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Medicinal Health Benefits of Traditional Rice (*Oryza sativa* L)

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ABSTRACT

Rice is the major food crop grown in India, predominantly with the richness of varietal diversity with respect to seasonality, geographical distribution and water resource availability. Rice the important crops cultivated in the region with respect to the favorable environment, consumers, market, rice base food and value chain and economic gain. In earlier days, people grew traditional varieties were familiar to the farmers with different ecological, seasonal, food qualities and uses. In the eastern part of India from Kamrup to Kanyakumari rice has been growing with genetic diversity and commonly many sub-centre of origin as claimed (Hostinapur, Koraput, Jagdalpur, Sarguja, Dinajpur, Sundarban, Karimganj, Titabor, U.P., Odisha, Chhattisgarh, Bengal and Assam). The use of rice is a very common food with dietary need to Ayurvedic medicine and fodder for cattle in the region. Old farmers were familiar with the unique varietal knowledge and their uses. After famine, independent focus on breeding and adoption of the nutrient responsive high yielding, semi dwarf, non logging varieties were more to eradicate the hunger and feed the growing population, while gradually farmers shifted to the high yielding and hybrid varieties looking to the yield and direct economic benefit and white rice preference by the consumers and demand in the market which lead to reduce the cultivation of traditional varieties due to low yield and lack of the chemistry of the old varieties. Due to vertical selection and cultivation of the modern varieties, stop cultivating traditional varieties and lost many traditional varieties and narrow down the genetic base and diversity. After the development of chemistry of aromatic rice, black rice, brown rice, red rice or high protein, zinc, Iron, calcium, low glycemic index etc. or medicine, stand more behind and loss the important varieties. Now, after understanding the indigenous traditional knowledge system on rice and looking back and trying to collect, explore and conserve the available traditional varieties following traditional knowledge system with the regional and global sustainability goal.

Key Words : Ayurveda, Disease, Indigenous, Health, Landrace, Medicine, Rice.

Introduction :

Rice is the staple food of over half of the world's population and 90% of Asians. Also, it has extensive curative properties known from the ancient days. In fact, specific rice varieties with medicinal

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properties were cultivated and used in the treatment of some ailments in different counties of South East Asia. In India, rice was distinguished into three broad kinds according to hardness, colour, flavour and size of the grain. Ancient records speak of the existence of rice varieties of curative value for various ailments, as detailed in Ayurvedic treatise (*Indian Materia Media*) of the 15th and 16th century AD. For instance, varieties like 'Njavara' and 'Gathuran' were used in the treatment of arthritis, whereas varieties 'Kalama', 'Pundarika', 'Panduka', 'Sugandhalaka', 'Kardamaka', 'Maetunaka' and 'Mahasali' have different medicinal properties (Mohanty, 2012, Umadevi *et al.*, 2012).

In general, earlier days true rice growers' mostly preferred the color or black rice as their main meal for dietary requirement during meal with the dynamic benefit, although varietal options was more with respect to the varietal diversity availability among the farmers and many people grew their own different varieties as per their different dices specific varieties and found in their field during growing season. Diverse dices base need of cultivation was their main choice rather than yield. They actually were very aware regarding the natural calamities, planning with respect to land ecology, selection of right varieties and need for the health with respect to the seasonality on the other hand, for their own consumption stacking the *Kharif* or *Aman* rice varieties was common among the farmers. At that time, rice farmers were more knowledgable with respect to the natural resources or varieties with respect to their generation after generation self practices. They experienced and acquired the practical benefit or true knowledge without any analytical laboratories and book's complexion and everything in their daily life and lifestyle as have been noticed in the earlier generations and people which represent the true knowledge bank without any formal education. It was general, somehow found in the extreme tribal areas, where localities are inferior with respect to communication and still exited the Indian system and tribal community and somehow also noticed in Assam and Meghalaya in North East India. Some common land races like Dharial, Dular, Marichabeti, Nona Ram Sal, and Tilak Kacheri having wider adaptability over diverse soil, topographic and climatic condition (Richharia and Govindaswamy, 1990). 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 households (Umadevi *et al.*, 2012; Kumar, 1988).

