Studies on some physical and chemical characters on diversity of some local Jamun (*Syzygium Cumini* Skeels) genotypes

ABSTRACT

The experiment was conducted by selecting 15 different jamun genotypes from Sriniketan and adjoining villages (viz. Andrews Pally, Rathindra Pally, Ballavpur, Bahadurpur Pashchim, Sonajhuri) and jamun fruits were brought to record their physical as well as bio-chemical character at laboratory of Department of Horticulture & post-harvest technology. Present study reveals a wide and significant variation in physical and bio-chemical characters of fruits has been observed among 15 different jamun genotypes. Among all genotypes G-14 was superior on the basis of fruit weight (3.16g), fruit diameter (17.46mm), and greater pulp content (2.34g) and average total sugar (16.26%) content. Owing to moderate fruit size (21.89mm in length and 15.64mm in diameter) G-4 genotype is also superior on the basis of higher TSS (25.90 □B), total sugar (13.65%) and reducing sugar (8.23%). So, the overall findings of the present study conclude that genotypes G-14 and G-4 are superior over the 15 local jamun genotypes.

Key words: Jamun, Genotypes, Fruit Physico- chemical Properties.

INTRODUCTION

Jamun/ Indian blackberry/ black plum (*Syzygium cumini* Skeels.), is an important evergreen tropical and minor fruit belongs to myrtaceae family and other common names of jamun are Java plum/ Kalajam/ Phalinda/ Rajamun/ Diabetiesfibre/ Rose apple/ Pitanga cherry. It is believed to be indigenous to India, Burma, Ceylon and Andaman Islands (Zeven and de wet., 1982). Jamun was introduced from India and Tropical Asia to Southern Africa for its edible and attractive fruits. Jamun is widely distributed in India, Malaysia, Australia and USA. Jamun is grown mostly tropical and sub-tropical countries in the world. India rank 2nd in production of jamun in the world after China. In India, jamun grown almost throughout the country, leading producer states are Maharashtra, Uttar Pradesh, Tamilnadu, Gujarat and others. Maharashtra is the leading producer of jamun in India. Jamun is very important fruit plant of both food and medicinal value. Jamun fruits have high demand for table and for the preparation of wide range of products like squash, R.T.S., syrup, jam, jellies, juice, vinegar etc (Patil *et al.*, 2012). Jamun plants have ornamental value, inflorescence is emerged from

leaf axils or branch lets and floral parts arise in the acropetal successions. Jamun flower are bisexual and mostly light yellow in color and flowering period is between first week of March to April and bear fruits from May to July. In jamun cross pollination is occured and mode of pollination is honeybees, house flies and wind. Flower and fruit drop is a serious problem in jamun (Singh *et al*., 2019). The medicinal value of seeds of jamun (alkaloids- jambosin and glycosides- jambolin or antimellin) which retard the conversion of starch into sugars and its seeds powder quickly reduce the quantity of sugar in urine, so it's very useful for diabetic patients. Ripe fruits of jamun are highly juicy, with a pleasant, slightly bitter, astringent taste and consumed as a fresh or in processed products. It is also used to make wine in Phillipines. Wood of jamun is resistance to water and termite attacks, is used to install motors in the wells and being fast growing tree, it provides excelled fire wood and charcoal to the rural population in India (Chaudhary and mukhopadhyay., 2012) and its wood is also used for the railway sleepers. In terms of medicinal value, jamun has astringent, stomachic, carminative, anti-scorbutic and diuretic properties (Singh, I.S. 2001). Thus, the present experiment entitled "Studies on some physical and chemical characters on diversity of some local Jamun (*Syzygium Cumini* Skeels) genotypes" has been undertaken to express the diversity of jamun fruits within the available genotype resources during the period of 2019 to 2021.

MATERIALS AND METHODS

The experiment was directed by selecting 15 different jamun genotypes from Sriniketan and adjoining villages (viz. Andrews Pally, Rathindra Pally, Ballavpur, Sonajuhri, Bahadurpur Pashchim) and for the physical and biochemical estimation brought the fruits at the laboratory of Department of Horticulture and Postharvest Technology, Palli Siksha Bhavana (Institute of Agriculture), Visva-Bharati, Sriniketan, West Bengal. For the present experiment two or more mature and healthy fruits from the each different jamun plants has been collected and the physical parameters of different fruits have been noted and the biochemical or quality characters of fruits have been studies. Observation on genotypes viz., fruit length (mm), fruit diameter (mm), fruit weight (g), fruit volume (ml), seed length (mm), seed diameter (mm), seed weight (g), pulp content (g), Total soluble sugars (°Brix), Acidity (%) Reducing sugar (%) and total sugar (%) content were recorded from randomly selected fruits from accession. The fruit length was measured with the help of digital vernier caliper

