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Mango cv. Phule Abhiruchi, New Cultivar for Pickle Industry

S P Gaikwad[1], S U Chalak[2] and G M Idate[3]

National Agriculture Research Project, Ganeshkhind, Pune 411 067 (Maharashtra)

ABSTRACT

A field experiment on evaluation and selection of pickle type mango was conducted at NARP, Ganeshkhind, Pune, during 2001- 2013 to study the performance of pickle mango selections under plain zone conditions. Ten different selections were collected from different localities in plain zone of Western Maharashtra. These were evaluated for their growth characteristics, fruit yield and pickle qualities. The pooled analysis of the year 2011, 2012 and 2013 was worked out and observed that there was significant differences for all the characters under study except fruit diameter and TSS before ripe. The variety Phule Abhiruchi (GK-PM-5) recorded maximum trunk girth (88.6 cm), number of fruits / tree (186.43), average fruit weight (242.6 g) , yield/ tree (45.5 kg) and acidity (3.2 %). This variety was evaluated for organoleptic parameters like firmness, flavor and texture, recorded overall highest score of 8.0 out of 10.0. Hence, the mango pickle variety Phule Abhiruchi (GK-PM-5) was recommended for pickling purpose in plain zone of Maharashtra.

Key Words: Evaluation, Mango, Pickle, Selections, Fruit quality.

INTRODUCTION

As mango is a seasonal fruit, about 20 per cent of fruits are processed for products such as puree, nectar, leather, pickles, canned slices, and chutney (Ravani and Joshi, 2013). Green mangoes in India are mostly used as pickles and chutneys. Pickles are prepared in almost every Indian home and also commercially. Raw mature mango is best suited for pickle production due to its high acidity, texture and characteristic typical mango flavour. Several formulated recipes with diversified taste, flavour, aroma and texture have been developed in India both for domestic and international markets. The quality of raw mango pickle depends mainly on the raw material and hence, varietal suitability and maturity stage play an important role in pickling. Research on physicochemical characteristics of mango varieties for pickling has been carried out by many workers (Jha *et al,*2003).

In Maharashtra mango is grown in an area of 4.85 lakh ha with 12.12 lakh tonne production and productivity of 2.5 MT / ha (Anon, 2014). The main mango growing districts are Thane, Ratnagiri, Sindhudurag, Jalgaon, Aurangabad, Solapur, Pune and Beed. Konkan Ruchi is the only recommended cultivar available for pickle preparation. Likewise, in plain zone of Western Maharashtra, there is no any single recommended cultivar for pickle preparation so far. Hence, an attempt was made to standardize a pickle mango cultivar for this region.

MATERIALS AND METHODS

A field experiment was planned in 2001 to evaluate the pickle mango selections having good pickle quality, yield and popular for pickle making in respective locality were collected from plain zone of Western Maharashtra. Ten accessions were selected. The scion material of each accessions was collected and grafted in-situ at NARP, Ganeshkhind, Pune during 2002-2003. The experiment was laid out in randomized block design with three replications. These accessions were planted in deep black alluvial soil at 10 X 10 m spacing. Six plants of each cultivar were used for study, two plants being a unit of replication. Ten fruits were randomly harvested from each replication for recording the observations. Observations on plant height, East West spread, Noth South spread, trunk girth at 30 cm above the ground, number of fruits/ tree/ year, yield /tree/ year, fruit dimensions were recorded.

Corresponding Author's Email: sunilchalak@gmail.com

The yield and pickle qualities of the all selections were evaluated for three years (2011, 2012 and 2013) and the pooled performance of pickle mango selections were recorded. Fruits were harvested at full maturity. The fruits were washed thoroughly with tap water and shade dried to remove surface water. Physical and quality parameters were recorded using 10 randomly selected fruits per accession. Mango pickle preparation was effected as procedure given by CFTRI. The quality of pickle was judged one month after pickle preparation as per sensory evaluation. A panel of ten judges evaluated the quality of the pickle with respect to firmness, flavour, texture and overall quality giving score between 1 to 10 for individual characters. The accession with maximum overall score was rated as the best.

RESULTS AND DISCUSSION

Growth Parameters

The pooled data (Table 1) revealed that the selection GK-PM-1 recorded maximum plant height (6.3 m) which was on par with GK-PM-4 (6.1 m) and GK-PM-3 (6.0 m) and Peshwa (6.0 m). Tree trunk girth was measured at 30 cm from ground level. It was maximum (82.2 cm) in cv. Phule Abhiruchi (GK-PM-5). Regarding plant spread, selection GK-PM-1 recorded maximum East West spread (6.6 m) which was on par with GK-PM-2 (6.4 m). However, North – South plant spread was maximum (6.9 m) in selection Peshwa which was at par with Phule Abhiruchi (GK-PM-5) (6.6 m).

Yield and yield contributing parameters

Number of fruits/tree

The pooled data in table 1 indicate that cv Phule Abhiuchi (GK-PM-5) recorded significantly maximum fruits/ tree1 (186.4). The selection GK-PM-4 recorded maximum average fruit weight (274.2 g) which was on par with GK-PM-1(266.8 g) and GK-PM-3(262.7 g). The maximum fruit weight recorded in GK-PM-4 might be due to comparatively less number of fruits/tree (132.3) and inbuilt peculiar fruit size.

Fruit yield and characters

The cultivar Phule Abhiuchi (GK-PM-5) recorded significantly maximum fruit yield/ tree/ year (45.5 kg). This was due to its certain genetical wealth , which reflected by producing maximum number of fruits/ tree. The data (Table 1) revealed that cv Phule Abhiuchi (GK-PM-5) and GK-PM-4 recorded maximum fruit length (10.8 cm). However, the differences for fruit diameter were non-significant but it was maximum (8.6 cm) in GK-PM-4. These results were in confirmation with Singh *et al* (2012).

