Original Research Article

Protein and Total Free Amino Acid Content evaluation of improved and local varieties/germplasm of Spine gourd (*Momordica dioica*Roxb.)

ABSTRACT: -

Spine gourd (*Momordica dioica* Roxb., 2n = 2X= 28) is a nutritionally rich, dioecious and perennial cucurbit with a good assortment of adaptability The present investigation entitled "Protein and Total Free Amino acid evaluation of improved and local varieties/germplasm of Spine gourd (*Momordica dioica*Roxb.)" Varieties of spine gourd improved germplasm/varieties from farmers' field and were sown in Completely Randomized Design (CRD) with Three replications during 2020. Biochemical characteristics of spine gourd analysis revealed that maximum Protein content (3.09mg/100g) was found in variety Kheri-3,1. Total free amino acid content (6.90mg/100g) was found in variety NDMD-2. Minimum protein content was found in the variety Arka Bharat (2.94mg/100g) and Total Free Amino acid content was reported in the variety Ambika-K-13,6 (6.27mg/100g). On the basis of observation, variety Kheri-3,1 and NDMD-2 were found superior in both Protein and Total Free Amino acid parameters followed by germplasm Arka Bharat and Ambika-13,6 respectively.

Keyword: - Protein, Total Free Amino acid, saponin M. dioica (SMD), Dioecious

INTRODUCTION

Spine gourd (Momordica dioica Roxb., 2n = 2X= 28) can be a nutritionally rich, dioecious and perennial cucurbit with a good assortment of adaptability, distributed in Asia and Europe [1]. Vegetables are good source of vitamins, minerals and dietary fibre. Vegetables play a large role in human nutrition, especially vitamins C (Ascorbic acid), Thiamine (B1), Niacin (B3), and Pyridoxine (B6), Folacin B9 (also known as vitamin Bc), minerals and dietary fiber[2]. Vegetables included in the daily diet have been potently linked to a reduced risk of certain types of cancer, heart disorders, stroke and other chronic diseases [3].It is a highly nutritionally valuable edible vegetable. The edible part of the fruit contains moisture – 84.1%, protein – 3.1%, ether extract - 0.97%, carbohydrate – 7.7%, fibre 2.97% and ash 1.1%. It also contains iron 4.6 mg, calcium 33 mg, phosphorus 42 mg, vitamin A 2, thiamine 45.2 mg, riboflavin 176.1 µg. The fruit also contain ascorbic acid. This vegetable and its

fruits are used in treatment of diabetic as prescribe by Ayurvedic practitioners. It is used as an astringent, antipyretic, antiseptic, spermicide and anthelmintic. It has antioxidant, antibacterial, anti-inflammatory, antilipid peroxidative, hypoglycemic, and analgesic properties. The fruit plays a role in treating pitta, asthma, leprosy, bronchitis, fever, tumors, urinary secretion, excessive salivation and heart disease. fruit juice is a home remedy for inflammation. The fruit powder is used to induce sneezing, thereby clearing the nose. Fruit ethanol extracts have shown nephro protective activity [4].It is a perennial dioecious climber with a tuberous root. It is a perennial dioecious climber with a tuberous root [5]. The alkaloid Present in seed called momordicin and present in root called Momordica foetida [6]The study of acute toxicity of saponin M. dioica (SMD) at a single dose of 5000 mg/kg/b.w. by oral route, no mortality was recorded, and mice treated for 14 days showed no change in normal behaviour. Dose administration; 1000, 500, and 250 mg/kg/b.w. by oral 5 route in rats for 28 days and one animal showed doses of 500 and 250 mg/kg/b.w. of SMD was safe, with no mortality for sub-acute but during a repeated dose of 1000 mg/kg/b.w. The group produced treatment-related symptoms of poisoning. Sub-chronic toxicity studies at doses; 500, 250 and 100 mg/kg/b.w. SMD in rats for 90 days and animals showed normal; hematological and biochemical parameters and gross findings compared to the control group[7]

Pic 1.Spine gourd production area

In the bright of the aforesaid critical importance to human health the wide-speared national use this study “Protein and Total Free Amino acid evaluation of improved and local varieties/germplasm of Spine gourd (Momordica dioica Roxb.)” germplasm receipts remained planned with the following.

(1) Collection of spine gourd improved germplasm /varieties from farmer’s field.

