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Juice percentage and shelf-life of passion fruit, *Passiflora edulis* as affected by post-harvest treatments and storage conditions

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ABSTRACT

The study was aimed at to investigate the influence of packing materials and storage conditions on juice percentage and shelf-life of passion fruit. Packaging materials such as perforated and non-perforated polythene bags, cling film, fresh banana leaves and fresh *Phrynum* spp leaves with two different storage conditions viz ambient storage condition and zero energy cool chamber storage were tested. Results showed that packing of passion fruits in non-perforated polythene bags and storing them under zero energy cool chamber (ZECC) storage conditions retained juice percentage and extended shelf-life of the fruits.

Keywords: Passion fruit; shelf-life; juice percentage; ZECC

INTRODUCTION

Passion fruit belonging to the family Passifloraceae is a commonly grown fruit in Nagaland. Fruit is good source of pro-vitamin-A, ascorbic acid, riboflavin, niacin and has a high mineral content. The fruit stands out not only because of its exotic flavor but also because of its vitamin content. In Nagaland it covers an area of 1,690 ha with an annual production of approximately 565 MT (Kikon 2004). Fruits are liable to rapid deterioration immediately after harvest and loose consumers appeal within a short span of storage period. This necessitates the development of special post-harvest treatments which can retain the quality of harvested fruits and extend their post-harvest shelf-life. The major objectives of the study were to study the effect of packing materials and storage conditions on the juice percentage and shelf-life of the fruits during storage and to study the interaction effect between packing materials and storage conditions on the juice percentage and shelf-life of the fruits during storage.

MATERIAL AND METHODS

The present investigations were carried out in Medziphema campus of Nagaland University. The fruit samples were

collected from a private farm at Peren district of Nagaland. Each treatment was replicated thrice with 50 fruits as one unit. Five fruits per treatment were used for taking various observations at every observation. Treatments consisted of two factors viz packing materials and storage conditions. Packing materials (under first factor) consisted of M_1-control (no packing), M_2- perforated polythene packing, M_3- non-perforated polythene packing, M_4- cling film packing, M_5- fresh banana leaf packing, M_6- Fresh *Phrynum* spp leaf packing. On the other hand storage conditions consisted of two different types of storage viz S_1- ambient condition and S_2- zero energy cool chamber (ZECC). The experiment was designed in Completely Randomized Block Design (CRD) and consisted of three replications intervals of the observations fixed at three days. The major items of the observations were juice percentage and shelf-life. The juice from the fruits was squeezed out manually from the pulp after removing the rind with the help of muslin cloth and the volume of juice was measured in graduated measuring cylinder and thus the percentage of juice out of the total fruit weight was calculated. Shelf-life of the fruits was calculated by counting the days from the date of fruit storage to the date on which the fruits showed shrunken appearance, became soft and unmarketable.

RESULTS AND DISCUSSION

Results of the present studies revealed that there was significant difference among different treatments applied.

Juice content*:* The data on juice content of the fruits as influenced by packing materials and storage conditions are shown in the Table1. It is evident from the data that packing materials did not have significant influence on the juice content of fruits during the storage period. However there was a decreasing trend in the juice content with the increase in storage period. It was also noted that the decrease in juice content was faster in control (M_1) whereas it was slower in non-perforated polythene packing (M_3). Further analysis of the data revealed that storage conditions also failed to significantly affect the juice content of fruits during all the observations. However there was a decreasing trend in the juice content with the increase in storage period and increase in juice content was faster under ambient condition (S_1) than ZECC storage conditions (S_2). Interaction between packing materials and storage conditions on the juice content was significant during all the observations.

Shelf-life: Influence of various packing materials and storage conditions on shelf-life of fruits is shown in Table 2. It was observed that all types of packing materials increased the shelf-life of fruits as compared

Table 1. Variation in juice content of passion fruit in response to packaging materials and storage conditions

Treatment	% juice content (days after storage)				
	4	7	10	13	16
Packing material (M)					
Control (M_1)	26.27	26.28	26.07	25.36	23.92
Perforated polythene packing (M_2)	26.91	26.20	25.63	25.48	24.99
Non-perforated polythene packing (M_3)	26.58	25.81	2587	25.55	25.11
Cling film packing (M_4)	27.02	25.85	25.63	25.24	24.77
Fresh banana leaf packing (M_5)	26.73	24.97	25.23	25.15	24.75
Fresh *Phrynum* spp Leaf packing (M_6)	28.30	26.09	25.86	25.33	24.34
$CD_{0.05}$	NS	NS	NS	NS	NS
Storage condition (S)					
Ambient condition (S_1)	26.74	25.34	2545	25.10	24.42
Zero Energy Cool Chamber(S_2)	27.19	26.40	25.94	25.60	24.86
$CD_{0.05}$	NS	NS	NS	NS	NS
Interaction					
$CD_{0.05}$ (MxS)	NS	NS	NS	NS	NS

to control (M_1) which had the shortest shelf-life (5.5 days) while non-perforated polythene packing (M_3) had the highest shelf-life (23.5 days).

Of the two storage conditions fruits from ZECC storage condition (S_2) had slightly better shelf-life (16 days) than the ambient condition (S_1) which had shorter shelf-life (14 days).

The juice content of the fruits was found to decrease with the increase in storage period in all the packing treatments. This was similar with the findings recorded in other fruits like Kagzi lime (Bhullar1983) and Mosambi, sweet orange (Ladaniya and Singh 2001).The decrease in juice content was slower in non-perforated polythene packing while the decrease was faster in no packing fruits. A similar result was recorded by Ganapathy and Singh (1976) in passion fruit. Besides that fruits from ZECC had slightly better shelf-life than ambient conditions. Similar results were also obtained by Collazos et al (1984) in passion fruit, tasco and tomato and by Mohammed (1983) in passion fruit. Kamble and Chavan (2005) also recorded more shelf-life of custard apple fruits under cold storage than under ambient condition.

Table 2. Influence of packing materials and storage conditions on shelf-life of passion fruit

Packing material (M)	Shelf-life (days) Ambient (S_1)	Storage condition (S) ZECC (S_2)	Mean
Control (M_1)	4	7	5.5
Perforated polythene packing (M_2)	16	16	16
Non-perforated polythene packing (M_3)	22	25	23.5
Cling film packing (M_4)	13	19	16
Fresh banana leaf packing (M_5)	13	13	13
Phrynum spp leaf packing (M_6)	16	16	16
Mean	14	16	

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