Fruit quality

The cultivar Phule Abhiuchi (GK-PM-5) recorded maximum acidity (3.2 %) which was on par with selection RHR-03 (3.1 %), RHR-01 (3.1 %), RHR-02 (3.1 %), GK-PM-2 (3.0 %), GK-PM-1 (3.0 %) and GK-PM-3 (2.9 %). The cv Phule Abhiuchi (GK-PM-5) recorded maximum pulp thickness (2.5 cm). However, though pooled differences for TSS were non significant but numerically selection GK-PM-3 recorded maximum TSS (8.2 oBrix). The cv Phule Abhiruchi (GK-PM-5) recorded least TSS (6.3 oBrix).

The cv Phule Abhiruchi (GK-PM-5) recorded maximum acidity (3.2 %) and minimum TSS (6.3 oBrix). Singh *et al* (2012) noticed a significant negative correlation between TSS and acidity. The acidity in raw mango is one of the most important quality parameters which decides the taste and stability of pickled product. (Vasugi *et al,* 2008). As thick pulp mango pieces are preferred while enjoying mango pickle, pulp thickness is also a important character. For these characters as concern cv Phule Abhiruchi (GK-PM-5) fits to as a ideal pickle cultivar.

Organoleptic evaluation

The data presented in table 2 describes variations among mango selections for raw fruit pulp colour, pickle firmness, flavor and its texture. The cv Phule Abhiruchi (GK-PM-5) recorded maximum overall score (8.0 out of 10.0). During the process of fermentation, the fruit firmness reduced significantly

Table 1. Pooled performance of different pickle mango selections for growth parameters (2011-2013).

Sr. No.	Selection	Plant height (m)	Trunk girth (cm)	Plant spread (EW) (m)	Plant spread (NS) (m)	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	Number of fruits/ tree	Yield / tree (kg)	TSS (0 B)	Acidity (%)	Pulp thickness (cm)
1	RHR-01	5.5	68.0	5.2	5.1	8.2	6.3	229.3	111.4	25.7	7.2	3.1	1.1
2	RHR-20	5.9	67.8	5.7	4.6	8.7	7.0	220.9	123.1	27.4	7.6	3.1	1.3
3	RHR-45	5.2	59.5	5.1	5.5	8.2	6.6	152.2	106.6	16.4	6.6	3.1	1.5
4	RHR-32	4.8	59.3	6.2	5.8	8.5	6.7	178.3	114.9	20.5	7.4	2.9	1.4
5	GK-PM-1	6.3	73.3	6.6	5.6	9.5	7.5	266.8	109.8	29.1	6.9	3.0	2.4
6	GK-PM-2	5.4	66.5	6.4	4.9	9.9	7.8	220.7	131.6	29.2	7.0	3.0	1.7
7	GK-PM-3	6.0	70.6	5.4	5.5	9.3	7.5	262.7	117.1	30.8	8.2	2.9	1.3
8	GK-PM-4	6.1	76.2	6.5	6.1	10.8	8.6	274.2	132.6	35.8	6.7	2.5	1.9
9	Phule Abhiruchi (GK-PM-5)	5.6	82.2	5.8	6.6	10.8	7.4	242.6	186.4	45.5	6.3	3.2	2.5
10	Peshwa	6.0	72.1	5.9	6.9	8.0	7.2	218.0	123.3	26.8	6.5	2.6	1.5
	SE +	0.1	2.3	0.1	0.2	0.5	0.5	4.4	38.6	3.2	0.4	0.1	0.1
	C.D. @5%	0.4	7.1	0.3	0.6	1.5	NS	13.2	12.9	9.6	NS	0.3	0.3

Table 2. Pooled quality parameters and organoleptic evaluation of pickle mango selections (2011-2013).

Selection	Colour	Firmness	Flavour	Texture	Overall score
RHR-01	Pure white	7.7	6.3	7.3	7.1
RHR-20	Pure white	6.7	6.7	7.3	6.8
RHR-45	Creamy white, slight yellowish	6.8	7.2	7.0	7.0
RHR-32	White, slight yellow	7.2	7.3	6.7	7.0
GK-PM-1	Pure white	6.7	7.3	7.3	7.1
GK-PM-2	Pure white	7.3	7.2	7.7	7.3
GK-PM-3	Creamy white	7.7	7.3	8.7	7.8
GK-PM-4	Pure white	7.3	6.7	7.3	7.1
Phule Abhiruchi (GK-PM-5)	Pure white	8.0	8.0	8.0	8.0
Peshwa	Yellowish white	7.3	6.3	7.2	6.9

among various accessions. The osmotic effect of salt on mango results in shriveling and moisture loss. The softening phenomenon during this process makes the variety unsuitable for pickle making (Vasugi *et al,* 2008).

Salient features of Pickle Mango Phule Abhiruchi Selection GK-PM-5

- Growth habit of tree is spreading.
- Late flowering with fruit harvest in rainy season.
- Fruit colour light green with thicker pulp.
- Fruit with more and whitish flesh.
- Stone size is small.
- Fruit acidity 3.0 - 3.3 %.
- Fruits per tree 135 - 280.
- Fruit weight 240 -250 g.

CONCLUSION

From present investigations it can be concluded that, cv Phule Abhiruchi (GK-PM-5) not only recorded maximum fruit yield but also fulfill the requirements of all sensory qualities essential for pickle preparation .

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