(2) To study the **Protein and Total Free Amino Acid** evaluation of spine gourd varieties/germplasm.

MATERIALS AND METHODS

The present investigation entitled "Protein and Total Free Amino acid evaluation of improved and local varieties/germplasm of Spine gourd (Momordica dioica Roxb.)" was conducted during Kharif season of 2020. The techniques and material employed for the study are described here under briefly.

Experimental Material:

Ten varieties/germplasms Spine gourd (Momordica dioica Roxb.) namely Arka Bharat, Kiron Mala, NDMD-5, Kheri-3,1, Krishnapur, RFM-37, NDMD-2, Kheri-LMP, PHULE-MD-5,1 and Ambika.K-13,6 was used as experimental material.

Protein content in spine gourd:

Protein content in grain was determined by the **Lowery's method, (1951) [8].** This method is based upon the reaction of protein with Cu2+ ion in alkaline medium as observed in biuret method of protein estimation. In addition to this three is involvement of reduction of phosphomolybdate and phosphor tungstate by the tyrosine amino acid present in protein. Ona gram sample was taken and homogenized in the presence of 10 ml of distilled water and centrifuged at 4000rpm for 15 minutes. The residue was discarded. Thereafter, 1 ml supernatant was taken and mixed with 1 ml 10 per cent trichloric acid. It was kept for 30 minutes and residue obtained was dissolved in 5 ml 0.1 N NaOH. 0.5-1.0 ml sample extract was taken in test tube and volume was made up to 1 ml with distilled water. Then 5 ml alkaline copper reagent was added and it was mixed properly. After 10 minutes, 0.5 ml folin reagent was added and it was kept at room temperature to 30 minutes. Finally, color intensity was recorded at 660 nm om spectronic-20 against blank reagent.

Pic 2. Fruits of Spine gourd

Total free amino acid content in spine gourd:

Total free amino acid was estimated according to method of **Jayaraman (1981) [9]** 0.5 g of sample was extracted 80 per cent ethanol and centrifuged at 5000 rpm for 10 minutes. A suitable aliquot 0.5 ml was taken in test tube and volume was made up 4 ml with distilled water. Thereafter 1 ml ninhydrin solution (0.2 N acetate buffer at 5.5 pH) was added and kept in water bath for 15 minutes. Test tube was cooled after the expiry of time and 1 ml of 50 per cent ethanol was also added. Measurement of colour was done at 550 nm Spectonic 20. Total free amino acid calculated using a standard curve for graded concentration standard proline.

EXPERIMENTAL RESULT AND DISCUSSION

The laboratory experiment of the present investigation on "Nutritional evaluation of improved and local varieties/germplasm of Spine gourd (Momordica dioica Roxb.) for human health benefits" are presented in this chapter. The observation recorded in the spine gourd were analysed statistically. The result is published in the form of table, graphs, photographs and silent features and described as under following.

1. Protein content (g)

The table 1 highlights that protein content varied from 2.94 - 3.09(mg/100g) in various varieties of spine gourd. Maximum protein content was found (3.09 mg) in Kheri -3,1 variety followed by 3.06 mg in variety NDMD-5 and RFM-37 and lowest

protein content was found Arka Bharat in variety 2.94mg followed by (2.97mg) Kiron Mala and PHULE-MD.5,1 significant correlation was obtained recording in various spine gourd variety in present investigation showed in Figure No. 1.

Table 1. Variation in Protein content (g/100g) in spine gourd Variety/germplasm.

S. No.	Varieties/Germplasm	Protein content (g/100g)
1.	Arka Bharat	2.94
2.	Kiron mala	2.97
3.	NDMD-5,1	3.06
4.	Kheri-3,1	3.09
5.	Krishnapur	2.98
6.	RFM-37	3.06
7.	NDMD-2	3.04
8.	Kheri-LMP	3.06
9.	PHULE-MD-5,1	2.97
10.	Ambika-K-13,6	3.05
	'F' test	**Sig**
	SE m+_	**0.008**
	CD at 5%	**0.025**

