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Short Research Article

Comparative Performance of Aonla (*Emblica officinalis* G.) Cultivars under Parbhani Condition

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Abstract

The present investigation was carried out at the Department of Horticulture, college of Agriculture, Marathwada Krishi Vidyapeeth, Parbhani Maharastra during year 2009-2010 to evaluate "Comparative Performance of Aonla (*Emblica officinalis* G.) Cultivars under Parbhani Condition". The experiment was laid out in Randomized Block Design (RBD) with four varieties and it was replicated five times.The study comprises of one experiment in which aonla trees under investigation to yield and fruit physico-chemical characters. The highest yield of fruits per tree was recorded in Kanchan (3459 fruits tree^{-1} and 99.79 kg fruits tree^{-1}). Higher size of fruits was observed in NA-7, whereas, small size fruits were observed in Krishna. Maximum weight of fruit was recorded in NA-7 (42.44 g). Maximum pulp percentage (96.74%) and minimum fibre percentage (0.66%) were recorded in Chakaiya. Kanchan variety recorded high TSS (11.90%) and maximum acidity (2.13%) whereas, minimum TSS and acidity percentage were recorded in NA-7 (1.79% acidity), respectively. Maximum and minimum ascorbic acid content were observation in Chakaiya (607.48 mg 100 g^{-1}) and NA-7 (362.32 mg 100 g^{-1}), respectively. Highest total sugar per cent (4.68) estimated in Krishna. However, on the basis of result obtained in present study, it can be suggested that Kanchan is superior variety under agro-climatic condition of Parbhani due to its performance regarding the highest yield with good quality fruits.

1. Introduction

Aonla (*Emblica officinalis* G.) also known as Indian gooseberry belonging to family Euphorbiaceae. Fruit is highly nutritive with a great medicine use and the richest source of Vitamin C which helps in relieving symptoms of scurvy. It is also a rich source of antioxidants which are extremely effective in reducing stress and fighting aging and increases the resistance against pathogenic attacks.

The growing popularity for alternate medicines, health foods and herbal products are enhancing the requirement for Aonla fruit. The Aonla tree bears fruits up to 65 to 70 year. It is a dry land fruit crop tolerant to alkalinity and salinity. In last few years, its cultivation has increased significantly because of hardy nature of plant with low water requirement and also due to increases in awareness among the consumers about its high nutrition and medicinal value. There has been no standardization of varieties of Aonla and they are mostly known on the basis of size, colour or after the name of places. However, no systematic work on the performance of the known varieties regarding growth yield and quality aspects has not been yet studied so far.

2. Materials and Methods

The orchard was established by procuring uniform Aonla budded of Kanchan, Krishna, Chakaiya and NA-7 at Department of Horticulture, MKV, Parbhani during 2009-10 and spacing 5×5 m^2. Weight of fruits (kg tree^{-1}) weighed with physical balance and expressed in kg tree^{-1}. Size of fruits the length and breadth of fruits were calculated by varnier-caliper. Weight of fruit was recorded by laboratory balance. Pulp: Stone ratio was calculated using following-

$$\text{Pulp stone}^{-1} = \frac{\text{No. of fruits (g)} - \text{Weight of stone (g)}}{\text{Total weight of stone (g)}} \times 100$$

Percent fibre content was calculated on the basis of fruit weight and weight of fibre content.

$$\text{\% fibre content} = \frac{\text{Average weight of fibre (g)}}{\text{Total weight of fruit (g)}} \times 100$$

Total soluble solids content was determined by hand refractometer (0-32 °Brix).

Reducing sugar (%) measure by the an aliquot of 5 ml diluted fruit juice was taken from 100 ml for filtration and mixed with 10 ml of Fehling 'A and 'B' solution. Now this mixture was titrated against 1.0% glucose. A blank with 10 ml of Fehling 'A' and Fehling 'B' was also run. The results were expressed as per cent reducing sugar.

Non reducing sugars was estimated by the deducating the quantity of reducing sugars from total invert sugars and multiplied by the factor 0.95. The results were expressed per cent non reducing sugars.

Total sugar (%) estimated bythe 5 ml aliquot was taken out from 100 ml sample. The aliquot was mixed with three drops of HCL and kept overnight. Next day, 2-3 drop of phenolphthalein indicator was added and neutralized with 30% sodium hydroxide (NaOH), solution containing 10 ml Fehling 'A; and 'B'. The mixture was titrated against 1.0% glucose in boiling solution using methylene blue as indicator. The appearance of brick red colour was marked at end point. The result was expressed as per cent total sugar. Acidity was determined by alkali titration (0.1 N NaOH) method and the results were expressed in terms of g 100 g^{-1} of flesh. The ascorbic acid content was determined by titrating a known weight of the pulp with 2, 6-dechlorophenolindophenol dye using three metaphosphoric acid as stabiling agent.

3. Results and Discussion

3.1. Physical and yield characters of fruits in different Aonla varieties

Data on yield is presented in Table 1 indicated that among four varieties screened the highest yield in terms of number of fruits per tree was observed in Kanchan (3459 fruit $tree^{-1}$) followed by Krishna (2468 fruit $tree^{-1}$).