Diversity of traditional rice varieties and their importance :

Rice holding higher genetic diversity, with more than thousands of years of varieties grown in many parts of the world. Some of the rice varieties were reported Sathhiya in Bihar 60 days duration, 'bail chaudi. Has 90 days duration with yield 25 quintals/acre. In India, among small and medium grain aromatic rice varieties, Kalanamak is one of the finest quality rice varieties. Till a decade ago Kalanamak was popular in Himalayan atria adjoining Nepal, particularly in district Siddhartha Nagar, Sent Jabir Nagar, Gorakhpur, Maharajganj, Gonda and Basti of Uttar Pradesh and in West Bengal, Champaran, Bihar (Singh *et al.*, 2005). Mettudayam is

a traditional paddy variety cultivated in the southern region of India and traditional paddy variety cultivar (Sarkar Nellu) was famous among the farmers of Gudiyatham village near to Vellore in Tamil Nadu even 30 years, also rice has one of the largest *ex situ* germplasm collection in the world (Jackson and Juggan, 1993, Das *et al.*, 1992). This accessible collection of diverse cultivated and wild rice germplasm has made great contribution to rice breeding. Genetic diversity in the available gene pool is the raw materials of all plant improvement programs. The availability of transgressive segregants in any breeding programs also depends upon the effective inclusion or selection of parents in any breeding program. The selection of parents based on genetic divergence has been successfully utilized in different crop species (Das *et al.,* 1992; Gaur *et al.*, 1978; Chang, 1977; Murty and Anand, 1966). Rice Varieties viz. Changa, Sasi Mohan, Kalirai, Soni Bhadoi, Parijat, Tulaipanji, Khasa, Dhaba, Kuya Joli Bhagoi , Nagrai Kalam were being cultivated in the village Bousha and surrounding in the District, Uttar Dinajpur, West Bengal.

Nutritional Fact 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 –third of the world's population who rely on the nutritional benefits of rice. Rice has the following nutritional benefits (Umadevi *et al.,* 2012) :

***Excellent source of carbohydrates* :** Rice is the greatest source of complex carbohydrates, which is an important source of the fuel of body need.

***Good Energy source* :** Carbohydrates are broken down to glucose, most of which is used as energy for exercise and use as essential fuel for the brain.

***Low fat, low salt, Zero Cholesterol* :** Rice is healthful for what is does not contain. Rice has no fat, no cholesterol and is sodium free. Rice is an excellent food to include in a balanced diet.

***Good Source of vitamins and Minerals* :** Good source of thiamine, niacin, iron, zinc, riboflavin, vitamin D, Calcium and fiber.

***No gluten* :** Rice is gluten free. All rice is gluten free, making rice the essential choice for people with gluten free dietary requirement.

***No Additive and Preservatives* :** Rice contains no additives, or preservatives, making it an excellent inclusion in a healthy and balanced diet.

***Contains Resistant Starch* :** Rice is also contains a resistant starch, which reaches the bowl undigested. This encourages the growth of beneficial bacteria, keeping the bowel healthy and non – allergenic.

***Cancer Prevention and Diet* :** Whole grains such as brown rice contain high amount of insoluble fiber-the type of fiber some scientists believe may help, protect from a variety of cancers. Rice is a low sodium food which is good got those is suffering with hypertension. Rice is the fair source of protein with all eight amino acids.

Rice, Food and Culture of West Bengal :

Rice is one of the most important field crop grown globally as the prime source of food, fodder and energy. The rice is a very diverse field crop from the growing region to the genetic diversity, cultivation

practices, seasonality, and ethnicity with respect to unique uses for continental dices, health benefit, nutritional and medicinal uses. In general, we consume rice as cook rice or bhat, khichuri, chira, panta bhat, muri, khoi, pitha, payas, beverages, etc. with varietal uniqueness and their preparation with respect to different community and their seasonal choice of dices with respect to the paddy varietal seasonality. Some varieties are very unique with respect to their specialty like Tulaipanji, Didheswar, Moinagiri, Mahsuri are very unique for cooking rice, Gobindabhog, Radhunipagal for Khichuri (Hotchpotch); Kalojira, Gobindabhog, Joha for payesh (Rice kheer); Changa, Mahipal, Parijat for Muri (Puffed rice); Mahamaya, Changa for Chira or Poha (Flattened rice); Khasa, Bora, Panha for Pitha; Motichur, Bhadoi for Mar bhat (Rice starch with rice), Basmati for softness and aroma; Kabirajsal, Garibsal and Pokkalli for medicinal uses etc (Dev *et al.*, 2000; Velprabakaran *et al.*, 2020).

