

**MANUFACTURE OF VALUE ADDED PAPAYA
PRODUCTS.**

By

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DECLARATION

The work in this thesis was carried out by me under the supervision of Prof. Athur Bamunuarachchi (Food Science & Technology department , University of Sri jayawardhenepura) and a report on a this has not been submitted in whole or in part to any University or any other institution for another Degree /Diploma.


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I Prof. Athur Bamunuarachchi hereby certify that the statement in the proceeding pages made by the candidate is true and that this thesis is suitable for submission for the University for the purpose of evaluation.



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SRI LANKA.

DEDICATION

AFFECTIONATELY DEDICATED
TO
MY LOVING PARENTS AND SISTERS

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ABBREVIATIONS

aw	Water activity
SMS	Sodium Metabi Sulphate
GMP	Good Manufacturing Procedures
PDA	Potato Dextrose Agar
UV	Ultra Violet
A.A	Ascorbic Acid
TRC	Total Plate Count
ND	Not Detected
H ₂ O	Water
C.HCl	Concentrated hydrogen Chloride
AOAC	Association of Official Analytical Chemists
SLS	Sri Lanka Standards
HPO ₃	Meta Phospheric Acid

Development of value added Papaya Products

By

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ABSTRACT

Most fruits and vegetables are seasonal. Due to improper post harvest handling there isn't a constant supply of fruit and vegetable to market. For this seasonal fruits need storage and preservation methods to extend shelf life. Osmotic dehydration, Dip in sugar syrup (minimally processing), Making fruit drink, and making value added ready to eat pulp are some of the methods which can be used for preserve papaya. These can be done easily and less expensively. In cottage level also this can be done. That gives opportunity for farmers to preserve their fruit by themselves.

Fresh ripped yellow and red papaya were used for this study. For osmotic dehydrating use only sugar solutions at various drying time. For papaya pulp in bottles used heat treatment up to 80°C and exhausting before sealing. SMS 300ppm was added as preservative. Pulp in cups as an instant product only use heated fruit pulp and lemon juice. That was done variation on lemon juice. Papaya drink was prepared with using well ripped papaya, sugar and water. Water and sugar content was changed to make different taste.

Vitamin C content, PH, Moisture, Water activity, Brix value of the sugar solution and pieces were measured according to the experiment.

Finally sensory evaluation was done by using nine point hedonic tables and were analyzed by ANOVA variance analysis.

According to results products all products were accepted by panelists

CHAPTER 1

Introduction

Papaya is a common fruit grown in Sri Lanka as well as other tropical countries. The origin of the plant is Eastern central America. It is a seasonal fruit. There are several varieties of Papaya available in the Sri Lankan market. Mainly pericarp colour of red/Orange to yellow. For this research, to prepare fruit drink used yellow coloured pericarp fruits and for other products used red

Papaya fruit contain higher amount of water (86.6%) and carbohydrate content is 12.2%. Because of this higher water content fruit spoil easily. Therefore post harvest losses are high.

Preservation of fruit prevent post harvest losses and also makes the fruit available during off season.

Modern world people are keen on eating fruits, which helps to maintain good health and also they like to buy ready to eat food products. So food industry focus on this type of products with higher nutritional value. In the current food market there is a demand for minimally processed food products.

There are lot of preserving methods available. such as making juices, cordial, nectar, jams, jellies, chutney, candid papaya, osmotic dehydration some of them.

Mixed fruit juices are available in markets, but sole papaya drink can be introduce as a new product. Over ripped fruits, which can't be use for direct eating can be used for this purpose.

Pulp can be used as a major product for further preparations as well as a ready to eat product. Value added papaya pulp in cups can be introduced as a ready to eat desert.

Osmotic dehydration is a traditional method used for food preservation. By using this method snack like products can be developed. This is an economical method. Due to the pressure gradient water lost from the fruit and the water activity is lowered, that inhibit the growth of micro organisms.

Objectives

- *Minimize wastage of Papaya
- *Give a new product by value addition to the traditional fruit.
- *To increase shelf life of Papaya products.
- *Study the variation of nutritional values (Vitamin C, Carotene and Reducing Sugar content) in fresh Papaya and Value added products.

CHAPTER 2

Literature Survey

2.1 . Common Introduction.

Common name ; Papaya, Papaw, Paw Pa w

Botanical name ; *Carica papaya* L.

Native ;

Eastern Central America

Distribution :

Now it distributed through out the tropical areas in the world. Common fruit in Sri Lanka. Commonly grown in Hambantota, Moneragala, Anuradhapura , Polonnaruwa and most other districts.

Tree:

The Papaya tree is a perennial, usually not more than 7m tall. Its stem is light green and hollow, less than 30cm diameter. Plant is often single but may branch occasionally. Topped with a crown of leaves and fruit. When a leaf or fruit becomes senescent, it will eventually detach and leave a clear scar on the stem.

Leaves have hollow petioles 60cm long or more and nearly round, deeply lobed blades up to 75 cm across.

Individual plant are usually unisexual, but hermaphrodite (bisexual) flowers and trees also occur.

Flower

The male flowers are stalk less, 2-3cm long,

Funnel shape, with 10 stamens in each , and borne in slender panicles up to 1cm long.

The female flower are 3-5 cm long, solitary or in a small cluster in the leaf axils, with an ovary 2-3 cm and five fan-shaped stigma on top. Bisexual flowers have either 5 or 10 stamens.

Fruit

Fruits are melon like , elliptic, pear shaped, cylindrical. Pear shaped and hermaphroditic fruit is the most common in markets. Length varying from 10-50cm.

Weight from less than 100g to 10Kg. Peel thickness may vary . Thickness of flesh may vary from 1.5 mm to 4 mm. A sweet juicy ,yellow orange to red colour pericarp. This pericarp colour depend on cultivar. Central cavity containing small black seeds.

Plant flower within 6 month from sowing and fruit 4-5 month after flowering .

Productivity decreased with age.

Quality characteristics and criteria

Size , shape, smooth skin and absence of blemishes are major characteristics.

2.2 Pathology of Papaya

Most common one is the ring spot virus attack.

The major post harvest diseases are anthracnosis and stem end rotting. Especially anthracnosis become a problem when fruit have 25 %or more Skin yellowing.

This post harvest diseases increases after 4 weeks of storage. This happens due to mechanical and thermal injuries occur during handling and storage.

Another disease is *Rhizopus* rot disease. This occurs on cuticle disruption or breaking of cuticle and also on fruit fly punctures. When fruit is 40- 60 % yellow , this problem increases.

Cercospora black spot is caused on skin .

Fruit fly infestation is common in Papaya.

2.3 Post harvest losses of Papaya

About 46% of Sri Lankan Papaya production losses in post harvest stage.

	% of losses
Producer	6%
Collector	10%
Wholesaler	20%
Retailer	10%
Total	46%

Table 1

2.3.1. Treatments for post harvest diseases,

These diseases are effectively controlled by dip in hot water at 49⁰ C for 20 minutes.

Fungicide treatment.

Heat treatment and irradiation used for fruit fly disinfestations.

2.4. Horticultural Maturity indices

Minimum standard for soluble solid content is 11.5%. So fruit should have started ripening before harvesting, as indicated by skin yellowing.

If the fruit is not mature , it contains low sugar content and poor ripening.

2.5. Physiological Disorders of Papaya available in market

These are non pathological disorders.

There are number of disorders ,