

PROCESSING OF PETHA



AATMANIRBHAR BHARAT

**PM Formalisation of Micro Food Processing
Enterprises Scheme (PM FME Scheme)**

INTRODUCTION

Industrial Overview:

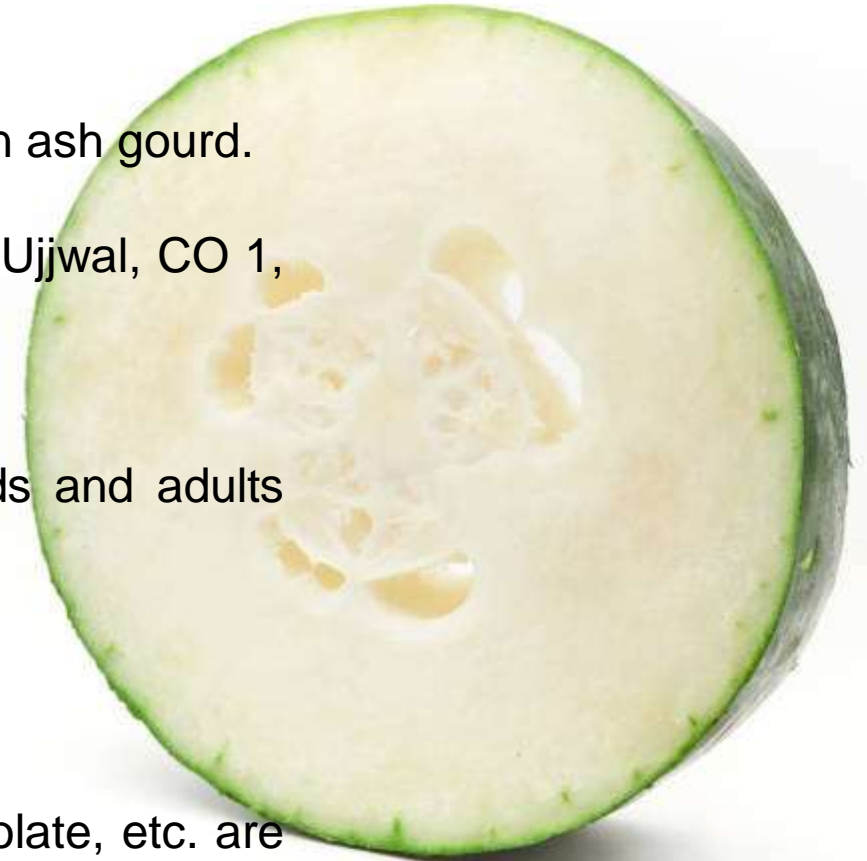


- Petha is a translucent candy made from ash gourds.
- In order to certify their place of origin, Petha made in Agra has a Geographical Indication (GI).
- Due to its ingredients of fruit, sugar, and water, it is considered the purest dessert in the world.
- Petha is generally made by cutting ash gourd into cubes, soaking in lime, boiling, and coating in flavored sugar syrup.
- With the growing demand of this Indian dessert, there is now a wide variety of Petha available including kesar petha and angoori petha.

INTRODUCTION

Product Description:

- Very popular "Petha" is made from Ash gourd fruit.
- A white gourd, winter melon, or fuzzy melon is also known as an ash gourd.
- Suitable variety of ash gourd for Petha making VAG 502, Pusa Ujjwal, CO 1, CO 2, Kashi Ujwal, MAH 1.
- Petha is of rectangular or cylindrical shape and loved by kids and adults alike.
- It is originated to Southeast Asia.
- kesar petha, angoori petha (grapes), paan petha (petha) chocolate, etc. are now the alternative for buyers.



Medicinal important of Ash Guard

- The importance of Ash gourd fruit is known since old times.
- it has been thought to be alkaline in nature, and hence its consumption has a cooling and neutralizing effect on stomach acids and as such used effectively for treating digestive ailments like hyperacidity, dyspepsia, and ulcers.
- It is also used to treat diabetes.
- Ash gourd carry modest levels of other B-complex groups of vitamins like riboflavin, pantothenic acid, and minerals like phosphorus, zinc, calcium, iron, and manganese.
- Ash gourd peel is a good source of dietary fiber that helps in smooth bowel movements and offers protection against colon cancers by eliminating toxic compounds from the gut.



