

Studies on physico-chemical characteristics of different variety/ genotypes of brinjal (*Solanum melongena* L.)

Abstract

The present study was conducted to evaluate 20 variety/ genotypes of brinjal for quality parameters. The sample was collected from vegetable trial field of this university as well as after grading of the sample and the quality analysis in the laboratory was conducted as per standard procedures in the laboratory of the department of agricultural biochemistry. A significant variation was detected in all traits studies. There was considerable variability among varieties. Data on the days to 50% flowering It is shown that the data on the Days to 50% flowering varied significantly from 31.78-40.42, plant height range from 64.05-82.65, no. of branches per plant range from 9.0-14.5, Ash range from 9.71-11.39, fat varied from 0.23- 0.37, Fibre range from 1.29-1.73.

Key word: Days to 50% flowering, Plant height, No. of branches per plant, Ash, Fat, Fibre.

Introduction:

Eggplant or brinjal (*Solanum melongena* L.; $2n = 2x = 24$) is important vegetable crop and is considered a rich member of the family Solanaceae, which contains approximately 1300 species it can be grown in diversified climatic conditions of various ecological regions. It possesses high species richness with considerable flexibility of phenotypic adaptability that made the species the most important vegetable economically. Eggplant is a general term for various *Solanum* species cultivated for their fruits, including the East Asian aubergine (*S. melongena* L.) and the two African native eggplants, Scarlet (*S. aethiopicum* L.) and Gboma (*S. macrocarpon* L.). Brinjal or eggplant (*Solanum melongena* L.) is one of the important solanaceous vegetable crop having diploid chromosome number $2n=2x=24$. One hundred gram edible portion of brinjal fruit contains 92.7% moisture, 24.0% calories, 4.0% carbohydrates, 1.4 g protein, 0.3 g fats, 1.3 g fibres, 124.0 (I.U.) vitamin A and 12.0 mg vitamin C (Chen and Li, 1996). It also contains 52.0 mg chlorine, 47.0 mg phosphorus, 44.0 mg sulphur and other minerals (Aykroyd, 1963). Plant height (cm), days to 50% flowering, primary branches per plant, fruit weight (g), fruit circumference (cm), fruits per plant, fruit length (cm), were estimated according to Searle (1961). Brinjal has high nutritive value when compared with tomato. It contains high amount of carbohydrates (6.4%), protein (1.3%), fat (0.3%), calcium (0.02%), phosphorus (0.02%), iron (0.0013%) and other mineral matters (Kandoliya *et al.*, 2015).

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Materials and methods:**Plant height (cm):**

The height of the five randomly selected individual plants from ground to tip were measured in centi-meter at final harvest stage, when the plant attained maximum growth and replication wise the average plant height of each genotype was calculated.

Days to 50% flowering:

The number of days taken from the date of transplanting to the opening of first flower on 50% of the plants of each genotype in each replication was recorded as date and calculated in days.

Number of fruits per plant:

Number of edible fruits from five tagged plants were counted at each picking and summed up for all the pickings and divided by five to get the number of fruits per plants.

Ash content:

Ash content was determined by the method as described by **Hart and Fisher, (1971)**.

Fat content:

Fat extractable lipid content in brinjal sample was determined by Soxhlet Extraction procedure using petroleum ether of boiling point 40-60 0C for six hours in a flash (**A.O.A.C., 1970**). Fat content was calculated using the following formula:

$$\begin{aligned} & \textit{Ether extract percentage in brinjal sample} \\ & = \frac{\textit{weight of extracy (g)}}{\textit{weight of sample}} \times 100 \end{aligned}$$

Fibre content:

The fibre content in brinjal was analysed by the method as described by **Hart and Fisher (1971)**.

Statistical Analysis:

All sample extract were prepared an analysis done using a Randomized Block Design (RBD) at 5% level of critical difference. Analysis of variance (ANOVA) for the design was carried out to determine the significance of differences among difference treatments.