Pic 3. Roots of Spine gourd

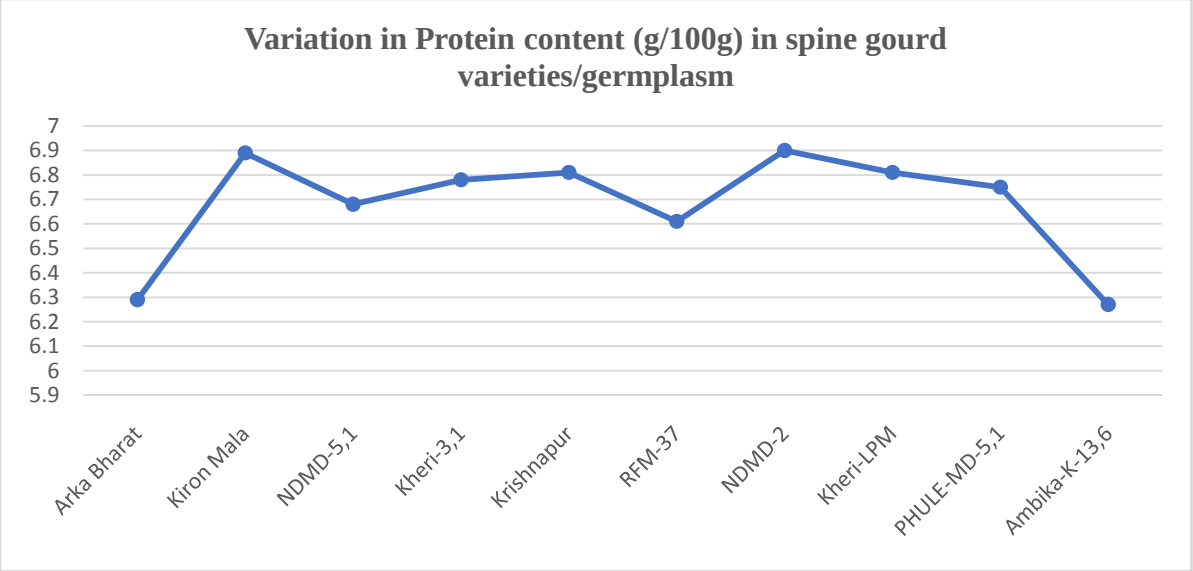

Fig no. 1. **Variation in Protein content (g/100g) in spine gourd varieties/germplasm**

2. Total free amino acid content (mg/100)

The data regarding total free amino acid content was shown in Table No.2 and graphically presented in Figure No. 2.The data showed that total free amino acid content varied from (6.27 – 6.90 mg/100g) in various varieties of spine gourd.

Table 2. **Variation in Total Free Amino acid content (g/100g) in spine gourd variety/germplasm**

S. No.	Verities/germplasm	Total Free Amino Acid content (mg/100g)
1.	Arka Bharat	6.29
2.	Kiron Mala	6.89
3.	NDMD-5,1	6.68
4.	Kheri-3,1	6.67
5.	Krishnapur	6.81
6.	RFM-37	6.61
7.	NDMD-2	6.90
8.	Kheri-LMP	6.81
9.	PHULE-MD-5,1	6.75
10.	Ambika-K-13,6	6.27
	'F' test	**Sig**
	SE m+_	**0.014**
	CD at 5%	**0.041**

Pic 4. Raw vegetable (Spine gourd)

Maximum total free amino acid content was found NDMD-2 (6.90 mg/100g) in variety followed by Kiron Mala (6.89 mg /100 mg) in variety. Minimum total free amino acid content was found in variety Ambika-13,6 (6.27 mg/100g) followed by

Arka Bharat (6.29 mg/100g) significant correlation was obtained recording total mineral in various spine gourd variety in present investigation.