Market Potential:

Agra's famous petha sweet industries as well as tourism, which went into near closure, are ecstatic.

As the Taj Mahal re-opens, the petha industry has greatly benefited.

Around 50 % of sales of Petha are due to agro-tourism.

The sellers, the processor, the distributor are all directly or indirectly linked to the Petha processing business and development.

About 1500 cottage units produce 700-800 tons of Petha daily.

Presently 15 varieties of petha are manufactured in India.



INTRODUCTION

Raw Material Description:

- Ash gourd is one of India's very important cucurbit plants.
- Ash gourd fruit has a long shelf life and good value-added properties.
- The fruit of ash gourd in India is commercially used for the production of candy and a variety of sweet delicacies called petha.
- in the southern and eastern part of the country of a variety of sweet delicacies known as petha in the north of India.
- Uttar Pradesh city of Agra (U.P.) India has become a renowned business hub for petha sweet manufacturing.

INTRODUCTION

Types of Raw Material:

The following Raw material required for the 100 kg Petha preparation.

Raw Materials Required	Weight
Ash gourd	200 250 kg
Water	500 liters (As required)
Lime	10 Kg
Alum	500 g
Citric acid	200 g

PROCESS & MACHINERY REQUIREMENT

Raw Material Aspects:



The fruits are ready for harvesting after 90 to 100 days after sowing.



This may continue up to 5 months (150 days) after sowing.



For the good quality of the petha, mature fruit is procured or harvested from the field.



Immature fruits are avoided at the time of raw material selection.

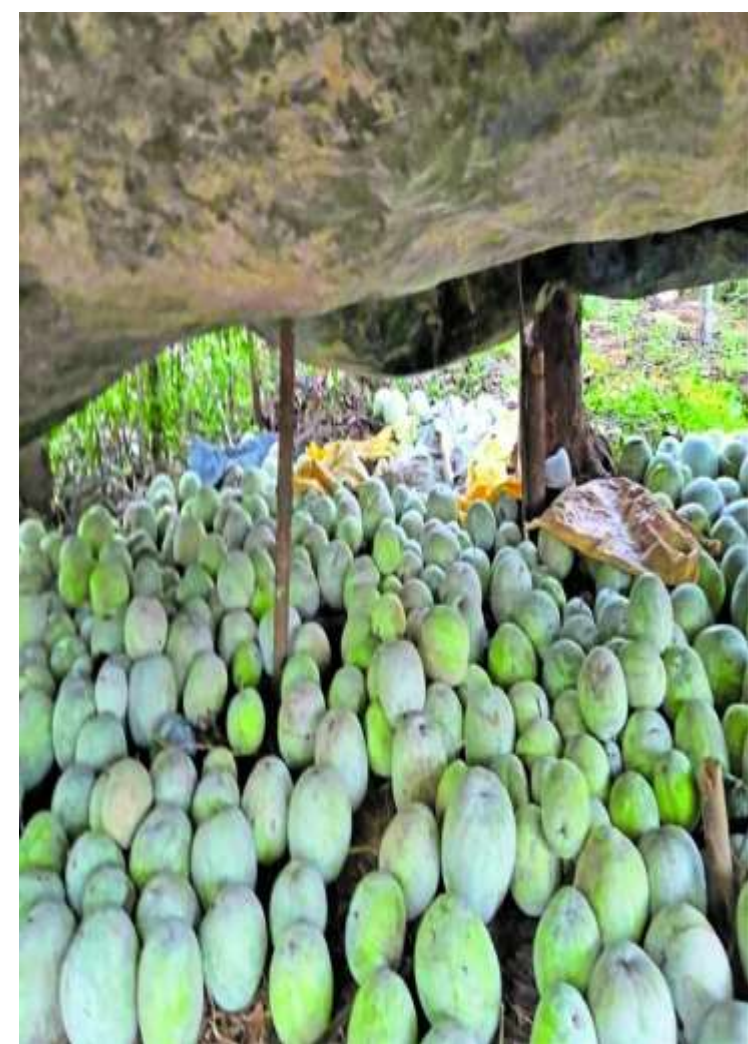


Matured ash gourd fruit has a good shelf life.



The harvested fruit can be kept for 3 to 4 months without any special arrangement wash the fruits thoroughly after harvesting before storing.

