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Chemical composition of different rice cultivars grown in North India

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Abstract
Three different varieties of rice were studied for proximate composition. Pusa-3 variety had the highest protein, fat, ash and lowest moisture content. Amylose content was highest in Jhelum variety. The differences in proximate composition between the varieties could be due to environmental as well as genetic factors. The information of the present investigation might be useful in processing and storage structures in food processing industry based on the variety difference of rice cultivars.

Keywords: Composition, Rice, Varieties

Introduction
Rice cultivars in different regions of the world differ in their composition depends on variety, climate, irrigation and fertilizer application (Singh *et al*., 2005) [12]. A significant variation in physical, composition, and cooking quality has been shown among rice cultivars produced in different parts of world with the influence of diverse genetic and environmental factors (Singh *et al*., 2005 [12]; Izawa 2008 [6]). Kashmir is known for temperate rice, grown in valley plains (1500-1650 m amsl) and cold-tolerant rice, grown in high altitude areas (1800-2400 m amsl). These rice genotypes are different from the typical sub-tropical/tropical rice genotypes in rest of India, especially with respect to cold tolerance (Sanghera *et al* 2010) [10]. In order to cope with the increasing population, food security, nutrient security, urbanisation, climate change and changing food preferences, there is need for not only high yielding varieties but also for nutritionally adequate rice varieties. The present investigation was undertaken to evaluate proximate composition of different rice varieties of Kashmir.

Materials and Methods
The paddy grains were obtained from Sher-e-Kashmir University of Agriculture Science and Technology, Shalimar, Jammu and Kashmir, India. Three cultivars (Jehlum, Pusa-3 and SKAU-345) were used in the current study. Paddy samples were dehusked and polished utilizing the locally available milling facilities. The flour samples from different varieties were analyzed for moisture, ash, crude fat, protein using standard methods of AACC (2000) [1]. Amylose content of the rice flour was determined by method described by Sadasivam and Manickam (1992) [11]. To 100mg of powdered sample 1ml of distilled ethanol was added after mixing it well, 10 ml of 1 N NaOH was added and was left overnight and volume was adjusted up to 100ml. 2.5 ml of extract was taken and 20 ml of water was added in addition to 2-3 drops of phenolphthalein indicator. 0.1 N HCl was added drop by drop until the pink colour disappears. Then 1 ml of Iodine reagent was added and the volume was raised up to 5 ml and the absorbance was recorded at 590nm.

Results and discussion
The proximate composition of rice flour milled from different cultivars is shown in Table 1.

Table 1: Chemical composition of different rice cultivars.

Rice Varieties	Moisture (%)	Ash (%)	Protein (%)	Fat (%)	Amylose (%)
Jhelum	12.01±0.71	0.28±0.02	6.35±0.52	0.43±0.02	22.78±1.25
Pusa-3	11.85±0.65	0.31±0.05	8.13±0.71	0.51±0.04	22.51±1.20
SKUA-345	12.05±0.80	0.22±0.01	5.21±0.43	0.40±0.01	21.36±1.12

Results are expressed as Mean± SD

Moisture content has a marked influence on all aspects of paddy and rice quality. Moisture content plays a significant role in determining the shelf life. Moisture content was highest (12.05%) in SKUA-345 variety and lowest (11.85%) in Pusa-3. In a study conducted by Thomas *et al*. (2013) [13] moisture ranged from 10.04- 12.88 per cent among rice varieties. Yadav *et al*. (2007) [14] reported moisture content varying from 11.64 to 12.72 % for different Indian rice cultivars. Variation in the moisture content may be attributed to environmental conditions during filling and maturation, such as high day time temperatures, low humidity and dry winds. The ash content present in a food sample plays an important role while determining the levels of essential minerals (Bhat and Sridhar 2008) [2]. Ash content was highest (0.31%) in Pusa-3 rice and lowest (0.22%) in SKUA-345 variety. The results are consistent with literature data on proximate composition cited by Deepa *et al*. (2008) [4]. Proteins are vital to the living process and carry out a wide range of functions essential for sustenance of life. Pusa-3 rice variety recorded the highest (8.13%) protein content and SKUA-345 variety had the lowest (5.21%) protein content. Varietal difference in protein may be attributed to several factors including environmental stresses such as salinity and alkalinity, temperatures, diseases, total nitrogen in the soil and other minerals such as molybdenum and total chlorine which tend to increase the grain protein content (Gopalan *et al*., 2009) [5]. Similar study was conducted on six different rice varieties marketed in Penang, Malaysia (locally grown and imported) and found that protein content of all the varieties evaluated ranged between 5.96 to 8.16%, with protein content in Pakistani Basmati as 7.75% (Thomas *et al*. 2013) [13] Fat content was highest (0.51%) in Pusa-3 rice and lowest (0.40%) in SKUA-345 variety. Yadav *et al* (2016) [15] reported the fat content of different rice cultivars ranged from 0.43 to 0.80%. Amylose Content (AC) is the most important character for predicting rice cooking and processing behavior (Juliano 1979 [7]; Webb, 1985 [16]). Rice can be grouped based on their amylose content into waxy (0-2%) very low (3-9%), intermediate (20-25%) and high above 25% amylose content amylose containing cultivars (Cruz and Khush, 2000) [3]. Our results indicated that all the rice cultivars had intermediate amylose content with highest (22.78%) in Jhelum rice and lowest (21.36%) in SKUA-345 rice variety. The variation in amylase content may be due to variation in the temperature during grain ripening stage, whereby the amylase content generally decreases as the mean temperature increases (Resurrection, 1977) [9]. In addition, the amylose content is also influenced by nitrogen fertilization, whereby the value decreases slightly with nitrogen fertilization but is not effected by the stage at which nitrogen is applied (Paule *et al*. 1979) [8].