Indigenous Uses of Rice Landraces :

In West Bengal, rice is grown in three seasons, viz., *Aus, Aman and Boro*. Distinctive uses of rice landraces and their byproduct were recorded in Uttar Dinajpur and Dakshin Dinajpur districts by the local tribal people use broken rice (boiled and fermented) with *Coccinia grandis* (vern. Jungli kundri), *Clerodendrum viscosum* (vern. Ghato), *Plumbago zelanica* (vern. Chitwar), *Vernonia cinerea* (vern. Chhepra) for the preparation of local rice veer (Jhara) and wine (Haria). Local/trial people of Uttar Dinajpur, Dakshin Dinajpur and Malda districts, bordering to Bangladesh are using Tulaipanji (Soft and digestive aromatic rice and GI) landrace during occasions, Marriage ceremony or Annaprasan (ceremony when infants offered food for the first time). A landrace Binni dhan is mainly grown in Dakshin Dinajpur was mostly used during Kalipuja for worship of goddess Kali Devi in the month of November-December (Amabasya tithi of Kartik masa or new moon day at mid November) which is very unique with small grains (Semwal *et al.*, 2014).

Aromatic landrace Magur sail was used for preparation of Kheer (Sweet meal) in Dakshin Dinajpur and adjoining region. A distinct land race Kali Mogha is also used for a sweet meal by the local people in Uttar Dinajpur, particularly in Majlispur and Maldwar. Landrace Chini Sakkar (taste like sugar) and Kalo nunia (Black textured small rice) are also used during religious ceremonies in Raiganj area of Uttar and Dakshin Dinajpur District, West Bengal and richness with the diverse varieties in the geography predominantly noticed with cultural diversity in the region with flood affected river basin and topographical diversity along with huge number of water bodies and rice diversity from dead water (Kalirai), floating (Ajan, Agar), upland or rainfed (Bhadoi, Soni, Kuajoli, Matichur), irrigated (Bora Dhan, Kalam) and low land (Changa), sallow low land (Sasi Mahan) and rice with various qualities (Kumar, 1988).

Indigenous Traditional Rice Knowledge and Medicine :

Tribal people still, somehow, conserve the nature by means, respect and give

value or importance to the nature as well as human with humanity. These people having batter and nature base knowledge on life saving practices with humanity and serve with the life, called as Kobiraj or Vaidya and this is the Ayurveda system only. Ayurveda is the Sanskrit word composed of two words 'Ayur' and 'Veda' whereas 'Ayur' means age or live and 'Ved' means long or Bardhak; means the plant or plant extract or substances which give us long life so is called Ayurvedic Medicine and the sastra or subject is called Ayurved. Rice varieties are the prime source of dietary food and energy, but when the rice is used as for the unique health benefit and improve our life, strengthen with the life longevity and livelihood by curing health disorders, is called Ayurvedic rice or medicinal rice. In Indian Ayurvedic literature, 'Susrutha Samhitha' and 'Charaka Samhitha' 1000 BC also reported the medicinal uses of traditional rice varieties (Ashraf and Lokanadan, 2017).

Scientific Understanding of Medicinal Rice :

Rich source of Anti-oxidants, the fiber of the grains of black rice includes the greatest levels of anthocyanin found in any food. In fact, it has the highest anthocyanin content compared to all other rice varieties and fights against Cancer due to the anthocyanin content of black rice with anti-cancer characteristic. It can effectively restrain tumour growth and the spread of breast cancer. Improves heart health status by controlling the cholesterol level and saves from the number of cardiovascular diseases. Helps in liver detoxification, fatty liver disease is, as is obvious, characterized by an excessive fat deposit build-up in the liver. The effectiveness of black rice in treating this condition was tested in mice. Prevents diabetes, whole grain black rice has its bran intact, which is a storehouse of dietary fibre. Since, fibre takes a longer time to digest, it makes sure that the sugar in the grain is absorbed over a longer period, keeping normal blood sugar levels (Takei *et al.*, 2019).

Table 1. Rice varieties and medicinal uses in India

Rice Varieties	Medicinal Uses
Gathuan	Grain is used in treatment o rheumatism.
Alcha	Cooked grains are useful for lactating women to cure small boils of infants.
Laicha	Cooked grains are used for pregnant woman to prevent unborn from Laicha disease (skin infection) in Chhattisgarh.
Karhani	Useful in case of paralysis
Pokkali	Energy booster, anti-cancer.
Maharaji	A tonic for woman after delivery.