Source of Raw Material:



- Ash gourd is not very popular as A vegetable but known for its value addition quality.
- A badi is prepared from ash gourd fruit.
- The fruit can cultivate any soil and does not require special care.
- Uttar Pradesh is the largest producer of ash gourd fruit especially in the area near agra city.
- The raw material for the petha industry can be procured directly from farmers or agricultural mandi.
- Contract farming can be the best option for suitable raw material availability.

Technologies:

Traditional Technology

- Petha Fruits (Ash Gourd) are directly procured from the farmer's field.
- Washing, Sorting, and peeling of Petha fruit is done manually.
- Then they are cut into pieces.
- These pieces are pierced with nail-like spikes.
- Pierced pieces are then immersed in Lime Water for 2 hrs. Then these pieces are boiled in water with Alum.
- After they are boiled, the Pieces are finally immersed in boiling sugar syrup for an hour.
- Finally, these pethas are dried in trays for further packaging.
- Final packaging is done and sends to the market.



Technologies:

Modern Technology

- With the rise of modern mechanization, the process of making Petha is being automated.
- Some of the innovative industries are using automatic fruit washing, peeling, piercing, and boiling cattle for making the petha.
- The Addition of medicinal plants and other flavors from Havana, Menthol, vetiver grass, lemongrass, are being used for value addition of the petha industry.
- The advantage of this modernization is that the capacity of processing also enhances the process and becomes hygienic also.

PROCESS & MACHINERY REQUIREMENT

Fruit selection and Harvesting of Ash gourd

- Mature fruit are harvested from the field.
- The fruits can also be directly procured from market.
- The ash gourd to be candied must be of perfect maturity stage and is free of fibers.



PROCESS & MACHINERY REQUIREMENT

Peeling, Cutting & Seed Removal

The harvested wax gourd is washed and cleaned.

The seeds are removed and It is then peeled and cut at an approximate dimension (cubical, cylindrical or spherical.), dimension and shape can vary according to choice.



PROCESS & MACHINERY REQUIREMENT

Piercing or Forking

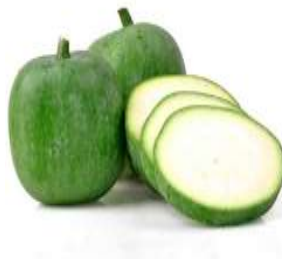
After peeling and cutting operations, pieces of Ash gourd are pierced with metal to ensure proper porosity. This would at last ensure proper entry of the sugar syrup.



PROCESS & MACHINERY REQUIREMENT

Soaking in lime water-

- The pierced/forked pieces of Petha are then dipped in lime water for around 2-3 hours.
- The proportion used is usually 20 kilograms of lime per 100 liters of water.
- This process helps to harden Petha to makes it compact. The methodology behind the use of calcium in the fruit slices to create an intercellular bond and making it more textured and rigid.



PROCESS & MACHINERY REQUIREMENT

Washing in running water

- After Dipping Petha in lime water, it is washed constantly in clear running water.
- Wash the calcium dipped bits in running water until the lime is completely washed away.
- In order to ensure the elimination of excess calcium ions, this is an essential and mandatory process.



PROCESS & MACHINERY REQUIREMENT

Dipping in chilled water

- The petha is dipped in chilled water after being cleaned in running water to reduce exothermic reactions due to excess Ca^{2+} ions are minimized.
- This is done for half an hour or 1 hour.



PROCESS & MACHINERY REQUIREMENT

Boiling with Alum

- Petha bits are boiled for one hour in water containing alum.
- This process is called, 'Josh Lena'.
- In order to preserve the standard of Petha, this is a very important step that must be performed cautiously and skillfully.
- This is achieved to maintain surface smoothness and reduce the effects of exothermic damage caused by excess calcium ions in the fruit tissues.



PROCESS & MACHINERY REQUIREMENT

Preparation of sugar syrup

- 70-80% of sugar is dissolved in water and is boiled at 100°C.
- After cooking for 5-10 minutes citric acid 2-3g is added / liter of water.

Boiling with sugar syrup

- The treated fruit pieces are dipped in boiling sugar syrup of suitable consistency.
- The sugar syrup and the fruit parts are boiled until the sugar syrup reaches a very high consistency (up to 80- 90 percent).
- To ensure consistent mixing, the petha is cooked properly and stirred periodically.



