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Research Article

Studies on Physical Characters of Different Cultivars of Aonla (*Emblica officinalis* Gaertn)

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ABSTRACT

A field experiment was conducted during 2018 at the collection of different varieties of aonla in NDUAT faizabad than carried out in the laboratory Department of Horticulture, Babasaheb Bhimrao Ambedkar University Lucknow. Studies on physical characters of different cultivars of Aonla (Emblica officinalis Gaertn) revealed that the maximum length of fruits (4.32 cm), width of fruits (4.62 cm), weight of fruits (42.53 g), number of capsules/segments per fruits (6.00), specific gravity (1.27), pulp percent (95.11%), stone perecent (13.65%), pulp: stone ratio (1:11.68) was recorded in cultivars (NA-7, NA-7, Chakiaya, NA-6, NA-6, Banarasi) respectively.

Keywords: *Aonla, Physical parameters.*

INTRODUCTION

Aonla or Indian gooseberry (*Einblica officinalis* Gaertn.) belong to the family Euphorbiaceae with chromosome number of 2n = 28. It is suitable for semi-arid region and withstands well in acidity and drought conditions, has found it suitable for various type of wasteland. It is hardy prolific bearer and highly remunerative even without much care and can be successfully grown in variable agro-climatic and soil conditions. The tree is much branched and ranges 8-18 m in height with thin light grey bark. Small thin irregular flakes leaves are simple, subsessile, closely set along the branchlets, colour light green and having the appearance of pinnate. Flowers are greenish yellow in axillary fascicles, unisexual, males numerous on short slender pedicels, females few, subsessible, ovary 3 celled; fruits globose, fleshy, pale yellow with six obscure vertical furrows enclosing six trigonous seeds in 2 seeded 3 crustaceous cocci. It is deciduous under north Indian conditions, however, it is considered as evergreen in the tropics. It can be successfully grown even in sodic and saline soils upto 35 ESP and 10Ece/ds respectively with maximum 9.5 soil pH. Though aonla is a subtropical fruit but its cultivation in tropical climate is quite successfully.

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It responds well to the conditions of dry weather, moderately cool temperature during winter followed by high temperature of summer. It can tolerate freezing temperature as well as temperature as high as 46°c. The fruits are highly nutritive and one richest sources of vitamin-C. Out of 100 gram edible portion of Aonla, it contain 0.5 g protein, 0.1 g fat, 0.7 g minerals, 1.9-3.4 g fibers, 14.1-21.8 g carbohydrates, 0.05 g calcium, 0.02 g phosphorus, 1.2 g iron and 200-750 mg vitamin-C Mehta et al. (2002). The fruits contain a chemical substance called 'leucoanthocyanins' which retards oxidation of vitamin-C. Aonla probably the only fruits to fill the gap of astringent food recommended by the ayurvedic system of medicine for a balanced diet and sound health. It is acidic, cooling, refrigerant, diuretic and laxative. Aonla is the main ingredients in Chavanprash and Triphla used in the treatment of headache, constipation and enlarged lever. Aonla distributes to all parts of India. In India it occupies nearly 93.000 ha. of area with annual production of 1.75 lakh tones. U.P. ranks first in both area and Production. It covers about 15750 ha area under aonla cultivation and production. Productivity potential and quality of any fruit crop are governed by the cultivars, nutrients status of soil, and the performance of cultivars under the given situation. In aonla, even after it's hardy nature there are problems like shy nature of bearing and inferior quality of fruits in seedlings which may or may not have high yield potential as well as good nutritive value. However most of existing commercial cultivars (Banarsi, Chakaiya, Fransis, Krishna and Kanchan), are the selections from the existing seedling population and there is scope in future for further selection of promising type from seedling population for one or more outstanding characteristics.

MATERIALS AND METHODS

Ten varieties / genotypes of aonla were selected to see their physical composition which are collected from Narendra Dev University of Agriculture and Technology Faizabad Up. Collection of fifty (50) healthy, uniform sized fruits free from diseases, pests and brushes randomly selected from the trees of each cultivars from each direction. When the fruits are nearly matured, then it was picked up and taken for experiment in the month of November. Details of varieties /genotype are as follows: Banarasi, Chakiya, Laxmi-52, Krishna, Francis, Anand-1, Kanchan, NA-6, NA-7, NA-10. Observations recorded to be Length of fruits, Width of fruits, Weight of fruits, Number of Capsules/segments per fruits, Specific gravity, Pulp (%), Stone (%), Pulp:stone ratio. The data so obtained were analysed statistically.