Results and Discussion

The data pertaining to days to 50% flowering of genotype cultivars for brinjal genotypes are presented in the Table. It was observed that the days to 50% flowering. The genotype C-9013 showed the maximum days to 50% flowering (40.42) followed by genotypes KS-453 (39.31), KS-556 (38.86) and C-8805 (38.37). The minimum days to 50% flowering was noted in genotype KS-331 (31.78). The days to 50% flowering C-9013 were significantly superior than KS-331. The results are supported by **Madhavi et al., (2017)**. Data regarding on Plant height of various cultivars of some brinjal genotypes are presented in the Table 1 and presented in Figure 1 through histogram. It was observed that the Plant height. The genotype C-9012 showed the maximum plant height (82.65) followed by genotype KS-554 (79.95), KS-224 (78.10) and C-9015 (77.75). The minimum plant height was noted in genotype KS-453 (64.05). The plant height C-9011 were significantly superior than KS-453. These results are in close agreement with the reports **Tripathy et al., (2017)**. Data regarding on No. of branches per plant of various cultivars of some brinjal genotypes are presented in the Table 2. and presented in Figure 2 through histogram. It was observed that the no. of branches per plant. The genotype KS-556 showed the maximum no. of branches per plant (14.99) followed by genotype C-7864-1 (14.5), C-9006 (14.16) and C-9011 (13.83). The minimum No. of branches per plant was noted in genotype C-8502-1 (07.50). The No. of branches per plant KS-556 were significantly superior than C-8502-1. These results are in close agreement with the reports **Rahman et al., (2016)**.

Comment [A2]: Mention table no.

Table 1 : The data pertaining to days to 50% flowering of genotype cultivars for brinjal

| S.N. | Varieties | Days to 50% flowering | | Pooled mean | Plant height (cm) | | Pooled mean | No. of branches per plant | | Pooled mean |
|------|-----------|-----------------------|-------|-------------|-------------------|------|-------------|---------------------------|------|-------------|
| | | 2021 | 2022 | | 2021 | 2022 | | 2021 | 2022 | |
| 1 | KS-235 | 34.32 | 32.23 | 33.275 | 65.4 | 67.6 | 66.5 | 08 | 10 | 9 |
| 2 | KS-454 | 36.54 | 38.97 | 37.755 | 67.5 | 65.0 | 66.25 | 09 | 11 | 10 |
| 3 | KS-456 | 31.22 | 35.43 | 33.325 | 70.7 | 67.9 | 69.3 | 11 | 14 | 12.5 |
| 4 | KS-453 | 39.87 | 38.76 | 39.315 | 62.3 | 65.8 | 64.05 | 13 | 11 | 12 |
| 5 | KS-224 | 36.54 | 38.78 | 37.66 | 78.9 | 77.3 | 78.1 | 09 | 12 | 10.5 |
| 6 | KS-554 | 34.56 | 35.67 | 35.115 | 80.5 | 79.4 | 79.95 | 10 | 12 | 11 |
| 7 | KS-555 | 37.65 | 36.76 | 37.205 | 78.2 | 76.5 | 77.35 | 13 | 11 | 12 |
| 8 | KS-556 | 38.97 | 38.75 | 38.86 | 72.0 | 70.9 | 71.45 | 15 | 13 | 14 |
| 9 | KS-331 | 31.23 | 32.34 | 31.785 | 68.2 | 67.6 | 67.9 | 08 | 10 | 9 |
| 10 | C-9011 | 33.76 | 34.55 | 34.155 | 67.9 | 69.8 | 68.85 | 13 | 11 | 12 |
| 11 | C-9012 | 33.08 | 35.46 | 34.27 | 83.4 | 81.9 | 82.65 | 10 | 12 | 11 |
| 12 | C-9013 | 40.98 | 39.87 | 40.425 | 76.0 | 74.3 | 75.15 | 09 | 11 | 10 |
| 13 | C-9015 | 37.65 | 36.72 | 37.185 | 78.9 | 76.6 | 77.75 | 08 | 10 | 9 |

