomach upsets, heart-burn and indigestion. Extracts from brown rice have been used to treat breast and stomach cancer and warts. They have also been used to treat indigestion, nausea and diarrhoea.

Keyword: Rice, Medicinal Applications, Therapeutic Uses

1. Introduction

Rice, *Oryza sativa* ($2n = 24$) belonging to the family Gramineae and subfamily Oryzoides is the second most important cereal crop and staple food for more than half of the world's population. Rice is a grain belonging to the grass family. It is related to other grass plants such as wheat, oats and barley which produce grain for food and are known as cereals. Rice refers to two species (*Oryza sativa* and *Oryza glaberrima*) of grass, native to tropical and subtropical southeastern Asia and to Africa, which together provide more than one-fifth of the calories consumed by humans. It occupies about 23 per cent of gross cropped area, 35 per cent of the area under food grains and 44 per cent of area under cereals. It is grown under diverse cultural conditions and over

wide geographical range. The slogan 'Rice is Life' is more appropriate for India as this crop plays a vital role in our National food security and is a means of livelihood for millions of rural household .

1.2 Rice By-Products

- Rice Husks, Rice Bran, Broken Rice, Rice Flour, Rice Milk, Rice Pudding
- Rice Starch, Rice Straw, Rice used in Beverage Making, Rice Paper
- Rice Glue, Rice Cakes (mochi), Rice Vinegar, Rice Soy Milk
- Red Yeast Rice, Rice based food products

1.3 History of Rice

Rice plants have been traced back to 5000 BC, but the practice of rice growing is believed to have originated in areas of China, and southern and eastern Asia, in about 2000 BC. Rice cultivation is considered to have begun simultaneously in many countries over 6500 years ago. Rice has been cultivated in China since ancient times. Chinese records of rice cultivation go back 4000 years. Most believe the roots of rice come from 3000 BC India, where natives discovered the plant growing in the wild and began to experiment with it.

African rice has been cultivated for 3500 years. In the Middle East and Mediterranean Europe, it started around 800 BC. Rice spread throughout Italy and then France, after the middle of the 15th century, later propagating to all the continents during the great age of European exploration. In 1694, rice arrived in South Carolina, probably originating from Madagascar. The Spanish brought rice to South America at the beginning of the 18th century.

Over 2 billion people in Asia alone derive 80% of their energy needs from rice, which contains 80% carbohydrates, 7–8% protein, 3% fat, and 3% fiber (Juliano, 1985). Until recently, rice was considered only a starchy food and a source of carbohydrates and some amount of protein. Rice protein, though small in amount, is of high nutritional value (Chaudhary and Tran, 2001).

Recent studies have unraveled a number of unknown properties of rice, some of which have been reported in ancient Indian Ayurvedic literature. The ancient literatures of rice-growing Asian countries such as Thailand, Myanmar, China, Malaysia, Indonesia, and India have attributed some medicinal properties to rice, in addition to it being the mainstay as food. In early oriental writings, whole brown rice was mentioned as the perfect food.

In China, the medicinal value of rice was known as far back as in 2,800 BC, when it was used by royal Chinese physicians for healing purposes. It was believed to restore tranquility and peace to those who were easily upset. Dried, sprouted rice grains were used to aid in digestion, toning

muscles and expel gas from the stomach and intestines. The Chinese believe rice strengthens the spleen as well as stomach, increases appetite, and cures indigestion. They use red rice yeast for various ailments.

Traditional Malaysian medical writings prescribe boiled rice 'greens' as an eye lotion and for use in acute inflammation of the inner body tissues. The application of dried powdered rice is recommended for skin ailments. In Cambodia, the hulls of mature plants are considered useful for treating dysentery. Hulls of three-month-old rice plants are diuretic. In the Philippines, rice polish (bran, *tiki tiki*) is extracted and used as an excellent source of vitamin B to prevent and cure beri-beri (Vir *et al.*, 2005).

In India, rice has enjoyed a unique status since ancient times because of its special qualities. Ancient Indian texts and folklore contain references to the special properties of rice. The great sage Parashara in the Sanskrit text *Krishi-Parashara* has aptly written in praise of this food grain. "Rice is vitality, rice is vigor too, and rice indeed is the means of fulfillment of all ends in life. All, Gods, demons, and human beings subsist on rice" (Majumdar and Banerji, 1960). Nobody could have expressed reverence to rice in a better way than sage Parashara.

1.4 Nutritional Facts about Rice

Rice remains a staple food for the majority of the world's population. Rice is very nutritious. This important carbohydrate is the staple food for more than two-thirds of the world's population who rely on the nutritional benefits of rice.

