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Nutrient Composition of Little Millet Varieties

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ABSTRACT

Little millet is one among the minor millet known well for its protein and crude fibre content. It is superior with the staple cereals rice and wheat, in terms of fat, fiber and iron. The present study was undertaken to analyse the proximate and mineral content of Little millet varieties grown in Andhra Pradesh. Little millet varieties namely JK-8, Pedasamalu/ PS, OLM-203 and OLM-206 were selected to analyse the nutrient composition. Standard analytical procedures were followed for determining the nutrients. The results of nutrient composition of four varieties of Little millet showed that the Moisture, Energy, Carbohydrate, Protein, Fat, Crude fiber Ash, Iron and Zinc ranged from 6.8 % to 8.0%, 329 Kcal to 356 Kcal, 56.74 g to 59.58g, 11.33 to 14.60, 4.58 g to 5.27 g, 5.04 g to 8.24 g, 7.02 g to 9.16 g, 3.98 mg to 5.12 mg and 27.9 mg to 41.8 mg respectively. The study revealed that the protein, fat and zinc values were high in the Little millet varieties studied.

Key words: *Little millet, Nutrient composition and Mineral composition..*

Little millet is categorised amongst one of the small seeded minor millets. They belong to the family *Panicum* and species *Sumantrense*. Little millet is popularly known with the names samalu, samai and sama in different regions of India. It was found to be predominantly grown in the places where primitive agricultural practices are still followed. This millet is recorded to be indigenous to Africa. Little millet is well known for its ability to grow in extreme dry and drought weather conditions. It requires less water resources for cultivation and is predominantly rain fed.

Little millet has fat (4.7 g), crude fiber (7.7 g), iron (9.3 mg) and phosphorus (220 mg) per 100 g which is comparable to cereals and other millets (Gopalan *et al*., 2010). Dietary fiber content of little millet is the contributing factor for its low glycaemic index and a recent study conducted on little millet indicated that it exhibits hypoglycaemic effect due to its higher proportion of dietary fiber (Itagi *et al*., 2013).

Little millet is nutritious and has a significant role in providing nutraceutical components such as phenols, tannins and phytates along with macro and micro-nutrients. Besides, it also exhibits hypo-glycemic, hypo-lipidemic effects and faecal bulking effects (Ravindran, 1991and Itagi, 2003).

Little millet though nutritionally superior and compares well to staple cereals, the usage is limited due to increased production and availability of preferred cereals (such as rice and wheat) at subsidized prices. Compared to staple grains, the small size of the grain and accidental addition of pebbles and stones while harvesting in fields makes it difficult for processing. In addition, limited availability of processing units in millet growing area restricts its usage. In turn it creates limited availability of convenience foods of millets compared to staple cereals. Shelf life of dehulled millet is low. Due to high fat content dehulled millets turn rancid early as they undergo autoxidation and can be easily infested. Various processing treatments including blanching, malting, dry heating, acid treatment, popping, etc. decrease the level of anti-nutrients, improve digestibility and increase shelf life. Utilization of millet for novel product development will help in diversifying their use which will be beneficial for human health (Kavita *et al*., 2015).

MATERIAL AND METHODS

Procurement of raw materials

Four different varieties of Little millet namely JK-8, Pedasamalu/PS, OLM-203 and OLM-206 available in Andhra Praesh were selected for the study and were procured from Regional Agricultural Research Station, Vizianagaram. Dehulling of the samples was carried out at Acharya N. G. Ranga Agricultural University, Lam, Guntur.

Cleaning and milling of grains

The dehulled grains were cleaned in one lot and used for the study. The dehulled grains were packed in air tight pouches and were further used for analysis. All estimations were carried out in triplicates.

Nutrient composition of Little millet varieties

The dehulled grains were milled into fine powder and dried for further analysis. The nutrient

Table 1. Proximate composition of Little millet varieties (per 100 g)

Varieties	Moisture (%)	Energy (Kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Ash (g)	Crude Fiber (g)
JK-8	8.03	329.00	56.74	11.33	4.58	9.16	8.01
PS	6.80	343.00	58.24	14.60	4.74	7.95	5.04
OLM-203	6.80	353.00	59.58	14.01	5.27	7.02	6.08
OLM-206	7.20	356.00	57.43	14.30	4.89	8.06	8.24
Mean	7.22	345.49	57.99	13.56	4.87	8.05	6.84
Standard Deviation (∓)	0.69	8.93	4.55	0.05	0.89	0.28	0.26
C.V (%)	0.98	2.56	7.82	0.51	17.90	3.14	3.41
C.D	0.01	1.78	0.91	0.01	0.17	0.28	0.05

Table 2. Mineral composition of Little millet varieties (per 100 g)

Minerals	Iron (mg)	Zinc (mg)
JK-8	3.98	39.7
PS	4.45	41.8
OLM-203	5.12	27.9
OLM-206	4.87	35.7
Mean	4.6	36.27
Standard Deviation (∓)	0.3	2.05
CV (%)	6.09	6.01
CD	0.16	0.41

analysis was carried out by using standard methods proposed by AOAC 2006.

Statistical analysis

The statistical significance was tested by using analysis of variance (ANOVA) *i.e*. CRD was performed on mean data separately for each nutrient in order to test the significant difference among the varieties at 5% level of significance.

RESULTS AND DISCUSSION

Proximate Composition of Little millet

Analysis of proximate composition reveals the quality of the grain and gives an authentic reason of why these millets can be considered of nutritional importance and how they play a critical role in mitigating the nutritional problems faced by the population. The proximate composition of Little millet like Moisture, Energy, Protein, Ash, Fat, Carbohydrate and Crude fibre were analysed for four varieties of Little millet namely, JK-8, PS, OLM-203 and OLM-206 are tabulated in Table 1.