| | | | | | | | | | | |
|----|------------------|----------------|---------------|---------------|--------------|-------------|--------------|-------------|-------------|---------------|
| 14 | C-9006 | 33.21 | 34.27 | 33.74 | 73.8 | 71.2 | 72.5 | 13 | 12 | 12.5 |
| 15 | C-8502-1 | 36.75 | 34.56 | 35.655 | 67.5 | 65.7 | 66.6 | 15 | 14 | 14.5 |
| 16 | C-8841 | 38.89 | 36.78 | 37.835 | 75.9 | 74.2 | 75.05 | 09 | 10 | 9.5 |
| 17 | C-5623 | 35.65 | 37.62 | 36.635 | 69.8 | 70.9 | 70.35 | 10 | 11 | 10.5 |
| 18 | C-7864-1 | 32.16 | 33.45 | 32.805 | 75.6 | 73.5 | 74.55 | 15 | 14 | 14.5 |
| 19 | C-8805 | 39.09 | 37.65 | 38.37 | 72.3 | 70.9 | 71.6 | 11 | 13 | 12 |
| 20 | Azad Kranti | 37.65 | 38.97 | 38.31 | 77.7 | 76.5 | 77.1 | 10 | 12 | 11 |
| | Mean | 35.9885 | 36.379 | 36.184 | 73.12 | 72.1 | 72.65 | 10.9 | 11.7 | 11.325 |
| | S.E. m± | 4.68 | 4.56 | 4.72 | 9.21 | 9.3 | 9.23 | 1.25 | 1.44 | 1.39 |
| | C.D. (5%) | 13.41 | 13.07 | 13.52 | 26.4 | 26.6 | 26.45 | 3.58 | 4.13 | 3.99 |

Data on ash content of various cultivars of some genotypes of brinjal are presented in the table. It is shown that the data on the ash content varied from 9.71-11.39%. The genotype C-8805 showed the maximum ash content (11.395%) followed by genotype- Azad Kranti (11.33%), C-8841 (11.28%) and C-9012 (11.17%). The minimum ash content was noted in genotype KS-235 (9.715%). The genotype of C-8805 superior than genotype of KS-235. These results are supported by **Khan et al., (2015)**. Data on fat content of various cultivars of some genotypes of brinjal are presented in the Table. It is shown that the data on the fat content varied significantly from 0.23-0.37. The genotype of Azad Kranti showed the maximum fat content (0.37) followed by genotype- C-9006 (0.36), KS-555 (0.35) and C-9012 (0.345). The minimum fat content was noted in genotype of C-5623 (0.235). The genotype of Azad Kranti superior than the genotype of C-5623. The results are supported by **Jenny et al., (2018)**. Data on fibre content of various cultivars of some genotypes of brinjal are presented in the Table. It is shown that the data on the fibre content varied significantly from 1.29-1.73. The genotype of KS-456 showed the maximum fibre content (1.73) followed by genotype- C-9013 (1.63), C-8841 (1.58), and Azad Kranti (1.57). The minimum fibre content was noted in genotype of C-9012 (1.29). The genotype of KS-456 superior than the genotype of C-9012. Similar results were reported by **Rahman et al., (2016)**

Table 2 : Data on ash content of various cultivars of some genotypes of brinjal

| S.N | Varieties | Ash Content (%) | | Pooled mean | Fat (%) | | Pooled mean | Fiber (%) | | Pooled mean |
|-----|-----------|-----------------|-------|-------------|---------|------|-------------|-----------|------|-------------|
| | | 2021 | 2022 | | 2021 | 2022 | | 2021 | 2022 | |
| 1 | KS-235 | 09.56 | 09.87 | 9.715 | 0.26 | 0.35 | 0.305 | 1.5 | 1.3 | 1.4 |
| 2 | KS-454 | 10.32 | 10.43 | 10.375 | 0.32 | 0.28 | 0.30 | 1.4 | 1.4 | 1.4 |
| 3 | KS-456 | 10.87 | 10.76 | 10.815 | 0.38 | 0.32 | 0.35 | 1.8 | 1.6 | 1.7 |

