

## Biochemical Composition of Eggplant (*Solanum melongena* L.) and its Nutritional Value

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**ABSTRACT:** The present investigation entitled “Biochemical composition of eggplant (*Solanum melongena* L.)” and its nutritional value was carried out in the Laboratory of Biochemistry, ANDUA&T, Kumarganj, Ayodhya (U.P.). The samples of different varieties/germplasms of eggplant (*Solanum melongena* L.) was procured from Vegetable Farm of this University which was analysed through Completely Randomized Design (CRD). From the study Biochemical parameters for fruit like protein in round 1.1-1.8% in long 1.0-1.6%, lysine in round 11.60-15.60 mg/100g and in long 12.90-15.80 mg/100g, Methionine in round 3.75-5.36mg/100g, in long 4.71-6.48 mg/100g, phenylalanine in round 24.90-29.31 mg/100g in long 24.58-29.49mg/100g, reducing sugar in round 2.25-2.90 mg/100g in long 2.30-2.89 mg/100g, non reducing sugar in round 1.48-2.10 mg/100g in long 1.66-1.76 mg/100g, total sugars in round 3.73-5.00 mg/100g in long 3.96-4.65 mg/100g, Anthocyanin in round 135.9-145.8mg/100g in long 135.1-143.2 mg/100g, Chlorophyll ‘a’ in round 0.86-1.03 mg/100g long 0.89-1.13 mg/100g, Chlorophyll ‘b’ in round 0.68-1.04 mg/100g in long 0.73-0.97mg/100g, and total chlorophyll in round 2.46-3.80 mg/100g in long varieties/germplasms 2.77-3.75 mg/100g. On the basis of overall observation, variety Punjab Sadabahar and 2019 BRL-6 was found superior in terms of nutritional and biochemical parameters. However, all other selected Eggplant varieties/germplasms contain basic nutrients within the range of cultivable Eggplant varieties/germplasms.

**Keywords:** Anthocyanin, Biochemical, Eggplant, Germplasm, Nutritional.

### INTRODUCTION

The eggplant (*Solanum melongena* L.), is one of the most commonly cultivated vegetables in both subtropical and tropical regions of the globe and it is an economically important vegetable that is widely cultivated (Mwinuka *et al.*, 2021). Eggplant is botanically known as (*Solanum melongena* L.) and is a member of the Solanaceae family and it is native to India. There are 24 chromosomes number. The part used is the fruit, which is edible and smooth excellent bright purple or black skin. Eggplant (*Solanum melongena* L.) is a popular subtropical and tropical vegetable. In India it is found mainly in Odisha, Bihar, Andhra Pradesh, Karnataka, West Bengal, Maharashtra and Uttar Pradesh are the most common locations in India. It is grown in 0.472 million hectares area and production 7.677 million tones with a productivity of 16.3 metric tonne per hectare fruits contain a adequate amount of nutrition, as well as other health-promoting bioactive compounds (Braga *et al.*, 2016) and contain extensively higher concentrations of phenolic acids, which are beneficial for human health and development

(Blando *et al.*, 2018). There are a number of antinutritional chemicals (such as saponins and steroidal glycol alkaloids (SGA)) that have been found in eggplant fruits, which have a bitter taste and may pose a health risk to the human body (Cardenas *et al.*, 2015). In terms of bioactive metabolites, eggplant displays an excellent record of accumulating bioactive metabolites in its fruits, such as phenolic acids, which display significant variations among different cultivars and wild relatives, thereby making it a very useful crop (Kaushik *et al.*, 2017). In its fruits, eggplant has a high concentration of bioactive metabolites such as phenolic acids. The biochemical composition of eggplant suggests that it might be an effective treatment for anemia, atherosclerosis, and fatty degeneration because of its biochemical composition. There is a growing popularity for eggplant due to its high content of carbohydrates, proteins, vitamins, as well as several other bioactive components, including phenolic acids, which are found in eggplants. In addition, eggplant is also proficient to contain traces of minerals such as copper, zinc, and iron. Its antioxidant properties may help to reduce the risk of various types of cancer,

protects against cardiovascular diseases, and prevents acute respiratory infections. Additionally, eggplant fibers aid digestion by eliminating toxins and toxic materials from the stomach as well as lowering the risk of colon cancer (Seraj *et al.*, 2017).

