

STUDIES ON VARIABILITY IN PHYSICO-CHEMICAL CHARACTERISTICS OF JAMUN (*SYZYGIUM CUMINII* SKEELS) GENOTYPES FROM EASTERN MAHARASHTRA

EKTA P. NINGOT , MEGHA H. DAHALE, S. G. BHARAD, P. K. NAGRE

Abstract: A survey was carried out in the fruiting season at different locations of vidarbha region of eastern Maharashtra to find out the existing natural variability among the jamun seedling trees and to identify superior genotypes with good fruit qualities. Ripe fruits from selected fruit trees were analyzed for different physico-chemical properties. The study revealed that there was a high degree of variability among the genotypes with a range for fruit weight (1.93 to 15.93 g), pulp content (53.33 to 86.67 %), seed content (13.33 to 46.67 %) and pulp to seed ratio (1.05 to 8.67). There was a wide variation in chemical characters also. Total soluble sugars ranged from 8.47 to 20.03° Brix, titrable acidity from 0.46 to 1.76 %, total sugars from 6.8 to 18.60 % and sugar: acid ratio from 7.12 to 48.14. Based on the physico-chemical evaluation of jamun fruits collected from different locations it is concluded that, there existed tremendous variability amongst the genotypes. Certain genotypes were found to be promising for either one or more characteristics. The present study will be helpful for screening and further selection of superior genotype of jamun for commercial plantation in eastern Maharashtra.

Keywords: genotypes, jamun, physico-chemical, variability

Introduction: Jamun (*Syzygium cumini* Skeels) is an under exploited indigenous fruit tree of India. It is a hardy crop and can tolerate drought as well as heavy rainfall conditions. It is widely grown in larger parts of India from Indo-gangetic plains in the north to Tamil Nadu in the south [8]. It produces purple, delicious fruits with prominent seeds. Because of its medicinal value and suitability for planting as wind break, its demand is increasing day by day and that will require selected plants of superior quality and high yield potential [5]. It is found scattered throughout Maharashtra particularly vidarbha region. However, no elite line has been recognized yet for vidarbha region and very meager information is available on improvement of jamun fruit. As majority of existing trees of jamun are of seedling origin, they show tremendous variation in their morphological and physico-chemical attributes [3]. This existing variability in nature can be exploited for crop improvement in jamun through selection method. Hence, the present study was undertaken to identify superior genotype of jamun amongst the variability found in the nature.

Material and methods: Jamun trees for the study were selected based on the survey conducted during the fruiting season in eastern Maharashtra. Fruits of different genotypes of jamun trees grown widely in eastern vidarbha zone of Maharashtra were included in the study. Ripen fruits of jamun trees which were free from blemishes or any physical injuries were carefully collected for physical and chemical analysis. The experimental material comprises of 32 selected jamun trees. The data was analyzed according to the procedure of analysis of variance for Completely Randomized Design with three replications in each treatment. Observations on physical parameters viz.,

fruit weight, pulp weight, seed weight and pulp seed ratio and chemical parameters viz., total soluble solids, titrable acidity, total sugars and sugar acid ratios were recorded and analyzed as per the statistical methods [4].

Results and discussion: The data pertaining to physical and chemical characteristics of jamun fruits showed significant differences and a high degree of variability (plate 1) for all the characteristics studied (Table 1 and 2).

Physical characters: Maximum fruit weight (15.93 g), fruit length (3.77 cm) and pulp weight (12.07 g) was observed in the genotype GDJ-04 which was at par with the genotype GDJ-09 and AKLJ-33 and minimum in the genotype GDJ-18 (table 1). Maximum percentage of pulp (86.67) was observed in GDJ-20 and minimum (53.33%) in GDJ-12. Minimum seed weight (0.47 g) was recorded in the fruits of GDJ-18 which was a small fruited type. Maximum pulp to seed ratio (8.67) was observed in AKLJ-32 and AKLJ-35 while minimum in GDJ-12. Large variability among the jamun genotypes was also reported [1], [3], and [6].

Chemical characters: It is revealed from the table 2, that maximum TSS content (20.03 ° Brix) was observed in the genotype GDJ-07 followed by the genotype GDJ-15 and minimum (8.47 ° Brix) in AKLJ-37. As regards acidity, maximum acidity (1.76%) was observed in AKLJ-34 and minimum in GDJ-01. Maximum TSS: acid ratio (48.14) was recorded in the fruits of genotype AKLJ-23 and minimum in AKLJ-37. Significantly maximum percentage of total sugar and reducing sugar was observed in GDJ-07 and minimum in AKLJ-37. Similarly significantly maximum Ascorbic acid of 52.74 mg/100g was recorded in GDJ-03 and minimum in AKLJ-34. This is

in accordance with the findings of several workers [2] and [7].