Rice Varieties	**Medicinal Uses**
Baisoor	In-case of headache, hemicranias, epilepsy, inhalation of fume of rice bran is useful.
Nagkesar	In lung diseases.
Bhejri	For early removal of placenta, it is given with linseeds and Gur to ows after delivery.
Resairi	Rice water is useful as a tonic for cattle, puffed rice mixed with bark of *Saccharum spontaneum* plant is useful in chronic cough.
Kalimoonch	Whole plant extract is useful for external application in case of skin troubles.
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Mapillai Samba, Illupaipoo Samba, Kalanamak, Kuzhiyadichan	Rich with Vitamin B complex and E.
Navara Kachili Samba,	High in calcium, Phosphorus, Magnesium, Potash, Sodium
Seeraga Samba	Immunity booster
Karuguruvai Kabirajsal,	High iron and protein content useful in anemia
Mapillai Samba	High butanoic acid and useful in gastrointestinal tract disorders like irritable bowel syndrome, ulcerative colitis and radiation prostatic
Raktashali	Good for fever, ulcer, eyesight, voice, skin, increase fertility in Kerala and Karnataka
Lal Sali	Treats fracture and burns in Assam
Lal Dhan, Matali, Kafala	Useful in fever and blood pressure, abortion and leucorrhea in Himachal Pradesh
Atikaya and Kari Kaaga	Used as tonic in coolness in Karnataka

Rice Varieties	Medicinal Uses
Neelam Samba,	Useful for lactating mothers in Tamil Nadu
Kichili Samba	Improve skin health, control blood sugar leveland prevent colon and intestinal cancer.
Kala Namak	Control breast cancer, heart diseases, improve eye health, regulate body weight in Uttar Pradesh
Kavuni	Prevent physiological diseases and diabetes in Tamil Nadu
Kattuyanam	Anemia, Neurodevelopment in Tamil Nadu
Karunguruvai	Leprosy, Chicken pox, elephantiasis, cholera, Venomous bites in Tamil Nadu, Kerala and Karnataka
Mapillai Samba	Gastrointestinal disorder, ulcerative, colitis in Tamil Nadu
Gathuran	Used in Arthritis

Source : Ahuja and Ahuja, (2014); Dev *et al.* (2000); Das and Qudhia, (2001); Kowsalya *et al.* (2022); Kumar *et al.* (2020).

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 region is known as the 'rice bowl of India'. Although, this is not scientifically proven effective, it has been used in many countries for medicinal purpose.

Medicinal Uses of Rice in different Parts of the World :

Although not scientifically proven effective, rice is believed by some to have medicinal properties. In the Philippines, rice polishing the bran (tiki-tiki) is extracted and used as an excellent source of Vitamin B to prevent and cure beri-beri. In Malaysia, The Medicinal Book of Malayan Medicine prescribes boiling the rice "greens" 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. In 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. In China, dried

sprouted rice grains were once imported from Malaysia and used as an external medicine to aid in digestion, give tone to the muscles, and expel gas from the stomach and intestines. The Chinese believe rice strengthens the spleen, as well as "weak stomach," increases appetite, and cures indigestion. In India, rice water (a decoction of rice) is prescribed by the Pharmacopoeia of India as an ointment to counteract inflamed surface.

According to the International Rice Research Institute, 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 or rice by mixing traditional methods of growing crops and modern technology and would be possible with the bio-fortification and help better the value and food chain in the world with the help of rice sciences (Anonymous, 2013).

Conclusion :

Those rice varieties are found to be under the mention categories are brown rice for health- organic brown rice, for diabetes- low glycemic index, for kidney diseases- low protein rice, rice for mental health- high GABA, gamma oryzanol, ferulic acids; rice for cancer prevention- high anti-oxidant ability; Wax free brown rice and low protein brown rice are generally used as medicinal purpose and remedies. A hopeful possibility of Black rice can be expected in the near future as it may receive much more net returns and achieve a lasting benefit-cost ratio as compared to high yielding rice varieties. Further financial benefit, the nutritional and medicinal advantages of black rice over normal white rice make its cultivation popular in recent times all over India. During the study, 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 valuable information about the medicinal values of traditional rice varieties in the region. Thus, millions of years of genetic diversity and germplasm heritage are vanishing forever gradually. Hence, urgent attention is warranted to collect, conserve, biochemical and scientific data,base generation on these unique rice varieties with respect to Indigenous Traditional Knowledge (ITKs) for the benefit and prosperity, the need and future looking to the rice cultural heritage ethnicity on rice identity of the region.

References :

Ahuja, U. and Ahuja, S. C. 2014. Rice in India. (in) *Encyclopedia of the history of science, technology, and medicine in non-western cultures.* 1-8. Springer Science, Business Media Dorhrecht.

