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RESEARCH ARTICLE :

Quality assessment of different muskmelon varieties by chemical and sensory analysis

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SUMMARY : A field experiment was conducted on muskmelon varieties for the assessment of qualitative traits (TSS, total sugars acidity, aroma, sweetness, flavour and appearance of fruit).High TSS content was observed in the varieties *viz.*, Kanpur (12.03° Brix), Alpur (11.33° Brix), Arka Jeet (11.11° Brix), Pusa Madhuras (10.46° Brix) and Siddavatam Dosa (10.00° Brix). The total sugars was high inthe varieties viz., Kanpur, Alpur, Arka Jeet, Pusa Maduras and Siddavatam Dosa (15.58 %, 15.02 %, 14.40 %, 13.26 % and 12.35 %, respectively). Low acidity was recorded in the varieties, Kanpur (0.06 %) and Alpur (0.08 %).The muskmelon varieties *viz.*, Bathesa, Kanpur, Pusa Madhuraswere adjudged best in terms of aroma (2.6, 2.3 and 2.1,respectively). The varieties, Alpur, Kanpur, Pusa Madhuras, Arka Jeet, Siddavatam Dosa were identified best in terms of sweetness (3.0, 3.0, 2.8, 2.6 and 2.5, respectively). The varieties, Bathesa, Alpur, Kanpur, Siddavatam Dosa, Pusa Madhuras were observed good interms of flavour (3.4, 3.3, 3.1, 3.0 and 2.8,respectively) based on ratings developed through organoleptic test.

KEY WORDS :
Muskmelon, Alpur, Arka Jeet, Pusa Maduras

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BACKGROUND AND OBJECTIVES

Muskmelon botanically known as *Cucumis melo.* is a species of melon, that belongs to the fmaily cucurbitaceae.It is one of the most admired fruits among the melonsbecause of its flavour, sweet taste and refreshing effect.'Kharbooja'is a common name of muskmelon and grown in river beds and rice fallows in India. It is widely grown throughout the world particularly in tropical and sub-tropical countries.Uttar Pradesh, Punjab, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra and Andhra Pradesh are the major muskmelon producing states in India.

There are various horticulture forms within *Cucumis melo* based on fruit characteristics namely cantaloupes, nutmeg muskmelon, winter melons, mango melons, pomegranate melons which hybridize readily with each other. Cultivars of muskmelon having orange coloured flesh and prominent green sutures on the outer surface of fruit are preferred by the Indian consumers.

Muskmelon is an excellent summer cooling fruit with a refreshing and delightful odourand high nutritional value. It contains

vitamin A, B, C and minerals like magnesium, sodium and potassium. Yellow and orange fleshed fruits contain more than 450 I.U of carotene (Das, 2006). The vitamin C present in muskmelon fruits acts as an anti-oxidant that helps to prevent heart diseases and cancer. Potassium (341.0 mg) in the fruit can also reduce the problem of developing kidney stones (Das, 2006).

In Andhra Pradesh, the Rayalaseema region comprising of Kadapa, Kurnool, Chittoor and Anantapuram is known for intensive muskmelon cultivation. Farmers of this region grow certain cultivars viz., SiddavatamDosa, Sharbat-e-Anar, Ingan, Bathesa, Alpur, Kanpur, PusaMadhuras etc. during November-March months in river beds and in rice fallows without knowing their yield capability quality characters and suitability to the existing growing environment. Quality (high TSS and low acidity) of the muskmelon fruit is more important than yield for the local markets and export purpose. Hence the present study was conducted for the quality assessment of muskmelon fruits with regard to consumer preference.

RESOURCES AND METHODS

A study on the "Evaluation of certain muskmelon (*Cucumis melo* L.) varieties for growth, reproductive, yield and yield attributing parameters" was conducted during February-May, 2012 at Horticultural College and Research Institute (H.C & R.I), Dr.Y.S.R Horticultural University, Ananatharajupet, Y.S.R District, Andhra Pradesh. The experiment was laid out in randomized block design with three replications and the material for the present study consisted eight treatments (Arka Jeet, Alpur, Bathesa, Ingan, Kanpur, Pusa Madhuras, Sharbat-e-Anar and Siddavatam Dosa).

Seeds were sown on the slope of the ridges at a depth of 4-5 cm by adopting a spacing of 1.5m×0.5m. Light irrigation was given immediately after sowing. Recommended dose of NPK (60:100:50 kg ha^{-1}) fertilizers was applied in the form of Urea, Single super phosphate (SSP) and Muriate of potash (MOP). At the time of field preparation, half the dose of Urea, full dose of SSP, MOP and 45 kg of neem cake were applied as basal and the remaining half dose of Urea was top dressed at 35 days after sowing (DAS). A combi-fertilizer (19:19:19) was also sprayed at the time of fruit development *i.e.*, 55 days after sowing. Two irrigations were given at 4 days interval in initial stage and subsequent irrigations were given at 10 days interval. Fruits were harvested at full slip stage when the fruit skin colour changes and softening of rind occurs.

Five plants were randomly selected in each treatment from each replication and the observations recorded on quality traits through chemical analysis (Total soluble solids, total sugars and acidity) and sensory score card (Aroma, sweetness, flavourand general appearance of fruit). Total soluble solids recorded by hand refractrometer and total sugars was recorded by adopting the A.O.A.C method. Aroma sweetness, flavour and general appearance of fruits were observed by sensory score card for the consumer preference.The mean values of the data recorded were analysed statistically adopting the method suggested by Sundaraj *et al.* (1972).

