

A Study on Nutrient Components of Foxtail Millet Varieties

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ABSTRACT

Foxtail millet has attained world wide popularity in the recent years due to its nutritive value and therapeutic use. The present study was undertaken to know the nutrient and mineral composition of foxtail millet varieties grown in Andhra Pradesh. Foxtail millet varieties namely Prasad, SIA-3058, SIA-3222 and SIA-3156 were selected to analyze nutrient composition. The results of nutritive composition of four varieties of foxtail millet showed that the Moisture, energy, carbohydrate, protein, fat, calcium, iron and zinc contents ranged from 6.63 to 10.56 %, 361.80 to 385.83 kcal, 66.33 to 67.32 g/100g, 12.50 to 14.47 g/100g, 3.98 to 5.60 g/100g, 28.69 to 31.71 mg/100g, 2.89 to 3.52 mg/100g and 2.48 to 3.72 mg/100g, respectively. The present study revealed that the values for energy, protein and Zinc are higher in foxtail millet when compared to rice, wheat and quinoa. The fat content of foxtail millet was found to be less than that in quinoa, the calcium and iron content of foxtail millet was high compared to rice.

Key words: Foxtail millet, Mineral composition, Nutrient composition

Foxtail millet (*Setaria italica*), a member of the family Poaceae, is also known as Italian millet. It is a minor cereal which forms the staple food for a large segment of the population, mainly those with low socio-economic status in India and Africa (Florence and Asha, 2012), Foxtail millet is ranked as second in the world for total production of millets.

It plays a very important role in agriculture and food of many developing countries because of its sustainability to grow under adverse heat and limited rainfall conditions (Vithal and Girish, 2006). Foxtail millet growing districts in Andhra Pradesh are Ananthapur, Kurnool, Prakasam and Guntur while Mahaboobnagar and Ranga reddy are the millet growing districts in Telangana. The nutrition properties of foxtail millet are of utmost importance for maintaining human health and for compete physical fitness (Radhika *et al.*, 2011). It was reported by Zhang *et al.* (1989) that the energy, protein, carbohydrate, lysine and fat content were 351 kcal, 10 – 12%, 69.95 %, 2.29 – 2.7 % and 4.5 % respectively and the protein content of foxtail millet is higher than in maize, rice and sorghum. The content of two essential amino acids methionine and tryptophan are highest among cereals crops. It was also reported to contain good amount of crude fiber and phosphorus

Foxtail millet is a good source of β carotene (126 – 191 μ g/100 g) (Goudar *et al.*, 2011). This millet has been proved to be suitable for people suffering from metabolic disorders (Itagi, 2003). It possesses certain phytochemicals with antinutrient effects which may hinder efficient utilization, absorption or digestion of nutrients and thus reduce their nutrient bioavailability and nutritional quality. Antinutrients are unevenly

distributed in the grain. Depending on their localization, the proportions of these antinutrients in the diet can be reduced by dehulling and further processing (Ramesh *et al.*, 2015). In India, food security is directly proportional to wheat and rice production as millet production and consumption has rapidly decreased for variety of reasons associated with processing of millets (Hariprasanna, 2016).

Hence the study was carried out to analyze the Nutritive value of selected foxtail millet varieties.

MATERIAL AND METHODS

Procurement of raw materials

Four different varieties of Foxtail millet namely Prasad, SIA-3058, SIA-3222, SIA- 3156 available in Andhra Pradesh were selected for the study and were procured from Regional Agricultural Research Station, Nandyal, Kurnool district. 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 containers until used for analysis. All estimations were carried out in triplicates.

Nutrient composition of foxtail millet varieties

The dehulled intact grains were milled into fine powder and dried for further analysis. The nutrient analysis was carried out by using standard methods proposed by AOAC 1980 and AOAC 2006. Estimation of moisture content was done by oven method.

