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Health Benefits of Traditional Rice Varieties of Temperate Regions

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Abstract

Rice is the leading crop produced and consumed on a large scale in the state of J&K (India) that is it is a stable food of the inhabitants residing in the domical, and is variably rich in genetic diversity. Rice production is the principal activity and a major source of income for the State. Traditional rice varieties have an enhancing potential in wide range of neutraceutical and functional foods. Besides possessing medicinal and nutritional properties, the remaining by-products obtained from these rice varieties in various post harvest operations are equally valuable. Traditional healers and local farmers have been using these traditional varieties in ayurveda and in curing of various kinds of ailments, such as cooling the body in ayurvedic treatments, improving vocal clarity, curing of boils, swellings and skin blemishes. Extracts of brown rice are also used as energy drink in individuals, patients and in treatment of chronic gastric problems, jaundice, dysenteric complaints and to increase lactation and nutrition to Childs. Sticky glutinous rice has been reported in treatment of stomach upsets, nausea, heart-burn and indigestion. Brown rice extracts have been reported in treatments of breast and stomach cancer and warts.

Keywords: Brown rice; Pigmented rice; Aromatic rice; Medicinal properties; Future scope

Introduction

Rice is a major source of staple food of more than two third of world population. About 80% of world rice is produced from the cultivation of Asian rice (*Oryza sativa* L.) [1]. Agriculture is the mainstay of more than 80% people in Jammu & Kashmir. In the state Jammu and Kashmir, rice represent main source of staple food crop, particularly those of Kashmir's. The acreage under rice cultivation in the valley constitutes about two-third of the total area under the crops in the whole state (J&K). About 75% of states rice is grown in the Kashmir valley. The land under rice cultivation in Jammu region is 159 thousand acres while it is 374 thousand acres under rice cultivation in Kashmir region. The paddy cultivation in the valley is known since ancient times and is grown even at an altitude of 2500mtrs above sea level. Most of the farmers are earning good amount of their produce in Kashmir valley as well as in the Jammu region. Out of 14 districts of Kashmir region, rice is cultivated in about 09 districts. Out of which 4 districts come under high productivity group (yield more than 2,500 kg/ha) [2].

Rice productivity in the state is high (2.2 Tons/Ha) compared to the national average productivity of about 1.9 Tons/Ha. Jammu and Kashmir State is rich in rice culture from the ancient times. About 32 varieties of traditional rice are being cultivated in the valley and varied from each other in various attribute such as, variation in dimensions, color, aroma, stickiness and presence of inherited health benefits etc. [3].

During recent times, both at national level and international levels, the land races are being preserved in the gene banks. The scientists said that they were also checking these land races for some such characteristics which were not available in the existing varieties so as to incorporate the same in the present varieties [4]. The trend toward hybrid from traditional varieties may be reversing as traditional varieties are experiencing an increasing trend among consumers, due to their incredible health benefits for example the traditional varieties possess low sugar content, making them pleasing choice for consumers who are suffering from diabetics, overweight, or regulating their sugar intake. They have higher amount of glutamic acid, fiber and vitamins. Some people also credit traditional varieties with other health benefits, such as giving sensations of cooling in the body, improves vocal clarity, eyesight, fertility and mitigating rashes [5].

Owing to several health-promoting impacts associated with anthocyanins, such as anti-oxidative, anti-inflammatory and anticarcinogenic effects [6], colored rice is considered as a functional food and food ingredient in many Asian countries [7]. The functional properties of anthocyanins in red and black rice varieties have been verified in numerous nutritional cases [8].

The day to day concern about the side effects of synthetic antioxidants like butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) [9,10] has increased the interest among researchers and nutritionists in exploration of antioxidants from natural sources, which are both economically and physiologically justified. It has been validated by researchers that changing the dieting habits from artificially processed to an naturally providing foods having high content of bioactive components including antioxidants like tocopherols, tocotrienols, oryzenols, polyphenols, flavonoids ,vitamin-C, play an important role in defending the body from attack of chronic diseases. Pigmented along with aromatic rice varieties besides having pleasant taste and odour are also associated with numerous health benefits. Pigmented rice possesses pigmented componds such as Cyanidin-3-O-β-D-glucopyranoside in abundant content [11], which is associated with diverse functional properties such as, protection against cytotoxicity [12], antineurodegenerative activity [7], inhibition of glycogen phosphorylase [13], and possessing antioxidant and scavenging activity higher than white rices and hybrid rice varieties [14].