Yield of fruits in terms of kg $tree^{-1}$ was observed that maximum yield of fruit per tree was recorded in Kanchan (99.79 kg $tree^{-1}$) followed by Krishna (76.55 kg $tree^{-1}$). Whereas, in NA-7 (46.32 kg $tree^{-1}$) recorded less yield among all the cultivars. Higher yield in Kanchan and Krishna could be attributed maximum spreading habit of growth of these cultivars. NA-7 recorded lowest yield because it is only erect growing having less number of primary branches. Similar trend of results work also reported by Singh et al. (1993); Supe et al. (1997) that Kanchan yielded maximum fruit followed by Krishna.

Significantly maximum length as well as breadth of the fruit was observed in NA-7 (4.26 cm and 3.81 cm) followed by Chakaiya (4.03 cm and 3.76 cm). Whereas, small size of fruits were noticed in Krishna (3.92 cm length and 3.46 cm breadth) and Kanchan (3.98 cm length and 3.62 breadth). Similar results were observed by Supe et al. (1997) they observed fruits of Krishna were small.

Maximum fruit weight was recorded in NA-7 (42.44 gm) followed by Krishna (37.77 gm). Significantly minimum fruit weight was observed in Kanchan (35.46 gm) and Chakaiya (37.20 gm).

Maximum pulp percentage was observed in Chakaiya (96.74%), followed by Krishna (94.40%). Whereas, minimum pulp percentage was observed in Kanchan (93.96 %) and NA-7 (94.14%). Kumar and Singh (1999) also recorded maximum pulp percentage in NA-9 (94.90%). Significantly least seed (stone) percentage was noticed in Chakaiya (4.60%), followed by Krishna (4.92%). Maximum seed percentage was observed in Kanchan (5.22%) followed by NA-7 (4.98%). Kumar and Singh (1999) also recorded minimum seed percentage in NA-9 and NA-10 cultivars at Faizabad (UP).

Maximum fiber percentage was observed in NA7 (0.88 %) followed by Kanchan (0.82%). Whereas minimum fiber percentage was observed in Chakaiya (0.66%) followed by Krishna (0.68%). Supe et al. (1997) also reported maximum crude fiber per cent found in Francis followed by Kanchan. They also reported minimum crude fiber per cent found in Krishna.

3.2. Cemical composition of the different Aonla varieties

Data presented in Table 2 indicated that there is significant variation in different chemical characters of screened Aonla varieties. While, studying chemical composition of different aonla varieties, it was noticed that highest TSS was observed

Table 1: Physical and yield characters of fruits in different Aonla varieties

Varieties	Physical characters of fruit						Yield $tree^{-1}$	
	Size of fruit (cm)		Weight of fruit (g)	Per cent pulp	Per cent seed $stone^{-1}$	Per cent fibre	Number of fruits	Weight of fruits (kg $tree^{-1}$)
	Length	Breadth						
Kanchan	3.98	3.62	35.46	93.96	5.22	0.82	3459	99.79
Krishna	3.92	3.46	38.77	94.40	4.92	0.68	2468	76.55
Chakaiya	4.03	3.76	37.20	96.74	4.60	0.66	1436	55.16
NA-7	4.25	3.81	42.44	94.14	4.98	0.88	1135	46.32
Mean	4.05	3.66	38.47	34.81	4.93	0.76	21.25	69.45

Table 2: Chemical composition of the different Aonla varieties

Varieties	TSS (%)	Acidity (%)	Ascorbic acid (mg 100 g^{-1})	Sugar		
				Reducing	Non reducing	Total sugar
Kanchan	11.90	2.13	527.74	2.35	1.14	3.49
Krishna	10.36	1.93	584.78	2.38	2.30	4.68
Chakaiya	8.88	1.79	607.48	2.70	1.28	3.96
NA-7	7.96	1.80	362.32	2.30	1.96	4.26
Mean	9.77	1.91	520.58	2.42	1.67	4.08

in Kanchan (11.90%) followed by Krishna (10.36%). Whereas, minimum TSS was observed in NA-7 (7.96%) followed by Chakaiya (8.88%). Supe et al. (1997) also reported maximum TSS in Kanchan followed by Krishna. Whereas, minimum TSS was observed in NA-7 and Chakaiya under MPKV, Rahuri.In the present investigation maximum acidity was recorded din Kanchan (2.13%) followed by Krishna (1.93%). Whereas, minimum acidity was recorded in Chakiya (1.79%) followed by NA-7 the per cent findings are exactly in conformity with the findings of Supe et al. (1997). They also be recorded maximum acidity in Kanchan (2.37%) and minimum acidity in Chakaiya (1.89%) under Rahuri condition. In the maximum ascorbic acid content reported in Chakaiya (607.48) followed by Krishna (584.78). Whereas, minimum ascorbic acid content recorded in NA-7 (362.32). Kumar and Singh (2002) also recorded, similar trend in respect of ascorbic acid in 10 cultivars of aonla under Faizabad (UP) condition. In the present investigation highest reducing and non reducing sugar was observed in Chakaiya (2.70%) and Krishna (2.30%), respectively. Whereas, minimum reducing and non reducing sugar observed in NA-7 (2.30%) and Kanchan (1.14%), respectively. The maximum total sugar was recorded in Krishna (4.68%) and minimum total sugar was recorded in Kanchan (3.49%). These result are in conformity with the result of Kumar and Singh, (1999). They also recorded similar results in respect of sugar per cent reducing sugar, non reducing sugar and total sugar in 10 varieties of Aonla.

4. Conclusion

Kanchan is superior variety under agroclimatic conditions of Parbhani. Kanchan is a highest yielder and good quality fruit under Parbhani condition.

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