## MATERIAL AND METHOD

The experiment was conducted at MES of Vegetable Farm ANDUAT Kumarganj, Ayodhya (U.P) during the *Kharif* season 2021. The climate of Ayodhya comes under the category of sub tropical zone. Ten varieties/ Germplasm of eggplant (*Solanum melongena* L.) namely in round varieties 2019/ BRR VAR-2, 2019/ BRR VAR-3, 2019/ BRL VAR-5, Punjab Sadabahar, Pant Rituraj, and long varieties 2019/BRL VAR-6, 2019/BRL VAR-9, 2018/BRL VAR-6, 2018/BRL VAR-8, 2018/BRL VAR-9 were used as experimental material. Recommended practices are adopted for raised seedling. Twenty to thirty days old seedlings are transplanted in main plot at the spacing of 73cm × 60 cm. The plot prepared by ploughing. The biochemical analysis of the experiment material was carried out in the laboratory of biochemistry department to determine various biochemical parameters. The content of protein in eggplant fruit was analysed by Lowery *et al.* (1951) method. Lysine content was determined by the method of Felker *et al.* (1978). Calculated the methionine content in fruit weighing and transferring a 0.5g sample into a flask in the same flask, 20 ml of NHCl was added by Horn *et al.* (1946). The PAL activity assays by the method of Campos *et al.* (2004). The total sugar content was determined by the method of Dubios *et al.* (1956) using phenol reagent. Reducing sugar content was estimated method of Miller (1972). The non reducing sugar content was obtained by subtraction of reducing sugar from total sugar.

## RESULT AND DISCUSSION

**Protein in content in eggplant.** Data pertaining to the protein content in eggplant fruit regarding long and round varieties have been given in Table 1 Protein content of eggplant fruit was recorded between 1.1%-1.8% in round varieties and 1.0%-1.6% in long varieties. Maximum protein content of eggplant fruit in round varieties was obtained in 2019 BRL-5 (1.8%) followed by Pant Rituraj (1.6%). Maximum protein content in long varieties of eggplant fruit was found in 2018 BRL -9 (1.6%) followed by 2019 BRL-9 (1.5%) Lowest protein content in round and long varieties were recorded in 2019 BRR-2 (1.1%) and 2018 BRL -6 (1.00%).out of ten varieties five varieties were indicated statistically variations. Protein content may varied from 1.1-1.8% in round varieties and 1.0-1.6% in long varieties. The present inferences are well favorably supported by Edeke *et al.* (2021).

Lysine content in eggplant. Lysine content of eggplant fruit was noticed between 11.6-15.60 mg/ 100g in round varieties and 12.90-15.80 mg /100g in long varieties mentioned in table 1. Highest lysine content of eggplant fruit in round varieties was obtained in 2019 BRL variety-5 (15.60mg/100g) followed by Pant Rituraj (14.50 mg/100g). Maximum lysine content in Tiwari *et al.*,

long varieties of eggplant fruit was obtained in 2019BRL-9 (15.80 mg/100g) followed by 2018 BRL variety-6 (14.80mg/100g) and 2018 BRL -9 (14.20 mg/100g). Lowest lysine content was recorded in 2019 BRR-3 (11.60mg/100g) and 2019 BRL-6 (12.90mg/100g) respectively, out of ten varieties in round and long variety six varieties were found statistically significant moderate. Lysine was analyzed in eggplant fruit and data have been presented in Table 1. The lysine were observed maximum in 2018 BRL variety-8, 2019 BRL -5. Lysine content varied from 11.60-15.60 in round varieties and in long varieties varied from 12.90-15.80 present data are nearly corresponding with Okaka and Okaka (2005).