from the tip of the fruit to bottom of the fruit and the average fruit length was calculated by the dividing total fruit length and it expressed in mm (Millimeter). The diameter of the fruit taken from randomly chosen healthy fruits, it was measured by the help of digital vernier caliper and expressed in mm (Millimeter). The fruit volume was measured by water displacement system and average of fruit volume of 15 fruits was observed and expressed in ml (Milliliter). The weight was measured using electronic weighing balance and the calculation of the average fruit weight by dividing total fruit weight by 15 and expressed in gram (g). The seed length and seed diameter were measured by using digital vernier caliper and it expressed in mm (Milimeter). The weight of the seed was measured with the help of electronic weighing balance and results were expressed in gram (g). The pulp content was measured by the deducting average seed weight from the average fruit weight of corresponding fruits and expressed in gram (g). The total soluble solids (TSS) of pulp of the fruits were measured by the Erma Hand Refractometer (0-32□B) in terms of degree brix (□B) at room temperature. The refractometer was calibrated by the distilled water before the use of refractometer. Bio-chemical assessment of the fruits like the titratable acidity (TA), reducing sugar and total sugar (TS) was done by method suggested by Association of official Analytical chemists. The sources of plant material and the age of tree were different. Thus, the studies on variation of such plants did not come under the normal statistical design. Each plant was considered as separate treatment and they were compared for different traits with their mean value of each parameter. Comparison was done on the basis of mean value and average value of parameters studied.

RESULTS AND DISCUSSIONS

The analysis of data on physical characters of fruits and seeds of 15 different local jamun genotypes is presented in table no.1. The obtained results are presented and discussed as follows. The maximum fruit length has been observed in G-4 (21.89mm). Higher fruit length was also noted in G-13 (20.69mm), G-12 (19.19mm), G-6 (18.46mm). Significantly minimum fruit length was observed in G-2 (4.99mm) followed by the G-8 (5.02mm) and average fruit length noted was 15.17mm. These present findings are very close to that reported by Swamy *et al*. 2017. The maximum fruit weight has been observed in G-12 & G-14 (3.16g) genotypes. Higher fruit weight was also noted in G-13 (2.38g), G-4 (2.61g), G-5 (2.58g) and G-7 (2.46g). However, minimum fruit weight was observed in G-8 (0.44g)

genotype followed by G-2(0.48g), G-3(1.06g). Average fruit weight of jamun genotype noted was 1.89g. The maximum fruit diameter was recorded in G-14 (17.46mm) followed by G-12 (17.33mm), G-1 (16.27mm), G-13 (15.47mm) & so on. While minimum fruit diameter has been observed in G-2(3.04mm) which was closely followed by G-8 (3.83mm). The average fruit diameter was noted as 12.31mm. Significantly maximum fruit volume has been observed in G-13 (3.28ml) followed by the G-4 (3.20ml), G-12 (3.15ml), G-14 (2.90ml). But minimum fruit volume was noted in G-2 (0.35ml) and also in G-8 (0.41ml) and the average fruit volume was noted 2.05ml. The maximum seed length was observed in G-4 (16.24mm) followed by the G-7 (15.64mm), G-6 (14.50mm), G-5 (14.11mm), G-13 (13.51mm). While minimum seed length was observed in G-2 (1.99mm) and closely followed by G-8 (2.42mm) & in G-10 (4.20mm). In the present experiment average seed length 9.70mm was observed. The maximum seed diameter has been found in G-7 (10.46mm) and significantly at par with in G-6 (10.31mm), G-13 (9.34mm), G-4 (9.19mm), G-5 (8.62mm). Significantly minimum seed diameter was observed in G-2 (1.83mm) followed by the G-8 (1.94mm), 3.10mm in G-10 & in G-3(3.14mm) and the average seed diameter was noted 6.88mm. The maximum seed weight has been recorded in G-7 (1.12g) which was closely followed by the G-6 (1.03g). While minimum seed weight was observed in G-8 (0.016g) out of 15 genotypes and also 0.02g in G-2, 0.41g in G-15 present. The average seed weight 0.63g was recorded in the present study. The present findings are in consonance with that proposed by Patel *et al*., 2005.

