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## Biochemical composition of pearl millet germplasm collected from Eastern UP

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**Abstract**

The present Investigation was carried out to study biochemical properties of pearl millet (*Pennisetum glausum* L.) genotypes. The various biochemical parameters such as carbohydrate NDBH-2(64.24g/100g), Protein Content pearl millet-3(11%), amino acids like tryptophan content NDHB-5(1.23mg/100g), lysine content NDBH-2(0.55mg/100g), Anti nutritional factors such as total phenolic content pearl millet-5(49.69%) and tannin content pearl millet-6(1.84mg/100g) were recorded maximum in present investigation.

**Keywords:** pearl millet, carbohydrate, protein, tryptophan, lysine, total phenolic content, tannin content, total sugar & nonreducing sugar

**Introduction**

Pearl millet (*Pennisetum glaucum* L.) is also known as spiked millet, candle millet or dark millet in Europe, cattail, peccaria in USA, Bulrish millet or dukhn in Africa, Bajra, Combo or saje in India. Pearl Millet is originated in central Africa. Pearl millet crop is grown in tropical semi-arid region of the world primarily in Africa and Asia. The height of the pearl millet plant may range from 0.5-4.0 meter.

In India the major pearl millet growing states are Rajasthan, Maharashtra, Gujrat, UP and Haryana. These states together accounted for 92% of area and total pearl millet production of 9.20 million tonnes and productivity of 1161kg/ha (Anonymous, 2014) [2]. In Haryana, Pearl millet production was 8.31 lakh tonnes and productivity of 2057 kg/ha in an area of 4.04 lakh hectare, giving a yield of 1161kg/ha (Anonymous, 2014b) [3]. The starch content of pearl millet grain ranges from 62.8 to 70.5% reducing sugar from 0.1 to 0.26% pearl millet is also a good source of fat having about 4.36 to 7.11%. (Anonymous, 2015 Karamvir *et al.* 2015) It is free from major antinutrients but contain low amount of phenolics (Simwemba *et al.* 1984, kumar 2015). Total cultivated area in UP is around 0.84 million ha and production 0.95 metric tonnes. (Agriculture statistics Report 2014) People affected by gluten related disorders such as celiac, non celiac gluten sensitivity and Wheat allergy suffers, needed gluten free diet can replaced gluten containing cereal in their diet. 100g pearl millet seed provides 11% protein, 73% carbohydrate, Mg 14mg and some other important nutrient like selenium 2.7µg (USDA).

**Material and Methods**

Ten germplasm of pearl millet were collected from different districts of Uttar Pradesh namely Gonda Faizabad Balrampur Sultanpur Jaunpur Gazipur Bahraich and Lakhimpur were used as experimental material. Samples of Pearl millet were brought to Biochemistry laboratory of NDUAT & Kumarganj Faizabad (UP) after collection. They were analyzed for various biochemical parameters. The collected pearl millet seed were cleaned dried and dried seeds were then crushed in pestle mortar in to powder form. The biochemical properties of the pearl millet powder were analyzed and the results were summarized. Total carbohydrate content analyzed by yamme and wills (1954) [10] Total Protein content in grain was determined by Lowry's method (1951) [14] tryptophan content was estimated by the method given by Spies and Chamber (1949) [16], lysine content was estimated by Felker *et al.* (1950), Total Phenolic content in pearl millet was analyzed by the method as described by Swain and Hillis (1984) [11], tannin content in pearl millet was determined by the method given by Rangana (1986).

**Result and Discussion**

The results on biochemical composition of pearl millet seed powder are shown in table. total carbohydrate in various germplasm was ranged between 54.42-64.24g /100g highest carbohydrate content was noticed in NDBH-2 (64.24g/100g).

Significant correlation was obtained regarding total carbohydrate content in different pearl millet germplasm. Similar range of total carbohydrate content in pearl millet germplasm was also reported by (Vandana *et al.* 2014). protein content in various germplasm was obtained between 8.47-11.00% highest protein content was recorded in the germplasm pearl millet-3 (11.00%). Significant correlation was obtained regarding protein content in various pearl millet germplasm. Similar range of protein content was reported by (Abagale *et al.* 2013). Highest tryptophan content was recorded in the germplasm NDBH-5(1.23g/100g). The tryptophan content in various germplasm of pearl millet was also reported by (Amadou *et al.* 2013) [1]. Lysine content in various germplasm was obtained between 0.43-0.55g/100g. highest lysine content was noticed in NDBH-2(0.55g/100g). Similar Range of lysine content in the pearl millet germplasm

was also given by (S. Gurupavithra *et al.* 2013n). Anti-nutritional content like tannin and total phenolic in various germplasm were recorded 43.73-49.96mg/100g and 0.88-1.84%. Similar range of tannin and phenolic content was reported by (Chethan and Malleshi 2007) [5]. The highest and lowest total sugar content was recorded between 1.50-2.13%. The nutritional quality of some pearl millet germplasm were analysed and observed similar range of total sugar (Vanisha *et al.* 2011). Non-reducing sugar content in different germplasm of pearl millet was recorded in the range of the 1.30-1.95% highest non-reducing sugar content was noticed in NDBH-5(1.95%). All the germplasm of Pearl millet were found non-significant regarding non-reducing sugar content. The nutritional quality of some pearl millet germplasm were observed and similar range of non-reducing sugar was reported by (Roopa *et al.* 2012).

**Table 1:** Biochemical evaluation of pearl millet germplasm

S.N.	Germplasm	Carbohydrate (g/100g)	Total Sugar (%)	Non Reducing Sugar (%)	Tryptophan (g/100g)	Lysine (g/100g)	Tannin (mg/100g)	Phenolic (mg/100g)	Protein (%)
1	pearl millet-1	54.42	1.90	1.76	1.17	0.47	1.10	47.60	10.89
2	pearl millet-2	55.60	1.53	1.37	0.93	0.46	0.97	49.48	10.79
3	pearl millet-3	63.67	1.86	1.63	1.07	0.53	1.30	49.50	11.00
4	pearl millet-4	58.79	1.60	1.41	1.08	0.48	1.03	49.55	10.48
5	pearl millet-5	59.49	1.50	1.30	1.06	0.52	0.99	49.96	9.05
6	pearl millet-6	61.35	1.80	1.65	1.03	0.43	1.84	47.60	10.21
7	pearl millet-7	54.80	1.83	1.70	1.04	0.49	1.08	43.73	9.82
8	pearl millet-8	60.33	1.63	1.46	1.01	0.51	0.88	45.24	8.47
9	NDBH-2	64.24	1.66	1.45	1.19	0.55	1.46	45.97	10.78
10	NDBH-5	63.81	2.13	1.95	1.23	0.51	0.93	47.97	9.46

## Conclusion

Pearl millet plays an important role in diet of people residing in the hilly and tropical regions because it contains high amount of essential nutrient and has health benefits so it can be used in commercial products to avoid the different health related problems. On the basis of results obtained in the present investigation, germplasm NDBH-2 was found superior in carbohydrate (64.24g/100g), Total sugar NDBH-5 (2.13%), tryptophan (1.23g/100g), lysine NDBH-2(0.55g/100g) Total tannin pearl millet-6 (1.84%), phenolic content pearl millet-5(49.96%) and protein content pearl millet-3 (11.00%). So these germplasm were performed best over other germplasm studied under investigation and used in further research work.

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