Rice has the following nutritional benefits:

- **Excellent source of carbohydrates:** Rice is a great source of complex carbohydrates, which is an important source of the fuel our bodies need.
- **Good energy source:** Carbohydrates are broken down to glucose, most of which is used as energy for exercise and as essential fuel for the brain.
- **Low fat, Low salt, No cholesterol:** Rice is healthful for what it does not contain. Rice has no fat, no cholesterol and is

sodium free. Rice is an excellent food to include in a balanced diet.

- **A good source of vitamins and minerals** such as thiamine, niacin, iron, riboflavin, vitamin D, calcium, and fiber.
- **Low sugar**
- **No Gluten:** Rice is gluten free. All rice is gluten free, making rice the essential choice for people with gluten free dietary requirements.
- **No Additives and Preservatives:** Rice contains no additives or preservatives, making it an excellent inclusion in a healthy and balanced diet.
- **Contains Resistant Starch:** Rice also contains resistant starch, which is the starch that reaches the bowel undigested. This encourages the growth of beneficial bacteria, keeping the bowel healthy.
- **Non-Allergenic**
- **Cancer Prevention and Diet:** Whole grains (such as brown rice) contain high amounts of insoluble fiber-the type of fiber some scientists believe may help protect against a variety of cancers.
- Rice is a **low-sodium food** for those with hypertension.
- It is a fair **source of protein** containing all eight amino acids.

Rice is believed by some to have medicinal properties. Although, this is not scientifically proven effective, it has been used in many countries for medicinal purpose. For example:

- **Philippines:** Rice polishings-the bran-is extracted and used as an excellent source of Vitamin B to prevent and cure beri-beri.
- **Malaysia:** In the Medicinal Book of Malayan Medicine, it is prescribed that boiled rice "greens" can be used as an eye lotion and for use with acute inflammation of the inner body tissues. The book also recommends applying a mixture of dried, powdered rice on certain skin ailments.
- **Cambodia:** The hulls (husk) of mature rice plants are considered useful for treating dysentery. The hulls of a three-month old rice plant are thought to be diuretic.

- **China:** The Chinese believe rice strengthens the spleen, as well as "weak stomach," increases appetite, and cures indigestion. Dried sprouted rice grains were once used as an external medicine to aid in digestion, give tone to muscles, and expel gas from the stomach and intestines.
- **India:** Rice water is prescribed by the Pharmacopoeia of India as an ointment to counteract inflamed surface

1.5 Medicinal Uses of Rice

India has a wealth of medicinal plants, most of which have been traditionally used in Ayurveda, Unani systems of medicines and by tribal healers for generations. In ancient Indian literature it is clearly mentioned that every plant on this earth is useful for human beings, animals and for other plants (Oudhia 1999). In Ayurveda the medicinal values of rice have been described: rice is considered to be acrid, oleaginous, tonic, aphrodisiac, fattening, diuretic and useful in biliousness (Caius 1986). In Chhattisgarh, rice is widely cultivated and the region is known as "the rice bowl of India". Rice is believed by some to have medicinal properties. Although, this is not scientifically proven effective, it has been used in many countries for medicinal purpose.

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In Indian state Chhattisgarh, Rice is considered as medicinal plant (Das and Oudhia, 2000; Oudhia, 2006). Insects attacking on rice are also used in Traditional Healing. The Traditional Healers use different parts of medicinal rice in treatment of both common as well as complicated diseases (Oudhia, 2008). Medicinal rice variety "Laicha" was so named because of its unique property to prevent "Laicha" disease (skin infection). During the survey it was observed that the younger generation is less aware about these medicinal rice varieties than the older generations, so there is a strong need for documentation of this valuable information about the medicinal values of traditional rice varieties in the region. The popular medicinal rice Acha, Laicha, Baissour, Maharaji, Jhilli, Kanthi Banko, Udan Pakheru, Ramkeli, Shyam Lal, Tenduphool etc. are still under cultivation and in use in Traditional Healing (Oudhia, 2000).

1.6 Internal Rejuvenation

Rice protein, which comprises up to eight per cent of the grain, has a special benefit as it has eight of the essential amino acids in a delicately balanced proportions. A complete internal rejuvenation takes place when rice protein is metabolized into health-building amino acids. These amino acids build resilient muscles which comes back to its original form after stretching and bending, healthy skin and hair and clearer eyesight and nourish the heart and lungs, tendons and ligaments, brain, nervous system and glandular network.