| | | | | | | | | | | |
|----|------------------|---------------|---------------|-----------------|---------------|---------------|---------------|-------------|--------------|---------------|
| 4 | KS-453 | 11.23 | 11.09 | 11.161 | 0.27 | 0.31 | 0.29 | 1.6 | 1.4 | 1.5 |
| 5 | KS-224 | 10.87 | 10.65 | 10.76 | 0.29 | 0.35 | 0.32 | 1.3 | 1.3 | 1.3 |
| 6 | KS-554 | 09.98 | 10.21 | 10.095 | 0.34 | 0.31 | 0.325 | 1.7 | 1.2 | 1.45 |
| 7 | KS-555 | 11.37 | 10.95 | 11.16 | 0.31 | 0.37 | 0.331 | 1.2 | 1.6 | 1.4 |
| 8 | KS-556 | 10.76 | 09.83 | 10.295 | 0.28 | 0.29 | 0.285 | 1.8 | 1.3 | 1.55 |
| 9 | KS-331 | 10.54 | 10.93 | 10.735 | 0.29 | 0.26 | 0.275 | 1.3 | 1.4 | 1.35 |
| 10 | C-9011 | 09.90 | 09.87 | 9.885 | 0.25 | 0.29 | 0.27 | 1.4 | 1.5 | 1.45 |
| 11 | C-9012 | 11.21 | 11.13 | 11.17 | 0.36 | 0.31 | 0.335 | 1.2 | 1.3 | 1.25 |
| 12 | C-9013 | 10.65 | 09.85 | 10.25 | 0.31 | 0.25 | 0.28 | 1.6 | 1.6 | 1.6 |
| 13 | C-9015 | 10.87 | 10.21 | 10.54 | 0.29 | 0.31 | 0.30 | 1.3 | 1.4 | 1.35 |
| 14 | C-9006 | 10.29 | 10.76 | 10.525 | 0.35 | 0.31 | 0.33 | 1.7 | 1.3 | 1.5 |
| 15 | C-8502-1 | 09.87 | 09.56 | 9.716 | 0.26 | 0.32 | 0.29 | 1.4 | 1.6 | 1.5 |
| 16 | C-8841 | 11.65 | 10.91 | 11.28 | 0.21 | 0.34 | 0.27 | 1.8 | 1.3 | 1.55 |
| 17 | C-5623 | 10.90 | 09.85 | 10.375 | 0.27 | 0.24 | 0.25 | 1.2 | 1.4 | 1.3 |
| 18 | C-7864-1 | 09.88 | 09.94 | 9.91 | 0.32 | 0.27 | 0.29 | 1.5 | 1.5 | 1.5 |
| 19 | C-8805 | 11.56 | 11.23 | 11.395 | 0.34 | 0.28 | 0.31 | 1.7 | 1.4 | 1.55 |
| 20 | Azad Kranti | 11.68 | 10.98 | 11.33 | 0.37 | 0.31 | 0.34 | 1.4 | 1.7 | 1.55 |
| | Mean | 10.698 | 10.451 | 10.57425 | 0.3035 | 0.3035 | 0.3035 | 1.49 | 1.425 | 1.4575 |
| | S.E. m± | 1.35 | 1.35 | 1.36 | 0.04 | 0.04 | 0.07 | 0.2 | 0.18 | 0.37 |
| | C.D. (5%) | 3.86 | 3.87 | 3.88 | 0.11 | 0.12 | 0.21 | 0.57 | 0.52 | 1.11 |

Conclusion:

The genotype C-9013, KS-453, KS-556 and C-8805 showed the maximum Days to 50% flowering, (40.42), (39.31), (38.86) and (38.37) Days to 50% flowering respectively. The minimum Days to 50% flowering was noted in genotype KS-331 (31.78). The genotype C-9012, KS-544, KS-224 and C-9015 showed the maximum plant height (82.65), (79.95), (78.10) and (77.75) respectively. The minimum plant height was noted in genotype KS-453 (64.05). The genotype KS-556, C-7864-1, C9006 and C-9011 showed the maximum No. of branches per plant (14.99), (14.50), (14.16) and (13.83) respectively. The minimum No. of branches per plant was noted in genotype C-8502-1 (07.50). The ash content ranged from in brinjal genotype C-8805, Azad Kranti, C-8841 and C-9012, 11.95%, 11.33%, 11.28% and 11.17%. While minimum ash content was noted in genotype KS-235 (9.715%). The genotype of Azad Kranti showed the maximum fat content (0.37) by genotype- C-9006 (0.36), KS-555 (0.35) and C-9012 (0.345). The minimum fat content was noted in genotype of C-5623 (0.23). Highest fibre content in various genotype of

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brinjal KS-456, C-9013, C-8841, and Azad Kranti (1.73), (1.63), (1.58) and (1.57). The minimum fibre content was noted in genotype of C-9012(1.29).

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