Original Research Article

Variability Studies on Physico-Chemical Characteristics of Jackfruit Genotypes from Eastern Maharashtra, India

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A B S T R A C T

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Studies on variability in physico-chemical characteristics of 13 jackfruit genotypes was carried out in the fruiting season at different locations of vidarbha region of eastern Maharashtra to find out the variability in jackfruits existing in nature. Ripe fruits from selected trees were collected and analyzed for different physico-chemical properties. The experiment was conducted in randomized block design. The average fruit weight ranged from 1.18 kg to 5.10 kg, bulb weight per fruit ranged from 0.14 kg to 0.82 kg, flake weight per fruit ranged from 0.11kg to 0.38 kg, number of bulbs per fruit from 17 to 159.33, bulb weight from 2.33 g to 30.3 g and seed weight from 0.3 g to 10.71 g. Colour of flakes were in between pale yellow to orange yellow. As regards the chemical parameters studied, TSS ranged from 14.07 to 27.53^0 B, acidity from 0.09 to 1.05%, total sugar from18.95 to32.53%, and reducing sugars from 14.44 to 24.98%. The study revealed that there existed high degree of variability amongst the jackfruit genotypes evaluated.

Introduction

Jackfruit is an enormous fruit which is large and bushy, found growing mainly in tropical areas. It is a gigantic spined oval fruit that has been first cultivated in Indian rainforests. It is mostly found in many parts of India. The jackfruit is a multipurpose species providing wood, timber, fuel and fodder with medicinal and industrial products. The primary economic part of jackfruit is the fruit which is used both when mature and immature. Jackfruit seeds can be roasted or boiled like chestnuts. The fruit pulp is sweet and tasty and used as dessert or preserved in syrup. Value added product includes chips, papads, pickles, ice-cream, jelly, sweets, nectar, wine, preserved flakes etc. The fruit is deliciously sweet and is rich in energy, dietary fibers, minerals and

vitamins. Jackfruit show a considerable range of variation in morpho-agronomic characters which may be because the trees are cross-pollinated and are mostly propagated by seeds. A considerable variation between trees has been observed for the traits such as growth habit, canopy structure, fruit shape, size, colour, fruit bearing, sensory quality etc. (Azad, 2000 and Haq, 2011).

In Maharashtra, jackfruit is successfully grown in the konkan area. It is very popular in the eastern vidarbha zone but with scattered plantation. Commercial cultivation of jackfruit in this region is still at a primitive stage, primarily because of the difficulty in procuring elite planting

materials. So far, there is no well-defined variety of jackfruit suitable for this region. Exploitation of existing variability for crop improvement in jackfruit is necessary. Study of physical and chemical characters of jackfruits is very useful in selection procedure for high yielding clones. Hence, the present study was undertaken to identify superior genotype of jackfruit amongst the variability found in the nature.

Materials and Methods

Jackfruit trees for the study were selected based on the survey conducted during the fruiting season in eastern Maharashtra. Fruits of different genotypes of jackfruit trees grown widely in eastern zone of Maharashtra were included in the study.

Fully mature and ripened fruits of jackfruit were carefully collected for physical and chemical analysis. The experimental material comprised of fruits of 13 selected jackfruit trees as treatment. The data was analyzed according to the procedure of analysis of variance for Randomized Block Design with three replications.

Observations on physical parameters viz., fruit weight (kg), bulb weight per fruit (kg), flake weight per fruit (kg), number of bulbs per fruit, bulb weight (g), seed weight (g) and flake colour and chemical parameters viz., total soluble solids, titrable acidity, total sugars and reducing sugar were recorded and analyzed as per the statistical methods (Panse and Sukhatme, 1985).

Results and Discussion

The data pertaining to physical and chemical characteristics of jackfruit showed significant differences and a high degree of variability for all the characteristics studied (Table 1 and 2).

Physical characters

Fruit weight

The data indicated significant differences amongst the genotypes for fruit weight (Table 1).

Maximum fruit weight (5.10 kg) was recorded in the genotype GDJF-13 and minimum in GDJF-9.

Bulb weight per fruit

Significantly maximum bulb weight per fruit (1.68 kg) was observed in GDJF-13 while minimum in GDJF-7.

Flake weight per fruit

It is revealed from Table1 that significantly maximum flake weight per fruit (0.87 kg) was observed in GDJF-13 which was followed by AKJF-3 and GDJF-12 while minimum in GDJF-8.

Number of bulbs per fruit

Significantly maximum number of bulbs per fruit (159.33) was observed in GDJF-13 which was followed by GDJF-9.

However lowest number of bulbs per fruit was recorded in GDJF-12.

Bulb weight

Highest bulb weight was recorded in the fruits of GDJF-12 followed by GDJF-13 while lowest in AKJF-2.

Seed weight

Significantly maximum seed weight (10.71 g) was observed in GDJF-12 while minimum in AKJF-2, AKJF-3 and GDJF-7.