Table 1. Nutrient composition of foxtail millet varieties

Nutrient components	Prasad	SIA-3058	SIA-3222	SIA-3156
Moisture (%)	12.50	8.58	6.63	6.34
Energy (kcal)	361.80	370.60	379.80	385.30
Carbohydrate (g/100 g)	66.30	66.80	66.50	67.32
Protein (g/100 g)	12.50	13.25	14.06	14.47
Fat (g/100 g)	3.98	4.35	5.10	5.60
Ash (g/100 g)	1.59	1.31	1.46	1.47
Crude fiber (g/100 g)	5.42	5.83	5.83	4.85

Table 2. Mineral composition of foxtail millet varieties

Name of foxtail millet varieties	Calcium (mg/100g)	Zinc (mg/100g)	Iron (mg/100g)
Prasad	29.42	2.49	3.47
SIA-3058	28.69	3.19	3.31
SIA-3222	31.71	3.24	2.89
SIA-3156	28.34	3.72	3.52

Carbohydrate was estimated by using Anthrone method. Protein was estimated by micro Kjeldhal method. Fat was estimated by using Soxhlet method. Ash was estimated by using Triacid digestion.

Statistical analysis

The statistical significance was tested by using CRD, analysis of variance (ANOVA) was performed on mean data separately for each nutrient in order to test the significant difference between the varieties at $p < 0.05$ level and CD at 5% level of significance.

RESULTS AND DISCUSSION

The four varieties of foxtail millet were subjected to analysis of proximate composition and the data pertaining to the present investigation is tabulated in Table 1. The values obtained for mineral analysis are tabulated in Table 2.

The moisture content ranged from 6.63 % to 12.50 % among various varieties, Suman *et al.* (2014) reported that the moisture content of foxtail millet was 9.35 %. The energy of four varieties of foxtail millet ranged from 361.80 kcal to 385.83 kcal, energy content was high in SIA – 3156 and low in Variety Prasad. Khapre *et al.* (2016) reported that the energy content of foxtail millet flour was 349 Kcal/ 100 g. The carbohydrate content among the four varieties of foxtail millet was high in SIA-3156 with 67.32 g/100g and low in variety Prasad with 66.33 g/100 g. Verna *et al.* (2014) reported that the carbohydrate content of foxtail millet flour was 69.95 %. The protein content of four

varieties of foxtail millet was high in SIA-3156 with 14.47 g/100 g and low in variety Prasad with 12.50 g/100 g. Khapre *et al.* (2016) reported that the protein content was found to be 12.1 per cent. So, the foxtail millet is protein rich and significant from nutritional point of view. The fat content of foxtail millet varieties ranged from 3.98 g /100 g to 5.60 g/100 g, According to Indian Food Composition Table (Longvah *et al.*, 2017), fat content of foxtail millet is 6.39 g. The ash content of foxtail millet varieties ranged from 1.31 /100 g to 1.59 g/100 g, the value obtained is slightly lower the value reported by Agarwal *et al.* (2005) which was 3.25 % and is very close to result given by Verna and Raghuvanshi (2001) which was 3.0 %. The value of crude fiber content of foxtail millet was high in SIA-3222 with 5.83 g/100g and low in SIA-3156 with 4.85 g/100 g. There was a statistically significant difference in the nutritive value between four varieties under study. The energy and protein content of foxtail millet were remarkably higher than quinoa (328 kcal and 13.11 g /100 g respectively), rice (351 kcal and 7.81 g/100 g) and wheat (320 kcal and 10.57 g/100 g). The fat content of foxtail millet was found to be less than that of quinoa (5.50 g/100 g).

The value of calcium of foxtail millet ranged from 28.34 mg/100 g to 31.71 mg/100 g. Mayuri (2015) reported that the calcium content of the foxtail millet (36.00 mg/100g). Iron content of raw foxtail millet was 5.75 mg/100 g as reported by Malik *et al.* (2002). In the present study the iron value of foxtail millet ranged from 2.89 mg/100 g to 3.52 mg/100 g. The value of zinc of foxtail millet ranged from 2.49 mg/100 g to 3.72 mg/100 g. Vithal and Girish, (2006) reported in the study that the zinc content of foxtail millet was 2.40 mg/100g. There was a statistically significant difference in the mineral values between four varieties under study. The calcium and iron content of foxtail millet was high compared to rice (8.11 mg/100 g and 0.72 mg/100 g) the zinc content was high compared to rice, wheat and quinoa (1.08 mg/100 g, 2.85 mg/100 g and 3.72 mg/100 g, respectively).

CONCLUSION

From the research work carried out, it can be concluded that there are varietal differences in the nutritional composition among the four varieties examined in the study. SIA- 3156 was found to have better nutrient component compared to other varieties. Consumption of these nutrient dense products will not only improve the nutritional status of population but also sustain the production of minor millets. Foxtail millet can be recommended in daily diet. There is a need to encourage the farming community to grow this crop thus contributing to achieving nutrition security.

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