RESULTS AND DISCUSSION

The physical parameters of fruit of different varieties/genotypes have been evaluated in term of weight of fruits, length of fruit, width of fruit, number of capsules/ segments per fruits. Pulp percentage, stone percentage, pulp: stone ratio and tremendous variability has been observed regarding the fruit weight that varied from 27.05g. (francis) to 42.74g(NA-7). Such variation in this character of different varieties/genotypes may be due to genetic makeup of genotypes or due to the rate of enlargement of cells of the mesocarp. Supe et al. (1995) also reported variability in weight of fruits in different varieties/genotype of aonla. Fruit weights were significantly higher in variety NA-7 as compared to other cultivars. The results confirm the finding of Singh et al. (1987) Singh and Pathak (1987) and Supe et al. (1995). They reported that the fruits weight varied from 18.62g. to 45.91 g and average weight of varieties NA-7 was higher than weight of Deshi varieties of aonla. The considerable variation was noted in length of fruits, which ranged from 42.95 cm to 4.32 cm. but Variety NA-7 had maximum Length (4.32 cm). Whereas, minimum length was noted in genotype NA-6 (2.95 cm) and width of fruits are noted was which ranged from 3.04 cm to 4.62 cm. Whereas, maximum width NA-7 (4.62 cm) and minimum width was noted in genotype NA-6 (3.04 cm). The length of fruit showing marked variation in different selected

varieties/genotypes. This variation is due to genetically characteristics of varieties and rate of enlargement of mesocarp cells of fruits as well as micro-climatic factors. This observation is in accordance with the results obtained by Balasubramanyam and Bangaruswamy (1998). They, increase in fruit diameter was significant and rapid upto seventy-five days after fruit set and thereafter, a slow, but steady increased was observed upto 90 days. After 90 days, there was no increase in fruit size.

Each variety/genotype had six capsules/segments per fruits and there was no any difference was noted for this trait. This is due varietals character of the fruits of different genotypes of aonla. The pulp percentage varied in different varieties/genotypes of aonla and it ranged from 17.17% to 98.31%. While variety Francis had maximum pulp percentage (98.31 %) whereas, minimum pulp percentage was noted in variety Laxmi-52 (77.17%). Such variation in this parameter is due to genetic make-up and nutrients uptake by plants. The results confirm. The findings of Supc et al. (1995) Kumar et al. (2001) Mitra and Mitra (2001). The stone percentage also varied from 7.60% to 13.65%, and variety NA-6 had maximum stone percentage (13.65%), whereas minimum stone percentage was noted in variety Banarasi (7.60%). The result is also in agreement with finding of Ram et al. (1983) and Singh et al. (1989).

The pulp: stone ratio in different varieties/genotypes of aonla ranged from 5.70% to 11.68s%. But Variety Banarasi had maximum pulp: stone ratio (11.68%). Whereas, minimum pulp: stone ratio was noted in variety Laxmi-52 (5.70%). This is due to maximum pulp percentage in variety Banarasi and minimum pulp percentage in variety Laxmi-52. The specific gravity varied in different varieties and genotype of aonla and it ranged from 1.04% to 1.27%. While variety chakiya has maximum specific gravity (1.27%). whereas, minimum specific gravity was variety of francis (1.04%).

Table 1: Effect of physical characters of different cultivars of Aonla (*Emblica officinalis* Gaertn)

Varieties /genotypes	Length of fruits	Width of fruits	Weight of fruits	Number of Capsules/ segments per fruits	Specific gravity	Pulp (%)	Stone (%)	Pulp:stone ratio
Banarasi	3.97	4.35	40.11	6.00	1.11	90.35	7.60	1:11.68
Chakaiya	3.26	3.93	32.47	6.00	1.27	92.43	9.00	1:10.29
Laxmi-52	3.21	3.49	30.23	6.00	1.16	77.71	13.62	1:5.70
Krishna	1.03	4.33	30.53	6.00	1.11	78.44	12.49	1:6.19
Francis	3.82	3.94	29.69	6.00	1.04	98.31	10.58	1:9.34
Anand-1	3.53	3.97	34.29	6.00	1.06	89.32	10.46	1:8.56
Kanchan	3.44	3.93	31.46	6.00	1.11	86.56	12.39	1:6.98
NA-6	2.95	3.04	32.44	6.00	1.16	95.11	13.65	1:6.96
NA-7	4.32	4.62	42.53	6.00	1.07	89.41	7.73	1:11.57
NA-10	3.36	3.25	27.05	6.00	1.13	86.7	9.46	1:9.18
C.D. (P=0.05)	**0.35**	**0.05**	**1.72**	**N/A**	**N/A**	**1.62**	**1.01**	**0.87**
SEm±	**0.11**	**0.02**	**0.58**	**N/A**	**0.05**	**0.54**	**0.34**	**0.29**

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