Synopsis

on

Effect of different coating materials on shelf life and post harvest quality of guava fruits

DISSERTATION -1 REPORT

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CERTIFICATE

This is to certify that synopsis titled **"Effect of different coating materials on shelf life and post harvest quality of guava fruits"** submitted in partial fulfilment of the requirement for the award of degree of **Master of Science** in the discipline of **Horticulture,** is a research work carried out by **Harpreet Kaur (Registration No. 11718232)** under my supervision and that no part of this synopsis has been submitted for any other degree or diploma.

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Introduction

Guava (Psidium guajava) belongs to the family Myrtaceae .The centre of origin of guava is Peru. Guava improvement work was started in 1907 at Pune. Uttar Pradesh produced best quality of the guava. Guava constituents rich content of the vitamin c. Guava fruit is most useful for the human diet to avoid the scury disease problem in the human body.Guava is hardy ,proflic bearer and highly renumerative fruit .Guava cultivation is done on the commercial scale. The Shapes of guava fruit ranges from round, oval, to pear -shaped and edible portion is thalamus and pericarp the nature of the trees of guava is spreading and bushy type. The bark of the trunk is bright and smoothy. Its leaves are light green and aromatic when crushed, (Yadav, 2002). Guava fruit is available to each and every person at very low price during the season. There are mainly three bahar season of the guava fruit. Ambe bahar ,Mrig bahar, Hasth bahar. The fruits of the ambe bahar is of the poor quality whereas the fruit of the hasth bahar having excellent quality and good yield .There are two types of the fruit one is completely seedless and other is partly seeded which are borne on the plants of seedless variety. In India guava production is about 25.10lakh tones and occupies an area of about 2.25 lakh hectares. Guava is cultivated in India since early 17th century and become a crop of commercial significance. It succeeds under a wide range of climatic conditions ranging. The range vary from sea level to an altitude of 1515m (5000 ft). The annual rainfall below 1016 mm from June to September. Fruit quality of the winter guava fruit is best, it escapes the attack of the fruit flies. Guava is the fifth most important fruit crop from the production point of view after the banana , citrus ,papaya. The total area of production and productivity of guava in India is about 0.244 million hectare, 33,18000 million tones and 13.5 mt/ha, respectively. In Madhya Pradesh total area and production of guava is about 7 mt/ha. Madhya Pradesh rank 1st in production of the guava it shares about 3.5 % area of production in India (NHB, 2014). Major guava producing districts in Madhya Pradesh are Jabalpur, Ujjain, Ratlam, Rajarh and Mandsaur (NHM, 2014).

Guava fruit becomes fully ripe between 3-5 days at room temperature The guava is highly perishable in the nature and it is susceptible to mechanical damage and chilling injury and has a limited postharvest shelf life. Guava fruit is the rich source of the pectin content. Several products like jam jelly ,RTS and the canned fruits are prepared from the ripe fruits of the guava. After the fruit have been harvested at optimum maturity the important work is to maintain the

quality of the fruit as such. The post harvest losses can be minimize by checking the rate through transpiration and respiration (BisenandPandey,2008).Post harvest dipping treatment increases the shelf life of the fruits by keeping their freshness and firmness as such.(Ahmead et al.,2005). Antioxidants also help in extending the shelf life of fruits. These are the compounds, which prevent the free radical formation and cell membrane disintegration which occurs by Lipoxygenase and lipid peroxidation reactions. Various commercial antioxidants are being used in post harvest sectors or in the food industries are like ascorbic acid, sodium benzoate, chitosan, benzyl adenine, butylated hydroxytoulene etc. These antioxidants will prevent or delay the formation of free radicals and different degenerative pathways like lipoxygenase reactions which would enhance the production of ethylene that may lead to the ripening (Bousquet and Thimann, 1984).