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Nutritional facts about traditional rice

Traditional cultivars of Rice have nutritive value higher than hybrid rice varieties. Besides serving as an important source of carbohydrate for more than two-thirds of the world's population and almost whole of inhabitants residing in the Kashmir valley, having rice as their staple food. This is having the vital function of acting as fuel for the body to carry on its vital activities. These traditional Rice varieties have lesser content of fat and good amount of oryzenol content as compared to hybrids and thus prevent the body from building up cholesterol levels. That ensures it as excellent source of food to be included as balanced diet in their routine dieting habits. These traditionally grown rice cultivars are good sources of minerals and vitamins such as niacin, thiamine, iron, riboflavin, vitamin D, calcium, and possess higher fiber and lesser amount of sugar content, making it an appealing choice for consumers suffering from diabetic complications. Rice does not contain gluten proteins (present in wheat), thereby making it an essential alternative for persons having requirements of gluten free diets such as patients suffering from celiac diseases. These varieties are non allergic due to absence of any additives, because these do not require excessive fertilizer and pesticide applications during their developmental and growth stages. These Rice varieties possess higher amylose content and are rich in resistant starch that cannot be hydrolyzed in the gastrointestinal tract and serves as a substrate for bacterial fermentation. These cultivars ensure several health benefits such as reducing the risk of developing type II diabetes, obesity and cardiovascular diseases by lowering the glycemic and insulin responses. Brown rice contains high amounts of insoluble fiber, which is reported by scientists to protect the body against a variety of cancers. These are also valuable sources of food for those suffering from hypertension due to its low sodium content and are also a fair source of protein containing all eight amino acids [15].

Medicinal uses of traditional rice

Jammu And Kashmir State has been a rich source of medicinal plants since ancient times, among these traditional rice varieties have been used by local inhabitants in unani, Ayurvedic, system of medicines since generations. In Ayurveda the medicinal Values of rice have been described as acrid, tonic, aphrodisiac, oleaginous, diuretic, fattening and useful in biliousness [5]. These traditional varieties have been regarded an energetic food for people and were recommended by saints of having the medicinal values to keep juvenile and long life. The extracted from the bran of these rice is used for curing neural diseases and also used to cure body pain and eye disorders It is having properties to rectify the basic ills affecting the circulatory respiratory as well as digestive system. Different groups of rice affect the human beings differently, as they possess different inherent qualities to alleviate the three doshas, (which according to ayurveda is considered three principles of energy, believed to be circulating in the body and govern physiological balance and activity). Ayurvedic practitioners prescribe different rices for various ailments. The traditional doctors (vaids) possess profound knowledge of different effects of rice and were particular about their prescription [16].

In Ayurveda, the traditional Indian medical system, colored rice has been called *shastika* rice and claims that it can restore imbalances in the human body. Pigmented rice is rich in antioxidants and polyphenols and has two or three times as much zinc and iron as white rice [17] which possess the desirable quality to boost, strengthen, regenerate and energize the body [18]. It is also used as baby food and replaces white rice on special occasion in the state. The red color, varying from light to dark red, is confined to the bran layer. Red Rice (Zag, Tel Zag, Gull Zag, Shel Kew, Kaw Quder) Keeps You Away From Obesity, Diabetes and Cancer. Rice with a red bran layer is called red rice. Susruta (400 BC), Charaka (700 BC), and Vagbhata (700 AD), the well-known vriddha trayi (Trio of Elders) of Ayurveda, considered red rice (rakta shali) the best among the other rice varieties, due to desirable property as they had the power to redress the imbalance in the tridosha or humours (the vata, the pitta, and the kapha – are collectively called the tridosha) whose imbalance in the body causes various types of diseases. In recent times, interest in red rices has been revived because of the presence of antioxidants. The antioxidant and scavenging activity of red rice is higher than that of white rice [19].