Conclusion: From the physico-chemical evaluation of jamun fruits collected from different locations it is concluded that there existed tremendous variability amongst the genotypes for either one or more characteristics. The present study will be helpful for screening and selection of superior genotype on the basis of physico-chemical characteristics of jamun for commercial plantation in eastern Maharashtra.



Plate 1: Variability in fruits of jamun

References:

1. A.H. Ghojaje, G.S.K. Swamy, V.C. Kanamodi, R.C.Jagdeesh, P. Kumar, C.P.Patil and B.S.Reddy. Studies on variability among best selected genotypes of jamun (*Syzygium cumini* Skeels). ISHS Acta Hort.890:II International Symposium on Pomegranate and Minor- including Mediterranean Fruits: ISPMMF.2009.
2. Jai Prakash, A.N.Maurya, and S.P.Singh. Studies on variability in fruit characters of jamun. Indian J. Hort., 63. 2010. pp. 63-69.
3. B. G. Keskar, A.R. Karale, B.C. Dhawale, and K.G. Chaudhary. Improvement of Jamun by selection. Maharashtra J. Hort., 4:1989. pp.117-20.
4. S. Singh and A.K. Shrivastava. Genetic diversity in jamun (*Syzygium cumini* Skeels). Indian J.Hort., 45(3) pp.11.
5. V.G.Panse, and P.V. Sukhatme, Statistical Methods for Agricultural Workers, ICAR, New Delhi. 1967. pp. 155.
6. P. S. M. Prince, V.P. Menon, and L. Pari. Hypoglycaemic activity of *Syzygium cumini* seeds: effect on lipid peroxidation in alloxan diabetic rats. J. Ethanopharmacol.1998. pp.61:71.
7. Priya S. Devi, M.Thangam, A.R. Desai, P.G. Adsule. Studies on variability in physico-chemical characters of different jamun (*Syzygium cumini* Skeels) accessions from Goa.Indian J. Hort., 59(2) 2002. pp.153-156.
8. S. Singh, and A.K.Singh. Studies on variability in jamun (*Syzygium cumini* Skeels) from Gujrat. Asian J.Hort.7(1) 2012. pp.186-189.
9. Sanjay Singh and A.K. Shrivastava, Genetic diversity in jamun (*Syzygium cumini* Skeels). Indian J.Hort.,45(3) 2002. pp. 11.

Dr. Ekta P. Ningot, Assistant Professor, College of Horticulture, Dr.PDKV., Akola, Maharashtra, India.
 Dr. Megha H. Dahale , Dr. S. G. Bharad , Associate Professor, College of Horticulture, Dr.PDKV., Akola
 Dr. P. K. Nagre , Professor and Head, Department of Horticulture, Dr.PDKV., Akola.

Table 1: Variability in physical characteristics of different jamun genotypes

Sr. No	Genotype	Fruit weight (g)	Pulp weight (g)	Pulp %	Seed weight (g)	Pulp to seed ratio
1	GDJ-01	11.92	8.99	75.67 (60.69)	2.93	3.47
2	GDJ-03	11.43	9.33	81.33 (64.41)	2.10	4.45
3	GDJ-04	15.93	12.07	76.00 (61.33)	3.87	3.19
4	GDJ-05	2.57	1.67	66.33 (54.53)	0.9	1.86
5	GDJ-07	2.87	2.1	77.33 (61.65)	0.70	3.89
6	GDJ-08	8.5	6.03	73.00 (58.84)	2.47	2.45
7	GDJ-09	14.17	10.93	78.33 (62.27)	3.23	3.41
8	GDJ-10	12.07	9.2	76.33 (60.90)	2.86	3.21
9	GDJ-12	6.77	3.47	53.33 (46.91)	3.30	1.05
10	GDJ-14	8.93	6.37	75.00 (60.00)	2.57	2.55
11	GDJ-15	8.67	6.2	69.33 (56.50)	2.57	2.53
12	GDJ-16	11.33	9.07	79.67 (63.30)	2.27	4.08
13	GDJ-17	11.67	7.93	70.33 (57.01)	3.73	2.12
14	GDJ-18	1.93	1.47	67.33 (55.24)	0.47	3.55