Problem Background

Fruits and vegetables are very important supplements to the human diet. The production of fruit and vegetables during 2006-07 as per the data available with the National Horticulture Board (NHB) is 58.92 and 116.03 million tonnes, respectively. Latest information indicates that 30% of all fruits produced (roughly worth Rs 13,600 crores) and 30% of the vegetable crops the country produces (worth Rs 14,100 crores) are lost due to mismanagement or due to improper handling. According to a combined study conducted by CII and McKenzie, at least 50% of the produced fruits and vegetables in the country are lost due to wastage and value destruction or due to improper handling. The loss rate about 50% the net availability of fruits and vegetables should be about 87 million tonnes. As per the National Institute of Nutrition (NIN) at least 300 g of fruit and vegetables are to be consumed by an individual for a balanced diet. Thus when the population is one billion, the minimum requirement of fruits and vegetables in the country is about 110 million tonnes in order to meet our basic nutrition requirement. The only way to deal with the present situation is to give a massive thrust to reduction of post harvest losses in order to make the food more available. There are following major issues reported in post harvest handling of Guava .Lack of sorting facilities, inappropriate packaging, and slow transport systems and inadequate storage facilities are the main key points of post harvest losses. Post harvest loss account direct physical and the quality loss which result to reduce the economic value of the fruit crop. Grading is generally not followed at the producer's level. As a whole, grading facilities of the desired level have not been created. Such facilities have to be developed

at packing houses / grading and packing-centers for farmers. Cold storage industry is more than a hundred years old. A number of cold storages have been set up . The capacity of cold storage was 18.21 million tonnes as on 31 December 2003, which is only 12.49% of the total production of 145.78 million tonnes. In recent years, due to the increase in the cost of land and building materials, and labour charges the cold storages is less attractive from profit point of view. This changes lead to decrease the demand of the cold storage houses.

Review of Literature

Bhalerao et al.(1994) reported that the guava cv. Sardar fruits were dipped in plant growth regulator solutions (15 ppm BA or 150 ppm NAA) and/or 2 % Ca(NO3)2solution to prolong the storage life of the guava fruit.

Pathmanabanet al. (1995)studied that the guava fruits are dipped in CaCl2 solution to prolong the shelf life of the fruit . Moisture loss was high in untreated fruit whereas minimum water loss was observed in fruits treated with fused Ca salts.

Singh (1998) reported that the use of the Calcium nitrate, NAA and GA to extend the storage life of Allahabad Safeda. Lower concentration of Calcium nitrate (1 %) and higher concentration of NAA (100 ppm) and GA3(40 ppm) were effective to reduced the rate of respiration. However, 1 per cent Calcium nitrate + 100 ppm NAA showed beneficial effects in prolonging the storage life of fruits as compared to remaining combinational treatments. The untreated fruits remained in acceptable conditions only for 3 days.

Jagadeesh and Rokhade (1998) studied the effect of various treatments on the storage behaviour of Sardar guava. Fruits were packed in cartons and 200 guage polyethylene bags. The physical and chemical characteristics remain better in polyethylene packed fruit and the organoleptic rating was higher under carton packaging.

Jayachandran et al.(2004) studied the effect of post-harvest application of calcium compounds to improve the quality of guava cv. Lucknow - 49 fruit during storage. the results revealed the superiority of calcium nitrate over the other calcium compounds used. Calcium nitrate (1%) recorded the highest values of moisture content (81.75%), ascorbic acid (216.23 mg/100g),and organoleptic rating (53.50%).

Selvan and Bal (2005) reported the effects of GA3(25, 60 and 75 ppm),

NAA (25, 50 and 75 ppm), calcium nitrate (0.5 and 1%) on the shelf life of guava cv. Sardar. Application of calcium nitrate at 0.5 and 1% resulted in the highest mean total soluble solid

content (11.50%) and lowest mean spoilage (10.16%),respectively. Mean acidity and vitamin C content were highest with the application of 500 ppm benlate, whereas the mean sensory score was highest with the application of 1% calcium nitrate.