Anonymous. 2013. (in) *Rice Almanac*. Global Rice Science Partnership. International Rice Research Institute. Philippines. ISBN: 978-971-22-0300-8.

Ashraf, A. M. and Lokanandan, S. 2017. A review of rice landraces in India and Its inherent medicinal values – the nutritive food values for future. *International Journal of Current Microbiology and Applied Sciences* **6** (12): 348-354.

Caius, J.F.1986. (in) *The medicinal and poisonous plants of India* (Reprint). Scientific Publishers, Jodhpur, India.

Chang, T. T. 1976 The origin, evolution, cultivation, dissemination and diversification of Asian and African Rices. *Euphytica* **25**: 425-441.

Das, G. K. and Qudhia. 2001. Rice as medicinal plant in Chhattisgarh (India): A survey. *Agricultural Science Digest* **21** (3): 204-205.

Das, R. K., Islam, M. A., Howlader, M., Ibrahim, S. M., Ahmed, H. U. and Miah, N. M. 1992. Variability and Genetic association in upland rice. *Bangladesh Journal of Plant Breeding and Genetics* **5**:51-59.

Dev, D. 2000. Folk rice varieties of West Bengal; agronomic and morphological characteristics. Research Foundation for Science and Technology and Ecology (RFSTE/Vrihi), New Delhi.

Gaur, P. C., Gupta., P. K. and Hishor, H. 1978. Studies on genetic divergence in Potato. *Euphytica* **27**:363-368.

Jackson, M.T, and Juggan, R. 1993. Sharing the diversity of rice to feed the world. *Diversity* **9**:22-25.

Khush, G. S. 2005. Taxonomy, ecology and agronomy of rice cultivation vis-a. vis genetic engineering of rice. (in) *Bio-safety of transgenic rice* (Chopra, V. L., Shantaram, S., and Sharma, R. P. eds.) pp 26-37.New Delhi. National Academy of agricultural Sciences. 237 pp.

Kowsalya, P., Sharanyakanth, P. S. and Mahendran, R. 2022. Traditional rice varieties: A comprehensive review on its nutrional medicinal , therapaetic and health benefit potential. *Journal of Food Composition and Analysis*. **114**: 104742: 1-11.

Kumar, A., Govindaraj, K., Vellaikumar, S., Shobhana, V. G., Kartikeyan, A. Akilan, M. and Satishkumar, J. 2020. Comparative profiling of volatile compounds in popular south Indian Traditional and Modern Rice varieties by gas chromatography-mass spectrometry analysis. *Front Nature*. **7**: 1-13.

Kumar, T. T. 1988. History of rice in India. Delhi. Gian Publishing House.

Mohanty, R. B., Panda, T. and Tripathy, B. K. 2012. Medicinal rice varieties of India need urgent attention. *Current Science* **102**:4, 547.

Murty, B. R. and Anand, V. 1966. Combining ability and genetics diversity in some varieties of Linum usitassimum. *Indian Journal of Genetics* **26**:21-36.

Oudhia, P. 1999. Medicinal weeds in rice fields of Chattisgarh (India). *International Rice Research Notes* **24**(1):40.

Richharia, R. and Govindasamy, S. 1990. Rices of India. Academy of Development Science. Karjat.

Semwal, D. P., Pandey, A., Bhandari, D. C., Dhariwal, O. P. and Sharma, S. S. 2014. Variability study in seed morphology and uses of indigenous rice landraces (*Oryza sativa* L.) collected

from West Bengal. *Australian Journal of crop Science* **8**(3):460-467.

Singh, U. S., Singh, N., Singh, H. N., Singh, O. P. and Singh, R. K. 2005. Rediscovering scented rice cultivar Kalanamak. *Asian Agri-History* **9**:211-219.

Umadevi, M., Pushpa, R., Sampathkumar, K. P. and Bhowmik, D. 2012. Rice – traditional medicinal plant in India. *Journal of Pharmacognosy and Phytochemistry* **1** (1):6-12. 2278-4136.

Velprabakaran, S. Rajeswari, S. and Brindadevi, S. 2020. Diversity of traditional rice varieties and medicinal benefits for human benefits. Life science leaflets. p 20-25. 2277-497.

Takei, N., Kodama, S., Hirakawa, A., Mizuno, S., Saika., K and Watanabe, S. 2019. Medical Rice: Brown rice for health and low protein rice for preventing CKD. *EC Nutrition* **14**:2