The B-complex vitamins, especially thiamin, riboflavin and niacin offered by natural brown rice promote youthful energy and nourishment to

skin and blood vessels. An abundance of minerals in natural brown rice help to nourish the hormonal system, heal wounds and regulate blood pressure. Rice also offers iron to enrich the bloodstream and phosphorus and potassium to maintain internal water balance along with other nutrients. Rice thus helps restore internal harmony.

- **High Blood Pressure:** Rice has a low-fat, low-cholesterol, low-salt contents. It makes a perfect diet for those hypertension persons who have been advised salt-restricted diets. It has been noted by modern researchers that wherever-rice is used as the main food, there is a corresponding benefit of youthful vitality and a very low rate of hypertension. Calcium in brown rice, in particular, soothes and relaxes the nervous system and helps relieve the symptoms of high blood pressure.
- **Body Balance:** The rice diet, in combination with milk, creates a marvelous body balance. In this regimen, natural brown rice is used as the only solid food throughout the day. Fresh milk is taken with each of the rice meals. The rice may be cooked in any manner but no salt should be used. The milk should be comfortably cool. The nutrients in the rice, form a unique balance with those in the milk. The two notable amino acids, isoleucine and lysine in the milk are greatly strengthened by rice protein, thereby enabling them to form stronger body-building blocks: The naturally lactic acid in milk works with rice protein to aid in the absorption of iron.
- **Digestive System Disorders:** Rice has a very low fiber content, and is therefore extremely soothing to the digestive system. This makes rice an ideal food for digestive system disorders. Thick gruel of rice mixed with glassful of butter milk and a well-ripe banana given twice a day is a very nutritious diet in typhoid, gastric ulcer, stomach and intestinal cancer,

colitis, diarrhea, dysentery, piles, rectal fissure, indigestion, in acute febrile diseases related to fever, hepatitis or inflammation of liver, jaundice, morning sickness, acute dilatation of the stomach, burning and indigestion due to hiatus hernia, excessive accumulation of the gas in the intestines, and all the diseases where the mild and light diet is indicated.

- **Diarrhea in Children:** Rice is useful in treating diarrhea in children. A teaspoonful of powder of charred parboiled rice mixed with a glassful of butter-milk should be given in doses of an ounce every half an hour in this condition. This will bring excellent results.
- **Skin Inflammation:** Rice may also be used externally in the form of powder or poultice. The rice flour, dusted thickly over the surface, has a very cooling and soothing effect in small-pox, measles, prickly heat and other inflammatory affections of the skin including burns and scalds. It allays heat and irritation. Rice powder should be used soon after the occurrence of injury in case of burns and scalds and it should be dusted thickly over the whole of the affected surface.

1.7 Rice Uses

Rice is a staple food and used by many ways as under:

- **Staple food:** Rice is used as a staple food by more than 60 percent of world population. Cooking of rice is a most popular way of eating.
- **Starch:** Rice starch is used in making ice cream, custard powder, puddings, gel, distillation of potable alcohol, etc.
- **Rice Bran:** It is used in confectionery products like bread, snacks, cookies and biscuits. The defatted bran is also used as cattle feed, organic fertilizer (compost), and medicinal purpose and in wax making.
- **Rice Bran Oil:** Rice bran oil is used as edible oil, in soap and fatty acids manufacturing. It is also used in cosmetics, synthetic fibers, detergents and emulsifiers. It is nutritionally

superior and provides better protection to heart.

- **Flaked Rice:** It is made from parboiled rice and used in many preparations.
- **Puffed rice:** It is made from paddy and used as whole for eating.
- **Parched Rice:** It is made from parboiled rice and is easily digestible.
- **Rice Husk:** It is used as a fuel, in board and paper manufacturing, packing and building materials and as an insulator. It is also used for compost making and chemical derivatives.
- **Rice Broken:** It is used for making food item like breakfast cereals, baby foods, rice flour, noodles, rice cakes, etc. and also used as a poultry feed.
- **Rice straw:** Mainly used as animal feed, fuel, mushroom bed, for mulching in horticultural crops and in preparation of paper and compost.
- **Paddy as a Seed:** The paddy is used as seed.

1.8 Health Benefits of Rice

Health benefits of **rice** can be found in more than forty thousand varieties of this cereal available in the world. The two main categories include whole grain **rice** and white rice. Whole grain rice is not processed much, therefore it is high in nutritional value, whereas white rice is processed so that the bran or outer covering is removed and it has less nutritional value. Rice can also be defined by the length of each grain. Indian or Chinese cuisines specialize in long grained rice, whereas western countries prefer short or medium sized grains. According to **Rice-Trade**, rice is extremely nutritious.