Rajput et al. (2008)studied the shelf life of guava fruits cv.Gwalior-27 increased with the increase in concentration of calcium compounds and Bavistin. The maximum shelf life, total soluble solids (TSS), ascorbic acid, pectin content and the minimum titrable acidity of guava fruits with pre-harvest spray of 2.0% Ca(NO3) and post-harvest dip in 2.0% Ca(NO3). Pre-and post-harvest application of calcium compounds and Bavistin significantly affected the shelf life of guava fruits.

Rajput (2010)studied that the calcium nitrate 2% had improved the fruit quality including the highest TSS, reducing sugar, total sugars, ascorbic acid and pectin content, while recording the lowest titratable acidity in guava fruits. Thus highest level of calcium nitrate improved the quality parameter of guava fruits under this study. Calcium nitrate 1% spray also improved the fruit quality traits in comparison to calcium chloride and control. The highest ascorbic acid and pectin content among all the treatments was recorded with 2% calcium nitrate which signifies positive role of calcium nitrate in improving the fruit quality.

Agrawal and Jaiswal (2012) observed the physico-chemical characteristics and shelf-life of guava fruits treated with 2.0 percent calcium chloride, 2.0 percent calcium nitrate, 1000 ppm copper oxychloride and distill water. All tested treatments indicated a significant changes in weight loss, total soluble solids, non-reducing, reducing, total sugars, pectin and rotting percentage in guava fruits of experimental set that of the controlset. The significant impact of treatment is found on the least rotting percentage in the order of fruits treated with calcium nitrate 2.0 percent and calcium chloride 2.0 percent. Hence, it could be concluded that post-harvest chemical treatment with calcium nitrate has the potential to control rotting incidence, prolong the shelf-life and preserve valuable attributes of post-harvest guava, presumably because of its effect on inhibition of ripening and senescence process.

Agrawal (2012)studied that the effect of pre and post harvest applications of different chemicals on shelf life of guava fruits during storage. The data showed that the pre-harvest spray of 2.0 per cent calcium nitrate solution and post harvest dip in 2.0 per cent calcium nitrate solution recorded highest shelf life of guava fruits followed by pre-harvest spray of 2.0 percent starch (potato) solution and post-harvest dip in 2.0 per cent calcium nitrate solution. The lowest values

of shelf life of guava fruit were recorded with pre-harvest spray of distilled water and post-harvest dip in any treatments.

Proposed Research Objectives

For good quality and shelf life of guava, The investigation will be carried out as studies on the effect of edible coatings on the physico-chemical attributes of guava fruit with following objective.

i. To standardize the best coating material for extending the shelf-life of guava fruits.
ii. To study the effect of edible coating on physical and chemical parameters of guava fruits

Proposed Research Methodology

The present investigation entitled "Effect of different coating materials on shelf life and post harvest quality of guava fruits" will be conducted at post harvest laboratory, Department of Horticulture, Lovely Professional University, Punjab..

The details of materials will be used during experimentation and methodologies followed are as below:

Details of experiment

Details of the experiment are given below:

Treatment symbol	**Treatment details**
T1	Control
T2	Aloe Vera
T3	Chitoson
T4	Aloe Vera+Ascorbic Acid
T5	Chitoson+Ascorbic Acid
T6	Aloe Vera+ Chitoson
T7	Aloe Vera+ Chitoson+Ascorbic Acid

5.1 Observations recorded

5.1.1 Physiological Parameters

i. Physiological loss in weight (%)

5.1.2 Fruit physical parameters

i. Fruit weight
ii. Specific gravity

iii. Marketable fruits retained

5.1.3 Quality Parameters

i. Total soluble solids (°Brix)

ii. Titrable acidity (%)

iii. Ascorbic acid (mg/100gm)

iv. TSS: acid ratio (%)

v. Total sugar (%)

vi. Reducing sugar (%)

vii. Non-reducing sugar (%)

Expected Research Outcomes

Better quality and higher shelf is pre requisite for post harvest management of guava fruit. Proposed plan will be helpful in selecting edible coating material which helps in maintain shelf life and post harvest quality of guava fruits.

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