Table.1 Evaluation of physical parameters of different jackfruit genotypes

Treat. No.	Genotype	Fruit weight (kg)	Bulb weight/fruit (Kg)	Flake weight/fruit (Kg)	Number of bulbs/fruit	Bulb weight (g)	Seed weight (g)	Flake colour
T_1	AKJF-1	2.06	0.34	0.25	106.33	3.33	0.85	Pale yellow
T_2	AKJF-2	1.58	0.28	0.23	100	2.33	0.3	Pale yellow
T_3	AKJF-3	1.62	0.41	0.38	101	4.33	0.3	Crimson yellow
T_4	AKJF-4	2.00	0.27	0.16	110.66	2.67	1.33	pale yellow
T_5	AKJF-5	1.98	0.41	0.26	95.67	4.67	1.5	Pale yellow
T_6	AKLJF-6	4.31	0.39	0.21	107.67	3.67	1.63	Cream yellow
T_7	GDJF-7	1.44	0.14	0.25	24	5.67	1.3	Dark yellow
T_8	GDJF-8	1.39	0.20	0.11	36.67	5.67	4.33	Dark yellow
T_9	GDJF-9	1.18	0.75	0.19	117.67	6.67	3.83	Shining yellow
T_{10}	GDJF-10	2.95	0.32	0.15	33.33	9.67	4.53	Orange Yellow
T_{11}	GDJF-11	3.70	0.36	0.25	52.33	7.0	3.1	Dark yellow
T_{12}	GDJF-12	4.92	0.56	1.27	17.00	30.3	10.71	Dark yellow
T_{13}	GDJF-13	5.10	0.82	0.12	159.33	10.3	5.11	Dark yellow
'F' test		**Sig**	**Sig**	**Sig**	**Sig**	**Sig**	**Sig**	
SE(m)±		**0.50**	**0.03**	**0.18**	**9.55**	**0.57**	**0.19**	
CD at 5%		**1.40**	**0.10**	**0.55**	**27.20**	**1.74**	**0.57**	

Table.2 Evaluation of chemical parameters of different jackfruit genotypes

Treat. No.	Genotype	TSS (^{0}Brix)	Acidity %	Total sugar %	Reducing sugar %
T_1	AKJF-1	16.43	0.32	27.22	23.84
T_2	AKJF-2	20.97	0.50	28.1	2412
T_3	AKJF-3	17.53	0.21	30.68	24.64
T_4	AKJF-4	18.33	0.3	32.53	24.98
T_5	AKJF-5	23.37	0.53	28.95	22.46
T_6	AKLJF-6	14.07	0.51	18.95	14.71
T_7	GDJF-7	19.3	0.58	23.66	16.38
T_8	GDJF-8	27.53	0.58	25.45	18.56
T_9	GDJF-9	26.37	0.30	30.49	24.77
T_{10}	GDJF-10	14.87	0.09	22.15	18.61
T_{11}	GDJF-11	17.17	0.25	28.35	19.20
T_{12}	GDJF-12	16.07	1.05	19.21	14.44
T_{13}	GDJF-13	16.3	0.43	22.15	16.65
'F' test		**Sig**	**Sig**	**Sig**	**Sig**
SE(m)±		**1.73**	**0.15**	**0.67**	**0.82**
CD at 5%		**5.34**	**0.46**	**2.06**	**2.54**

Flake colour

Colour of flakes showed variability (Table 1). Colour varied from pale yellow, dark yellow, orange yellow, crimson yellow to creamy white.

The data for physical parameters revealed that the variation in physical attributes of fruits might be due to the cross pollinated nature of jackfruit which resulted in differences in genetic make-up of different jackfruit genotypes grown in different agroclimatic conditions.

This is in confirmation with the findings of Mitra and Maity (2002), Rai *et al.,* (2003), Reddy *et al.,* (2004), Singh *et al.,* (2011), Anu *et al.,* (2015) and Rahman *et al.,* (2016) in jackfruit.

Chemical parameters

The data on chemical parameters is presented in Table 2.

Total soluble solids

Maximum TSS content was observed in GDJF-8 (27.53^0 B) followed by GDJF-9 and AKJF-5. While lowest TSS was observed in AKLJF-6.

Acidity

The highest titratable acidity was recorded in AKJF-2 (0.62 %) whilw lowest in GDJF-12.

Total sugars

Total sugar content of different jackfruit genotypes varied significantly. The highest total sugar was noticed in the genotype AKJF-4 (32.53 %) while lowest in AKLJF-6.

Reducing sugar

Highest reducing sugar was observed in AKJF-4 (24.98%) while lowest inGDJF-12.

It is well evident from the chemical parameters that the variation in chemical attributes of fruits might be due to the differences in genetic make-up of different jackfruit genotypes grown in different agro-geographical groups. This is in agreement with the findings of Mitra and Maity (2002), Jagdeesh *et al.,* (2007), Goswami *et al.,* (2011), and Deb *et al.,* (2013).

From the present study on physico-chemical evaluation of jackfruit fruits collected from different locations it can be 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 genotypes of jackfruit for commercial plantation in eastern Maharashtra.

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