15	GDJ-19	8.73	6.03	71.67 (57.92)	2.70	2.38
16	GDJ-20	9.00	7.17	86.67 (68.72)	1.83	4.77
17	AKLJ-23	8.67	6.33	74.33 (59.61)	2.33	2.78
18	AKLJ-24	9.67	7.67	79.67 (63.54)	2.00	4.67
19	AKLJ-25	8.33	4.67	55.33 (48.10)	3.67	1.30
20	AKLJ-26	12.00	8.00	67.33 (55.19)	4.00	2.09
21	AKLJ-27	9.67	6.00	62.00 (52.00)	3.67	1.69
22	AKLJ-28	9.67	7.33	75.33 (60.26)	2.33	3.11
23	AKLJ-29	10.33	8.33	77.67 (61.87)	2.00	5.39
24	AKLJ-30	12.00	6.33	73.00 (58.75)	2.33	2.78
25	AKLJ-31	12.33	9.67	78.33 (62.33)	2.67	3.78
26	AKLJ-32	11.67	10.33	85.67 (68.04)	1.33	8.67
27	AKLJ-33	14.00	12.00	85.67 (68.11)	2.00	7.39
28	AKLJ-34	11.00	9.33	75.00 (60.24)	1.67	6.33
29	AKLJ-35	12.00	10.67	82.33 (65.67)	1.33	8.67
30	AKLJ-36	10.33	9.00	80.33 (63.70)	1.33	7.33
31	AKLJ-37	8.07	5.30	65.67 (54.14)	2.77	1.92
32	AMTJ-40	2.40	1.20	64.67 (53.65)	1.20	1.55
'F' test		Sig	Sig	Sig	Sig	Sig
SE(m)±		0.78	0.70	2.44	0.39	1.02
CD at 5%		2.20	1.98	6.86	1.09	2.87

Table 2: Variability in chemical characteristics of different jamun genotypes

Sr. No.	Genotype	TSS (°Brix)	Acidity %	TSS: Acid ratio	Total sugar %
1	GDJ-01	14.94	0.46	32.62	12.18
2	GDJ-03	15.17	0.79	19.43	13.55
3	GDJ-04	11.67	0.77	15.34	10.80
4	GDJ-05	17.77	0.75	24.90	14.57
5	GDJ-07	20.03	0.75	27.25	18.60
6	GDJ-08	15.37	1.10	14.14	13.58
7	GDJ-09	16.70	0.68	25.99	14.19
8	GDJ-10	14.87	0.74	20.63	13.90
9	GDJ-12	15.27	1.14	14.39	13.40
10	GDJ-14	12.10	1.03	12.76	10.80
11	GDJ-15	18.16	0.83	22.29	15.87
12	GDJ-16	16.44	0.66	25.14	13.80
13	GDJ-17	11.10	0.79	17.53	9.60
14	GDJ-18	18.06	0.64	30.27	15.38
15	GDJ-19	14.80	0.76	20.43	12.12
16	GDJ-20	15.50	0.73	21.64	13.65
17	AKLJ-23	13.14	0.64	48.14	10.62
18	AKLJ-24	15.94	1.30	14.35	13.24
19	AKLJ-25	16.24	1.05	15.64	13.87
20	AKLJ-26	12.37	0.75	18.08	11.31
21	AKLJ-27	13.74	1.10	12.57	12.18
22	AKLJ-28	11.47	1.00	11.80	9.80
23	AKLJ-29	15.64	1.21	14.01	10.62
24	AKLJ-30	16.57	0.96	17.78	13.43
25	AKLJ-31	13.60	1.65	14.21	10.20
26	AKLJ-32	15.17	1.22	17.77	13.50
27	AKLJ-33	13.37	1.08	14.21	11.00
28	AKLJ-34	13.80	1.76	11.49	11.18
29	AKLJ-35	12.54	1.15	12.53	10.87
30	AKLJ-36	11.57	0.87	13.74	10.62
31	AKLJ-37	8.47	1.40	7.12	6.87
32	AMTJ-40	14.60	0.97	15.33	13.25
'F' test		Sig	Sig	Sig	Sig
SE(m)±		0.53	0.25	6.13	0.29
CD at 5%		1.25	0.69	17.26	0.83