Conclusion

In the present scenario there is need for not only high yielding varieties but also for nutritionally adequate rice varieties Differences in varieties were observed in the studied cultivars of rice with regard to their proximate composition. Among the studied varieties, Pusa-3 rice variety showed the excellent chemical composition compared to other varieties. This information might be useful in rice breeding programmes and biotechnological research for further improvement of rice.

References

1. AACC. International. Approved Methods of the American Association of Cereal Chemists, 10th Ed. Methods. 2000; 39-70A, 55-30, 55-31. The Association: St. Paul, MN.
2. Bhat R, Sridhar KR. Nutritional quality evaluation of electron beam-irradiated lotus (Nelumbo Nucifera) seeds. Food Chem. 2008; 107:174-184.
3. Cruz DN, Khush GS. Rice grain quality evaluation procedures. In: *Aromatic rices*. (eds. R.K. Singh, U.S. Singh and G.S. Khush). Oxford and IBH publishing Co.Pvt. Ltd., New Delhi, 2000, 15-28.
4. Deepa G, Singh V, Naidu KA. Nutrient composition and physicochemical properties of Indian medicinal rice-Njavara. Food chem. 2008; 106:165-171.
5. Gopalan C, Sastri BVR, Balasubramanian SC. Nutritive value of Indian foods. NIN, ICMR, 2009. Hyderabad-500 007, India.
6. Izawa T. The process of rice domestication: A new model based on recent data. Rice. 2008; 1(2):127-134.
7. Juliano BO. The chemical basis of rice grain quality. In: Proceedings of the workshop on chemical aspects of rice grain quality. IRRI, Los Banos, Philippines. 1979; 69-90.
8. Paule CM, Beng KA, Juliano BO, Coffwan WR. Variability in amylase content. Starke. 1979; 28:15-22.
9. Resurrection AP, Juliano BO, Tanaka Y. Nutritional content and distribution in milling fractions of rice grain. J. Sci. Food and Agric. 1977; 30:475-481.
10. Sanghera GS, Husaini AM, Parray GA, Rather AG, Shikari AB, Wani SA. Generation of cold tolerant CMS lines of rice and identification of maintainers/restorers for hybrid rice development in Kashmir. Ind. J. Crop Sci. 2010a; 5:143-146.
11. Sadasivam S, Manickam A. In: Biochemical Methods for Agricultural Sciences, Wiley Eastern Ltd., New Delhi, 1992, 184-185.
12. Singh N, Kaur L, Singh SS, Sekhon KS. Physiochemical, cooking and textural properties of milled rice from different Indian rice cultivars. Food Chem. 2005; 89(2):253-259.
13. Thomas R, Nadiah WA, Bhat R. Physicochemical properties, proximate composition, and cooking qualities of locally grown and imported rice varieties marketed in Penang, Malaysia. IFRJ. 2013; 20(3):1345-1351.
14. Yadav RB, Khatkar BS, Yadav BS. Morphological, physicochemical properties of some Indian rice cultivars. J. Agric. Technol. 2007, 204-209.
15. Yadav RB, Satnam M, Yadav BS. Physicochemical, Pasting, Cooking and Textural Quality Characteristics of Some Basmati and Non-Basmati Rice Varieties Grown in India. Int. J. Agric. Technol. 2016; 12(4):675-692.
16. Webb BD. Criteria of rice quality in the U.S. In: Rice Chemistry and Technology. 1985, 403-442.