- **Great Energy Source:** As rice is rich in carbohydrates, it acts as fuel for the body and aids in normal functioning of the brain.
- **Cholesterol Free:** Eating rice is extremely beneficial for health, just for the fact that it does not contain harmful fats, cholesterol or **sodium**. It forms an integral part of balanced diet.
- **Rich in Vitamins:** Rice is an excellent source of vitamins and minerals like

niacin, vitamin D, calcium, fiber, iron, thiamine and riboflavin.

in undigested form. It aids the growth of useful bacteria for normal bowel movements.

- **Resistant Starch:** Rice abounds in resistant starch, which reaches the bowel



- **High Blood Pressure:** As rice is low in sodium, it is considered best food for those suffering from high blood pressure and hypertension.
- **Cancer Prevention:** Whole grain rice like brown rice is rich in insoluble fiber that can possibly protect against many types of cancers. Many scientists believe that such insoluble fibers are vital for protecting the body against cancerous cells.
- **Dysentery:** The husk part of rice is considered as an effective medicine to treat dysentery. A three month old rice plant's husks is said to contain diuretic properties. Chinese people believe that rice considerably increases appetite, cures stomach ailments and indigestion problems.
- **Skin Care:** Medical experts say that powdered rice can be applied to cure some forms of skin ailments. In Indian subcontinent, rice water is duly prescribed by ayurvedic practitioners as

an effective ointment to cool off inflamed skin surfaces.

- **Alzheimer's disease:** Brown rice is said to contain high levels of neurotransmitter nutrients that can prevent Alzheimer's disease to a considerable extent.
- **Heart Disease:** Rice bran oil is said to have antioxidant properties that promotes cardiovascular strength by reducing cholesterol levels in the body.

According to International Rice Research Institute in Philippines, the nutritional value of rice needs to be improved more so that it benefits mankind. Rice, being the most dominant cereal crop in most of the countries can improve the health condition of millions of people who consume it. Efforts are made to increase the micronutrient value of rice by mixing traditional methods of growing crops and modern biotechnology. The institute further states that development of rice with high iron and zinc compounds could be possible through bio-fortification. That can also induce high quality

yields, which could be eagerly accepted by farmers as well as rice consumers.

- **More on Rice:** Rice can also prevent chronic constipation. The insoluble fiber from rice acts like a soft sponge that may be pushed through intestinal tract quickly and easily. Brown rice and whole grains are said to be rich in insoluble fiber.

2. Minerals and Vitamins Content in Rice

2.1 Raw Hand pounded Rice*

Food Value	Minerals and Vitamins
Moisture - 13.3%	Calcium - 10 mg
Protein - 7.5%	Phosphorus - 190 mg
Fat - 1.0%	Iron - 3.2 mg
Fibre - 0.6%	Small amount of Vitamin E
Minerals - 0.9%	Small amount of Vitamin B Complex
Carbohydrates - 76.7%	Calorific Value - 346
* Values per 100 gm's edible portion	

2.2 Raw Milled Rice*

Food Value	Minerals and Vitamins
Moisture - 13.7%	Calcium - 10 mg
Protein - 6.8%	Phosphorus - 160 mg
Fat - 0.5%	Iron - 3.1 mg
Fibre - 0.2%	Small amount of Vitamin E
Minerals - 0.6%	Small amount of Vitamin B Complex
Carbohydrates - 78.2%	Calorific Value - 345
* Values per 100 gm's edible portion	

But, it is advisable to drink lots of water for relieving constipated state along with fibrous foods. Diabetic patients are recommended to include brown rice rather than white rice that contains low levels of glycemic index. Just a cupful of brown rice on daily basis provides you with almost 100% manganese value, which aids in producing energy from carbohydrates and protein. Brown rice is extremely beneficial for normal functioning of nervous system and production of sex hormones.

2.3 Rice Bran Oil and Constituents

Rice bran oil, in its natural state, contains several constituents of potential significance in diet and

health. Interest has focused primarily upon gamma-oryzanol, tocotrienols, and tocopherols, all of which demonstrate antioxidant properties. The latter two are naturally-occurring forms of Vitamin E.

3. Conclusion

Health benefits of rice include providing fast and instant energy, good bowel movement, stabilizing blood sugar levels and providing essential source of vitamin B1 to human body. Other benefits include skin care, resistance to high blood pressure, dysentery and heart diseases. Rice is the staple food in most of the countries and it is an important cereal crop that feeds more than half of the world's population.

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