**Methionine content in eggplant.** Methionine content of eggplant fruit was noticed between (3.75-5.36 mg/100g) in round varieties and (4.78-6.48 mg/100g) in long varieties mentioned in Table 1. Maximum methionine content of eggplant fruit in round varieties was obtained in Punjab Sadabahar (5.36mg/100g) followed by 2019 BRR -3 (4.40mg /100g). Maximum methionine content in long varieties of eggplant fruit was obtained in 2019 BRL-9 (6.48 mg/100 g) followed by 2018 BRL-9 (6.24mg/100g) 2018 BRL variety-8 (5.89 mg /100g). Minimum content of this amino acid recorded in 2019 BRR (3.75 mg/100g) 2019 BRL -5 (3.89 mg/100g) in round varieties and in long varieties minimum content was found in 2018 BRL-6 (4.71 mg/100g). Out of ten varieties round and long varieties. Six varieties are significantly moderate.

The Methionine were observed maximum in variety Punjab Sadabahar followed by 2019 BRR-3 and Pant Rituraj in round varieties and maximum content observed in long varieties 2019 BRL-9 followed by 2018 BRL-9 in round and long varieties varied from (3.75- 5.36) and long variety range from (4.71-6.48). These results are corresponded with the observations made by Okaka and Okaka (2005); Mori *et al.* (2013).

**Reducing sugar content in eggplant.** Reducing sugar content of eggplant fruit was noticed between 2.25-2.90 mg/100g in round varieties and 2.30-2.89 in long varieties mentioned in Table 2. Maximum reducing sugar content of eggplant fruit in round varieties was obtained in Pant Rituraj (2.90 mg/100g) followed by 2019 BRL-5 (2.80 mg/100g) and 2019 BRR-3 2.63. Maximum reducing sugar content in long varieties of eggplant fruit was obtained in 2018 BRL -9 (2.89 mg/100g) followed by 2018 BRL-6 (2.88 mg/100g) and 2018 BRL-(2.75mg/100g). Minimum reducing sugar content was recorded in round varieties/germplasms 2019 BRR-2 (2.25mg/100g) and Punjab Sadabahar (2.55 mg/100g) and in long varieties 2019 BRL-9 (2.30mg/100g) and 2019 BRL-6 (2.46mg/100g). All the long and round varieties of eggplant fruits regarding sugar content were found statistically variations. The reducing sugar in eggplant fruit was varied from 2.25-2.90 mg/100g in round varieties/germplasms and in long varieties/germplasms 1.46-1.82 mg/100g. Present data are nearly equivalent with Srikant *et al.* (2014).

**Non reducing sugar content in eggplant.** Non-reducing sugar content of eggplant fruit was noticed between 1.48-2.10mg/100g in round varieties and 1.46-

1.82 mg /100g in long varieties mentioned in Table 2. Maximum non reducing sugar content of eggplant fruit in round varieties Pant Rituraj (2.10 mg/100g) followed by 2019 BRR-3 (1.85 mg/100g) and 2019 BRL-5 (1.66 mg/100g) in long varieties 2018 BRL-6 (1.82 g/100g) followed by 2018 BRL-9 (1.76 mg /100g) and 2018 BRL-8 (1.70 mg/100g). Minimum non reducing sugar was recorded in round and long varieties/germplasms in 2019 BRR-2 (1.48 mg/100g) and 2019 BRL-6 (1.46 mg/100g). Present data are nearly equivalent with Chaudhary and Kumar (2014).