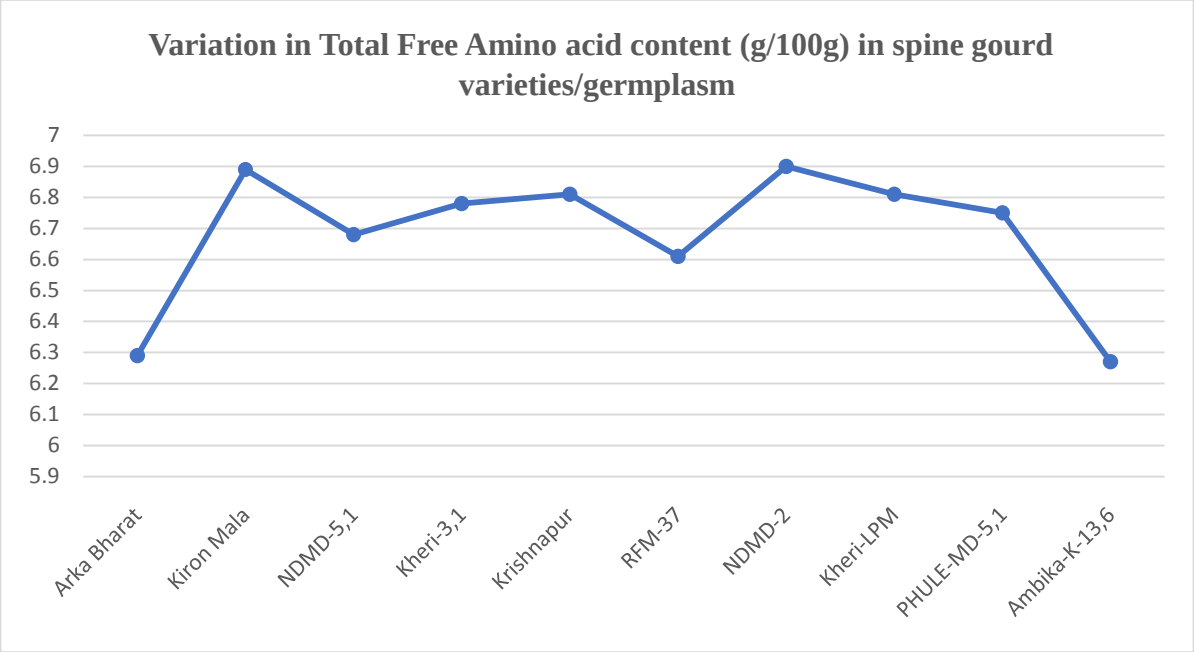

Fig. no.2. **Variation in Total Free Amino acid content (g/100g) in spine gourd variety/germplasm**

DISCUSSION

The findings of present have been shown in the preceding chapter and are being discussed, elucidated and interpreted in the light of accepted principal of Biochemistry and supported by literature cited.

1. **Protein content**

The data pertaining to protein content have been shown in Table 1 The table highlights that protein content varied from 2.94 - 3.09(mg/100g) in various varieties of spine gourd. Maximum protein content was found in (3.09 mg) Kheri -3,1 which was significantly superior over the rest of variety followed by 3.06 mg in variety NDMD-5 and RFM-37 varieties. Spine gourd germplasm and observed that an increase in the amount of protein due to rainfall in comparison to no rainfall. These results are in closed with **Yadav and Srivastava (2002), Sreerama*et al.*, (2010), Abu-Salem and Abu-arab (2011), Sreerama*et al.*, (2012) [10, 11, 12, 13].**

2. Total free amino acid content

Total amino acid content in all varieties and germplasm of spine gourd was found in the range of (6.27 – 6.90 mg/100g) mg. Maximum total free amino acid was noticed in variety NDMD-2 (6.90 mg/100g) followed by Kiron Mala (6.89 mg /100 mg. Total free amino acid content varied significantly in all the variety and germplasm

of spine gourd. The similar findings have been recorded by **Islam *et al*. (1991**)[14] in spine gourd.

SUMMARY

The present investigation entitled "Protein and Total Free Amino acid evaluation of improved and local varieties/germplasm of Spine gourd (Momordica dioica Roxb.). The physical and biochemical characters of spine gourd were recorded after the harvest of crop. The biochemicals evaluation of the spine gourd just after harvest. The fruit after the harvest were collected and brought to biochemical laboratories for analysis. The result obtained are summarized as below:

1. Protein content was recorded maximum in Kheri-3,1 (3.09mg/100g) variety and lowest was found in Arka Bharat (2.94mg/100g) variety.
2. Maximum Total free amino acid content was found in NDMD-2 (6.90mg/100g) variety and minimum Total free amino acid content was found in Ambika-K-13,6 (6.27 mg/100g) variety.

CONCLUSION

On the basis of physical and biochemical observation it can be concluded that the germplasm Arka Bharat are very useful because these are good source of protein content (3.09mg/100g) in Kheri-3,1 followed by variety Kheri-LMP, RFM-37 and NDMD-5 (3.06mg/100g), total free amino acid content found in variety NDMD-2 (6.90mg/100g).

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