Ancient Ayurvedic treatises laud the red rice as a nutritive food and medicine. They are known to be influential in the treatment of various ailments such as diarrhea, vomiting, fever, hemorrhage, chest pain, wounds, and burns [20]. Colored rice has been preferred in the past for their special features such as medicinal value and exclusive taste. A large number of these varieties are still grown in various parts of the sate by tribal's and small farmers who are deprived of modern technologies and health care systems, where indigenous rice with their nutritional and medicinal properties are a rich alternative for the same. This indigenous rice variety in state and India seems to contribute tremendously to the health of the women including adolescent girls, lactating mothers and pregnant women [20]. Ayurvedic properties of Raktasali (red rice) and their effect on human physiology. Red rice (Raktasali) was the most efficacious in subduing deranged humors [21,22]. It was considered good treatment for fevers and ulcers, Improves eyesight, voice improver, semen enhancer, diuretic, spermatophytic, refrigerant, cosmetic, and tonic and was antitoxic.

Pharmological and clinical trials with red rice has shown anti-fungal, anti-bacterial, anti-viral, ant-diarrheal, anti-inflammatory, antioxidant, antitumor, anti-thyroid and anti-hyper cholesterolemic activities. It also stimulates protein secretion besides having radical scavenging effects [14].

Aromatic rice provides most benefits of health and nutrition. These are considered healthier as they possess more vitamin and fiber in their outer bran layers. Brown aromatic basmati rice contains 20% more fiber than other brown rice varieties, which prevents the formation of cancerous cells in the body. According to Canadian diabetes association, glycemic index of basmati aromatic rice is lower than other rice varieties, and thus essential for those suffering from diabetes. Ayurveda supports its properties and proved it to be a great healing food. Traditional scented rice varieties have been revealed by scientists to possess higher amount of Fe and Zn and helps in the bioavailability of iron [23]. The need of the day is to commercialize these varieties and promote them through public awareness about their important characteristics.

Present research and future scope

Currently, rice is regarded as a neutraceutical and functional food besides being a staple source of food and primary source of carbohydrate or starch. Its role of having low glycemic index in comparison to other genetically modified rice varieties, which containing complex carbohydrates and regarded as high glycemic index food provides a better novel substitute for diabetic patients. Presence of valuable mineral content, excellent starch characteristics. Antioxidant and anti inflammatory activity represent these unique among cereals sources (wheat, maize etc).starch of these rice is almost completely absorbed by human body [24]. Scientifically, it have been proved, that Amino acids possessed by these varieties have high biological value, high content of essential fatty acids and selenium, and have anti-hypertension

effect. Hence, rice is now regarded as a functional food. Rice extracts have been validated in inhibiting chloride channels in human body and thus reduce intestinal losses' in acute diarrhea, thereby serving as oral rehydration solutions (ORS) [25]. These rice based ORS are now preferred than glucose based ORS, as reported by World Health Organization programmes [26]. Rice due to its least allergic properties are recommended for patients suffering from irritable bowl syndrome. Colored rice varieties have been reported to possess antioxidant properties [27] and considered more nutritious, being rich in iron (Fe), Zinc (Zn), and minerals. These rices have been found to reduce atherosclerotic plaque by 50% more than white rice in rabbits [28] clinical trials conducted in USA have concluded that red rice yeast reduces cholesterol and total triglycerides, providing a novel food based approach to lowering cholesterol [29-32]. Rice thus meet most of the requirements of a good and healthy food and is the only cereal that is eaten as whole grain, which according to Ayurvedic texts is more easily digestible than flour.

Conclusion

The temperate regions in north India have been an abode of traditional rice varieties since prehistoric times and were used recommended for medical uses by traditional healers and local farmers. Theses varieties thus fit into the description of healthy and functional foods. Due to emergence of high yielding varieties these have been replaced at a large pace and are posing the threat of extinction. Thus these varieties need to be conserved and promote them by commercialize and through general public awareness about their medicinal benefits. Considering the presence of flavonoid and anthocyanin content together with highest radical scavenging activity due to the presence of polyphenols in these varieties. These favors the health conscious consumers. Clinical validation of these varieties is mandatory, so that these excel in the international market (like the red rice yeast of china having worldwide demand).

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