Table no. 1: Physical characters of fruits and seeds

Genotypes	Fruit length(mm)	Fruit diameter(mm)	Fruit weight(g)	Fruit volume(ml)	Seed length(mm)	Seed diameter(mm)	Seed weight(g)
G-1	17.65	16.27	2.24	2.60	9.28	7.88	0.74
G-2	4.99	3.04	0.48	0.35	1.99	1.83	0.026
G-3	12.42	12.29	1.06	1.22	4.69	3.14	0.60
G-4	21.89	15.34	2.61	3.20	16.24	9.19	0.84
G-5	18.45	12.96	2.58	2.60	14.11	8.62	0.80
G-6	18.46	14.38	2.16	2.71	14.50	10.31	1.03
G-7	15.64	10.46	2.46	2.22	15.64	10.46	1.12
G-8	5.02	3.83	0.44	0.41	2.42	1.94	0.016
G-9	14.51	13.50	1.16	1.30	9.11	7.24	0.49
G-10	10.77	8.66	1.46	1.08	4.20	3.10	0.52
G-11	13.39	12.76	1.42	1.05	10.73	8.03	0.48
G-12	19.19	17.33	3.16	3.15	11.68	8.24	0.86
G-13	20.69	15.47	2.80	3.28	13.51	9.34	0.78
G-14	18.43	17.46	3.16	2.90	9.07	7.15	0.82
G-15	16.11	11.03	1.28	2.81	8.34	6.83	0.41
Mean	15.17	12.31	1.89	2.05	9.70	6.88	0.63

Pulp and bio- chemical characters of fruits of 15 different local jamun genotypes are presented in Table no.2. Highest pulp content was noted in G-14 (2.34g) which was closely followed by the G-12 (2.30g). Significantly lowest pulp content was found in G-8 (0.42g). Out of 15 genotypes in 7 genotypes pulp content was found below 1.00g and others above 1.00g. The average pulp content of 1.25g was recorded for 15 genotypes. The present results were partially supplemented by Swamy *et al*. 2017. The observance of the data revealed that G-4 possessed significantly maximum TSS (25.90□B) followed by the G-13 (25.40□B), G-6 (24.20□B), G-5 (23.30□B). Minimum TSS was noted in G-11 (12.60□B) out of 15 genotypes and average TSS was noted 18.08□B. The findings were almost similar with that of Verma *et al*. 2019. Significantly maximum acidity has been observed (1.42%) in G-10 and also in the G-14 (1.17%). Minimum acidity was observed in G-5 and G-7 (0.55%). Out of 15 genotypes only in two genotypes recorded acidity above 1.00% and in others 13 genotypes below 1.00%. The average acidity of pulp of the jamun fruits was recorded 0.82%. Srivastava *et al*., (2010) were found variation in acidity which is very close to the present findings.

Table no.2: Pulp and bio- chemical characters of fruits

Genotypes	Pulp content(g)	TSS(□B)	Acidity (%)	Total sugar (%)	Reducing sugar (%)
G-1	1.50	13.4	0.72	12.50	11.56
G-2	0.45	19.2	0.91	16.26	11.11
G-3	0.46	13.6	0.68	13.69	9.85
G-4	1.77	25.9	0.85	13.65	8.23
G-5	1.70	23.3	0.55	16.86	9.85
G-6	1.13	24.2	0.72	15.87	9.38
G-7	1.34	21.3	0.55	14.66	9.70
G-8	0.42	16.3	0.70	15.38	10.36
G-9	0.67	15.0	0.74	18.86	10.01
G-10	0.94	17.2	1.42	15.50	12.82
G-11	0.94	12.6	0.91	16.83	11.12
G-12	2.30	13.8	0.70	13.66	9.52
G-13	2.02	25.4	0.78	14.70	9.85
G-14	2.34	14.4	1.17	16.26	10.36
G-15	0.87	15.6	0.96	13.98	10.52
Mean	1.25	18.08	0.82	15.24	10.28

Highest reducing sugar has been recorded in G-10 (12.82%) and also observed in G-1 (11.56%), G-11 (11.12%) & G-2 (11.11%). While minimum reducing sugar was found in G-4 (8.23%). The average reducing sugar of 15 genotypes was noted 10.28%. Kaur and Bal (2015) reported that variation in reducing sugar which are partially similar to the present findings. Out of 15 genotypes maximum total sugar has been found in G-9 (18.86%) and also followed by the genotypes G-5 (16.86%), G-11 (16.83) & G-2, G-4 (16.26%). Significantly minimum total sugar was noted in G-1 (12.50%) genotype. The average total sugar 15.24% was observed in present study. The present experiment was closer to the Alam *et al.*, 2020.

CONCLUSION

In the present experiment a wide and significant variation in fruit physical character as well as quality characters was observed among 15 different jamun genotypes. From the findings of the present study, it can be concluded that genotype G-14 was superior on the basis of higher fruit weight, fruit diameter and greater pulp content and average total sugar content. Owing to moderate fruit size G-4 genotype is also superior on the basis of higher total soluble solids, total sugar and reducing sugar.

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