Moisture Content

Determining moisture content is essential to understand quality of the grains. Moisture content is also an indicator of grain storability. Grains with high moisture content (over 14.5%) attract mould, bacteria, and fungi, which promote spoilage of grains during storage. Low moisture content in grains has reported to be more stable during storage. Moisture content can be an indicator of profitability in milling (Wheat Marketing Centre, 2004).

The values f or Moisture Content was 8.03%, 6.8%, 6.8% and 7.2% for the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The highest Moisture content was recorded in JK-8 with 8.03% and lowest was observed in PS and OLM-203with 6.8%. The results of the statistical analysis showed significant difference existed among the varieties with respect to Moisture content ($p \leq 0$). Hence it can be comprehended that the variety PS is least prone to deterioration of the grains during storage and is of good quality.

Energy

Millets are known to have good amounts of energy content in them. The mean values were 329 Kcal, 343 Kcal, 353 Kcal and 356 Kcal of the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The results of the statistical analysis also showed no significant difference existed among the varieties with respect to Energy content (p 0.09).

Carbohydrate

The quantity and quality of carbohydrate present in the grain determines its suitability and functionality in the formulation of value added products for therapeutic use. The values for Carbohydrate content were 56.74 g, 58.21 g, 59.58 g

and 57.43 g for the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The Carbohydrate content was found to be almost similar in all the four varieties of Little millet studied (p 0.95).

Protein

Protein plays major rolein food products because of the attributes like, high hydration capacity and gluten strength**.** There is a huge impact of protein content on finished food products. If a food product is expected for chewy effect as in case of breads and buns, ingredients high in proteins are used. In case of products that demand either crisp or tender texture, low proteins are used. (Wheat Marketing Centre, 2004).

The values of Protein Content for four varieties of Little millet were 11.33 g, 14.60 g, 14.01 g and 14.30 g for the varieties JK-8, PS, OLM-203 and OLM-206 respectively. The highest Protein content was recorded in PS with 14.60g and lowest was observed in JK-8 with 11.33g. The results of the statistical analysis also showed significant difference existed among the varieties with respect to Protein Content (p 0). It can be concluded that the variety PS has the highest amounts of protein content and it can be popularised amongst the people to consume.

Fat

Analysing Fat content determines the type of storage that is required to store the grain in order to retard the action of oxidative rancidity. The mean values were 4.58g, 4.74g, 5.27g and 4.89g of the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The results of the statistical analysis showed no significant difference existed among the varieties with respect to fat content (p 0.91).

Ash

The ash content in grains has significance for milling. Ash is predominantly found in the bran, grains having higher amounts of ash contents enable to predict the yield during milling. The ash content in grain reflects to the amount of bran present in flour. By the addition of flour having high amounts of ash gives darker colour to the finished food products

The values of Ash Content for four varieties of Little millet was 9.16 g, 7.95 g, 7.02 g and 8.06 g of the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The highest Ash content was recorded in JK-8 with 9.16 g and lowest was observed in OLM-203 with7.02 g. The results of the statistical analysis also showed significant difference existed among the varieties with respect to Ash content (p 0.01).The variety OLM-203 can be considered to give highest yield during milling.

Crude Fibre

Grains rich in crude fiber affects the texture, imparts hardness but, also increases gumminess and chewiness in the end products. It gives a significant cracked hard crust (Feili *et al.*, 2013).

The values of Crude Fibre content were 8.01g, 5.04g, 6.08g and 8.24g of the varieties JK-8, PS, OLM-203 and OLM-206 respectively. The highest Crude fibre content was recorded in JK-8 with 8.01g and lowest was observed in PS with 5.04g. The results of the statistical analysis also showed significant difference existed among the varieties with respect to Crude fiber content (p 0).

It can be observed that the crude fibre content is highest in the variety OLM-206 in comparison with the other three Little millet varieties studied and also among the Little millet variety studied by Nazni and Bhuvaneshwari (2015) reporting 5.0 g of Crude Fibre.

Mineral composition of Little millet

Mineral composition of Little millet like Iron and Zinc were analyzed for four varieties of Little millet, namely JK-8, PS, OLM-203 and OLM-206 and shown in Table 2.

Iron

Millets are known to be rich in iron, which plays a crucial role in prevention of anaemia. The values of Iron content were 3.98 mg, 4.45 mg, 5.12 mg and 4.87 mg for the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The results of the statistical analysis also showed no significant difference existed among the varieties with respect to Iron content ($p \leq 0.14$).

Zinc

The mean values were 39.7mg, 41.8mg, 27.9mg and 35.7mg of the varieties JK-8, PS, OLM-203 and OLM- 206 respectively. The highest Zinc content was recorded in PS with 41.8mg and lowest was observed in OLM-203 with 27.9mg. The results of the statistical analysis also showed significant difference existed among the varieties with respect to Zinc content (p 0).

CONCLUSION

From the research work carried out, it can be concluded that there are varietal differences in the nutrient composition between the four varieties of Little millet analysed in the study. PS (Pedasamalu) was found to have better nutrient composition in terms of protein and zinc. OLM-206 had good crude fiber content. In spite of varietal differences in terms of nutrients, the average nutrient composition of Little

millet is good. Hence the incorporation of Little millet in value added product development and inclusion in regular diet can benefit the population in maintaining good health and nutritional status.

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