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Studies on the maturity standards of litchi cv Rose Scented

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Abstract

Studies on the maturity standards for litchi cv Rose Scented were undertaken to work out appropriate indices for predicting its harvest date. Observations recorded for two years revealed that the best time for harvest was 73 days after full bloom when the fruits attain appropriate physiological maturity with an attractive colour pigmentation (75 per cent) over greenish yellow surface. Besides fruit colour and number of days after full bloom; fruit weight, aril weight and TSS content can be considered as most reliable indices for determining the harvest maturity for this important Litchi cultivar.

Introduction

Litchi is an important fruit of sub-tropical area and can be grown successfully upto the elevation of 950 m above msl. Bihar is the major litchi growing state in India besides Uttar Pradesh, Uttranchar, Punjab, Haryana and West Bengal. It is becoming a favourite fruit with the orchardists of Himachal Pradesh also. It is being grown mainly in district Kangra besides some pockets of Sirmour, Solan, Bilaspur, Chamba, Mandi, Hamirpur and Una. At present area under this crop is 3539 ha while the production stands at 3702 MT in the state. It ripens during mid June to mid July in the state when the crop is over in other litchi growing areas of the country and no other fruit is available to compete with it. Thus, it is remunerative and becoming popular with the orchardists of the state. "Rose Scented" is an important litchi cultivar having a distinct rose aroma, which makes it attractive and sells at a premium.

To maintain dessert quality, appropriate storage life and ensured higher returns, it is desirable to pick the fruit at proper stage of maturity. If picked prematurely, the litchi fruits are likely to be undersized, poorly coloured, sour, off-flavoured, poor in quality and subject to various disorders. On the other hand, over-ripe fruits may become too soft, unable to bear transportation, poor in flavour, and low keeping quality. Unlike other fruits, litchi usually does not improve in quality after harvest, so these should be allowed to mature properly on the trees and picked at appropriate time. The present studies were therefore, undertaken to work out the most appropriate time and indices of harvest for this commercially important litchi cultivar grown in this area.

Material and Methods

The present studies were carried out during 1998 and 1999 on fully grown Rose Scented litchi trees (age 15-16 years) at Litchi and Mango Research Station Nagrota Bagwan, Distt. Kangra (H.P.). Data on physico-chemical characteristics of fruits were recorded at three days interval from 58-79 days after full bloom during the two year study. Ten specimen fruits were picked from all round the tree on each sampling date for analysis. In all, there were eight sampling dates, replicated thrice and a tree represented each under Randomized Block Design. Changes in fruit characteristics like fruit weight, size, volume, weight of aril and stone, TSS, acidity etc. were recorded as per standard methods. Aril: stone ratio as well as TSS: acid ratio were later worked out.

Results and Discussion

Data pertaining to periodical changes on the physico-chemical characters of the 'Rose Scented' litchi fruits recorded at three days interval from 58 to 79 days after full bloom during the years 1998 and 1999 are presented in Table-1.

Fruits size in terms of its length and diameter, weight and volume; weight of aril and stone, aril: stone ratio; total soluble solids as well as TSS: acid ratio increased in the fruits at a faster rate during the earlier dates of sampling and the rate of increase declined during the last 3-4 sampling periods. Acid content on the other hand declined up to the last date of observation. Fruit colour, which was greenish yellow initially, was

Table 1. Periodical changes in the physio-chemical characteristics of Litchi fruit (cv Rose Scented) during maturity