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

Quality parameters :

Total soluble solids (TSS °Brix) :

The data pertaining to these parameters is presented in Table 1.Significant variation was observed among varieties muskmelon with respect to TSS. High TSS of 12.03°B was recorded in the variety, Kanpur followed by Pusa Madhuras (11.33°B)and Arka Jeet (11.11° B). Low TSS was recorded in the variety, Sharbat-e-Anar (7.43° B).These results are similar to those obtained by Bendlettelli *et al.* (1999) in melons, Long *et al.* (2004) and Faustino *et al.* (2008) in muskmelon and Solmaz *et al.* (2010) in Turkish melons revealed that TSS was

Table 1 : Qualitative traits of different muskmelon varieties

Treatments	TSS (^{0}Brix)	Total sugars (%)	Acidity (%)
Alpur	11.33	15.02	0.08
Arka Jeet	11.11	14.40	0.10
Bathesa	9.21	11.50	0.14
Ingan	8.01	9.96	0.18
Kanpur	12.03	15.58	0.06
Pusa Madhuras	10.46	13.26	0.11
Sharbat-e-Anar	7.43	9.69	0.20
Siddavatam Dosa	10.00	12.35	0.13
S.E. $\pm$	0.35	0.28	0.01
C.D. (P= 0.05)	1.05	0.84	0.03

Table 2 : Sensory evaluation (Organoleptic test) of varieties and hybrids

Treatments	Aroma	Sweetness	Flavour	General appearance of fruit
Alpur	1.5	3.0	3.3	2.0
Arka Jeet	1.0	2.6	1.0	1.0
Bathesa	2.6	2.2	3.4	2.3
Ingan	2.0	1.2	1.2	1.2
Kanpur	2.3	3.0	3.1	3.1
Pusa Madhuras	2.1	2.8	2.8	2.8
Sharbat-e-Anar	2.3	1.0	2.3	2.5
Siddavatam Dosa	1.8	2.5	3.0	2.5

positively influenced by average fruit weight and number of fruits per plant in melons but the data of the experiment showed no significant interaction of TSS with the number of fruits per plant. These findings are also revealed by Purquerio *et al.* (2003) in melons and Yadav *et al.* (2005) in long melon.

Total sugars (%) :

Data presented in Table 1 shows significant variation to total sugars among muskmelon varieties. The variety, Kanpur recorded high total sugars (15.58 %) followed by Alpur (15.02 %). Low level of total sugars was recorded in the variety, Sharbet-e-Anar (9.69 %). Total sugars is an important quality attribute of muskmelon fruit. The first perceived flavour of the melon is sweetness which is mainly contributed by total sugars. Sweetness of these varieties was due to the relative concentrations of carbohydrates and organic acids present in the melon. Stepansky *et al.* (1999), Pandey *et al*. (2008) and Ahmed (2009) in muskmelon and Benedettelli *et al.* (1999) in melons made similar observations.

Acidity (%) :

Acidity shows significant variation among different varieties of muskmelon (Table 1.). Among varieties, low acidity was recorded in Kanpur (0.06 %) followed by Alpur (0.08 %). The variety, Sharbat-e-Anar recorded high acidity (0.2%). Acidity is an important quality contributor in melons. Muskmelon fruits with high total sugars and low acidity will have greater consumer preference as opined by Danin-Poleg *et al*. (2001); Burger *et al.* (2002) and Filho *et al*. (2006) in muskmelon. Based on the present study the varieties, Kanpur and Alpur were found promising for this trait.

Sensory evaluation (Organoleptic test) :

High variation was observed among varieties of muskmelon with respect to aroma, sweetness, flavour and general appearance of fruit.Highest rating to aroma was observed in the variety, Bathesa (2.6) followed by Kanpur (2.3) and lowest rating was observed in Arka Jeet (1.0).Highest rating to sweetness was observed in Alpur(3.0) and Kanpur (3.0) followed by Pusa Madhuras (2.8), Arka Jeet (2.6) and lowest rating was observed in Sharbat-e-Anar (1.0).Sensory or eating quality of musk melon fruit is largely determined by its sweetness in addition to the volatile aromatic compounds as opined by Burger *et al*. (2002) and Hirai (2008) in muskmelon.

The variety, Bathesa (3.4)recorded highest rating to flavour followed by Alpur, Kanpur, Siddavatam Dosa and Pusa Madhuras(3.3, 3.1, 3.0 and 2.8, respectively) and lowest rating was recorded in the variety, Arka Jeet (1.0).Muskmelon fruits with rich flavour coupled with sweetness have more acceptability by the consumer. The first perceived flavour attribute of melon is sweetness and when the cultivar possesses high TSS, all the judges rated it high for flavour. The strong correlation between TSS and flavour was reported by Leach *et al*. (1989), Guerineau *et al.* (2000); Hirai (2008) and Faustino *et al.* (2008) in muskmelon.

Highest rating to general appearance of fruit was observed in the varieties *viz.*, Kanpur (3.1), Pusa Madhuras (2.8), Siddavatam Dosa (2.5), Sherbat-e-Anar (2.5) whereas, Arka Jeet (1.0) and Ingan (1.2) were rated low for this trait.Appearance of fruit is the important influencing factor on marketability of muskmelon.The varieties, Kanpur and Pusa Madhuras had good fruit appearance as per the rating given by panellists. The studies made by Li *et al.* (2010) in muskmelon were in line with the present study.

Conclusion :

TSS and total sugars were found maximum in the varieties *viz.*, Kanpur, Alpur, Arka Jeet, Pusa Madhuras and Siddavatam Dosa and these were also adjudged best in terms of fruit flavour, taste and aroma based on organoleptic test results

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