**Total Sugar content in eggplant.** Total sugar content of eggplant fruit was noticed between 3.73-5.00

mg/100g in round varieties and 3.92-4.70 mg/100g in long varieties mentioned in Table 2. Maximum total sugar content of eggplant fruit in round varieties was obtained in Pant Rituraj (5.00mg/100g) followed by 2019 BRR-3 (4.48mg/100g). Maximum total sugar content in long varieties of eggplant was obtained in 2018 BRL-6 (4.65mg/100g) followed by 2018 BRL-6 (4.67mg/100g). Lowest total sugar content was recorded in 2019 BRR-2 (3.73 mg/100g) and 2019 BRL-6 (3.92 mg/100g). The total sugar content in eggplant fruit varied from 3.73-5.00 in round varieties and in long 3.92-4.70. The finding is well supported by Hanson *et al.* (2006).

**Table 1: Protein, Lysine and Methionine content in round and long varieties/ germplasm of eggplant fruits.**

Sr. No.	Varieties/ germplasms	Protein content (%)	Lysine(mg/100g)	Methionine (mg/100g)
<b>Long Varieties / germplasms</b>				
1.	2019 BRL-5	1.8	15.60	3.86
2.	Pant Rituraj	1.6	14.50	4.15
3.	2019 BRR -3	1.3	11.60	4.40
4.	Punjab Sadabahar	1.2	13.30	5.36
5.	2019 BRR -2	1.1	12.50	3.75
<b>Round Varieties/germplasms</b>				
6.	2018 BRL -9	1.6	14.20	6.24
7.	2019 BRL-9	1.5	13.90	6.48
8.	2019 BRL-6	1.4	12.90	5.45
9.	2018 BRL-8	1.1	15.80	5.89
10.	2018 BRL-6	1.0	14.80	4.71
	<b>SEM</b>	<b>0.10</b>	<b>0.43</b>	<b>0.21</b>
	<b>CD at 5%</b>	<b>0.29</b>	<b>1.27</b>	<b>0.64</b>

**Table 2: Reducing Sugar, Non reducing and total sugar content in round and long varieties/germplasms of eggplant fruits.**

Sr. No.	Varieties/ germplasms	Reducing sugar(mg/100g)	Non-reducing sugar (mg/100g)	Total sugar (mg/100)
<b>Round Varieties</b>				
1.	Pant Rituraj	2.90	2.10	5.00
2.	2019 BRL-5	2.80	1.66	4.46
3.	2019 BRR-3	2.63	1.85	4.48
4.	Punjab Sadabahar	2.55	1.58	4.13
5.	2019 BRR-2	2.25	1.48	3.73
<b>Long varieties</b>				
6.	2018 BRL-9	2.89	1.76	4.65
7.	2018 BRL-6	2.88	1.82	4.70
8.	2018 BRL -8	2.75	1.70	4.45
9.	2019 BRL-6	2.46	1.46	3.92
10.	2019 BRL-9	2.30	1.66	3.96
	<b>SEm±</b>	<b>0.05</b>	<b>0.03</b>	<b>0.08</b>
	<b>CD at 5%</b>	<b>0.14</b>	<b>0.09</b>	<b>0.23</b>

## CONCLUSIONS

Present attempt entitled, with aiming specified objectives especially nutritional biochemistry resulted significant and vital inferences among few eggplants of respective varieties/germplasms. Out of ten varieties/germplasms round variety i.e. Punjab Sadabahar and in long eggplant, 2019 BRL-6 germplasms were found most promising and best in terms of nutritional composition as such. In the light of qualitative, aspects have enriched components like

amino acid anthocyanin and chlorophyll aforesaid variety i.e. Punjab Sadabahar and Germplasm 2019 BRL-6 having significant presence of Methionine. Lastly, concluded that Punjab Sadabahar and Germplasm 2019 BRL-6 can be recommended for consumption purpose widely among, vast population by replacing other varieties along with increasing sizeable acreage by adoption in their vegetable farm sequence.

## FUTURE SCOPE

This study seeks to determine the potential of eggplant by-products as a source of bioactive compounds. By examining the bioactive compounds' functional characteristics, production methods, and prospective uses in vegetables and meals.

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