Fruit Characteristics		Days after full bloom								
		58	61	64	67	70	73	76	79	CD (5%)
Length	I	3.10	3.16	3.30	3.52	3.74	3.84	3.92	3.93	0.24
	II	3.18	3.25	3.42	3.72	3.92	4.05	4.10	4.12	0.19
Dia	I	2.45	2.57	2.70	2.83	2.92	2.95	2.97	2.99	0.14
	II	2.57	2.65	2.78	2.93	3.03	3.07	3.09	3.10	0.11
Weight(g)										
	I	12.1	13.9	15.4	16.7	17.9	18.7	19.2	19.5	0.9
	II	12.2	14.1	15.8	17.1	18.4	19.4	19.7	19.9	0.5
Volume (cc)										
	I	11.13	12.91	14.37	15.85	17.03	17.57	18.52	19.32	1.03
	II	11.22	13.05	14.62	15.95	17.25	18.75	19.15	19.30	0.60
Aril wt(g)										
	I	5.98	7.08	8.51	10.25	11.89	12.42	12.83	13.06	0.77
	II	6.01	6.95	8.51	10.68	12.38	13.20	13.35	13.47	0.36
Stone wt (g)										
	I	2.10	2.40	2.61	2.77	2.90	2.94	2.97	2.99	0.23
	II	2.22	2.51	2.66	2.81	2.92	2.96	2.99	2.01	0.12
Aril/Stone-ratio										
	I	2.85	2.95	3.26	3.70	4.10	4.22	4.32	4.37	0.13
	II	2.71	2.77	3.20	3.80	4.24	4.46	4.47	4.48	0.19
TSS(%)										
	I	16.2	17.3	18.5	19.8	20.8	21.2	21.5	21.7	1.1
	II	16.4	17.5	18.6	19.9	20.8	21.4	21.7	21.9	0.7
Acidity(%)										
	I	1.15	1.05	0.90	0.80	0.72	0.65	0.59	0.54	0.15
	II	1.30	0.21	1.05	0.95	0.84	0.71	0.65	0.61	0.35
TSS/Acid-ratio										
	I	13.9	16.6	20.8	24.8	29.1	33.2	36.6	40.6	6.4
	II	12.6	14.5	17.8	21.1	28.1	31.1	33.8	36.0	5.9
Fruit colour		Greenish yellow No blush	Greenish yellow pinkish blush 5%	Greenish yellow blush 20%	Greenish yellow blush 25%	Greenish yellow blush 50%	Greenish yellow blush 75%	Pink green	Dark pink	

I. Year 1998
II. Year 1999

noticed to undergo interesting changes. Pigments of pink colour developed systematically and turned to be dark pink in the end. The trend of the changes in the physico-chemical characteristics of the fruits was almost similar during the two years of study.

Fruit length, diameter and stone weight increased significantly up to 70 days after full bloom (afb) when the fruits were greenish yellow in colour having a pinkish blush over 50 percent of the fruit surface. On the other hand fruit weight, aril weight and total soluble solids rose to its best up to 73 days after full bloom with greenish yellow fruits having a blush over 75 percent of fruit surface. The rate of increase in such characteristics was insignificant thereafter, during the two years study. Physico-chemical changes in terms of fruit volume, acid content aril: stone ratio as well as TSS: acid ratio recorded was not consistent during

both the years and hence cannot be considered important indices for determining maturity standards in this litchi culitvar. Underhill and Wong (1990) suggested that culitvar variability; growing region and season had a significant effect on maturity of litchi fruits. Badiyala (1993) considered days after fruit set along with other fruit characters to be good index for determining maturity in 'Muzzararpur' cultivar of litchi grown in H.P. Singh *et al.* (1995) observed a sigmoid pattern of growth in litchi fruits and reported similar improvements in quality up to ripening stage. Sud (2004) reported that in case of Dehradun cultivars, besides fruit colour and number of days required for maturity after full bloom, fruit size, TSS and TSS: acid ratio could also be considered as best indices for determining the harvest maturity.

The study reveals that besides the fruit colour and number of days required after full bloom; fruit weight, aril weight and TSS Contents can be considered as most reliable indices for determining the maturity standards of this commercially important cultivars and the best time of harvest was worked out to be 73 days after full bloom, when the fruits attained optimum quality of fruits with an attractive colour pigmentation (75 per cent) over greenish yellow fruits.

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