PROCESS & MACHINERY REQUIREMENT

Draining of excess sugar syrup

- The excess syrup is drained out.
- Then one then Rose petals, essence & flavoring agents such as saffron, are added to make different flavors of pethas.
- It is then cooled into assorted boxes and bins until it is packaged.



Cooling and packing

- After overnight soaking, the Petha are cooled and are packed in airtight packaging.





PROCESS & MACHINERY REQUIREMENT

Flow Chart:



Machine and Equipments	Description	Machine Image
Weighing machine	Weighing scales are used to measure weight of product and raw materials.	
Fruit washing machine	This machine is used for washing fruit.	

Flow Chart:




Machine and Equipments	Description	Machine Image
Fruit Peeling & Cutting Machine	This machine is used to peel the given fruit or vegetable using appropriate blade set. Flowed by chopping into required size using chopper.	
Piercing Press	This machine is light duty press used for perforating	

PROCESS & MACHINERY REQUIREMENT

Flow Chart:

Machine and Equipments	Description	Machine Image
Steam Jacketed Kettle	Steam jacketed kettle are used for boiling the ash gourd and sugar syrup	
Tray sealing machine	The tray sealing machine is used for sealing the containers or boxes for final packaging.	

Additional Machine & Equipment:

Machine and Equipments	Uses	Picture
Iron Karahi	Karahi serve for the Boiling, frying of different type of food. In Petha manufacturing this is used for boiling petha fruit. Which are often named Karahi dishes after the utensil.	
Stove	Stove is heating device in which natural gas is used for fuel. Gas may be supplied to the burner prior to combustion at a pressure sufficient to induce a supply of air to mix with it.	
Material Handling Equipments & hand tools	Bins, Trays, Trolleys, knife etc. Uses for material handling	

Process & Machinery Requirement

General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	<ul style="list-style-type: none"> ➤ Proper periodic lubrication of all bearings in various machines. ➤ Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	<ul style="list-style-type: none"> ➤ Ensure proper weighing & metering specially in case of semi-automatic plant. ➤ Install warning sensor in buffer region of loading capacity to ensure efficient operation.
3.	Mechanical Key Failure	<ul style="list-style-type: none"> ➤ Ensure that mechanical keys are replaced as per there pre-defined operational life. ➤ Prevent Overloading.

Process & Machinery Requirement

General Failures & Remedies:

S. No.	General Failures	Remedies
4.	Loss of Interface	<ul style="list-style-type: none"> ➤ This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant & ensure no employee goes near transmission lines, unless authorized. ➤ Provide proper physical shielding for the connections.
5.	Improper Boiling	<ul style="list-style-type: none"> ➤ This basically arises due scaling within cooking kettle due to use of hard water. ➤ This problem is resolved by using appropriate descaling agent.

PROCESS & MACHINERY REQUIREMENT

Nutritional Information:

Major component of Ash gourd

Principle	Nutrient Value	Percentage of RDA
Energy	13 Kcal	1%
Carbohydrates	3g	2.3%
Protein	0.4 g	<1%
Total Fat	0.2 g	1%
Cholesterol	0 mg	0%
Dietary Fiber	2.9 g	7.6%
Vitamins		
Folates	5 µg	1.25%
Niacin	0.400 mg	2.5%
Pantothenic acid	0.133 mg	2.5%

PROCESS & MACHINERY REQUIREMENT

Nutritional Information:

Major component of Ash gourd

Principle	Nutrient Value	Percentage of RDA
Pyridoxine	0.035 mg	3%
Riboflavin	0.11 mg	1%
Thiamin	0.04 mg	3.3%
Vitamin-A	0 IU	0%
Vitamin-C	13 mg	14%
Electrolytes		
Sodium	6 mg	<0.5%
Potassium	111 mg	2.4%
Minerals		
Calcium	19 mg	2%
Iron	0.4 mg	5%
Magnesium	10 mg	2.5%
Manganese	0.058 mg	2.5%
Phosphorus	19 mg	2.5%
Selenium	0.2 µg	<1%
Zinc	0.61 mg	6%

Export Potential & Sales Aspect:

- Agra's petha is so famous that varieties are available in most of the Indian markets.
- The Agra Petha industry produces 700 to 800 tons of petha every day.
- it has over 50,000 employees in over 700 small and large production plants.
- One of the very famous and most reckoned Panchhi Petha House is the oldest chain of manufacturing and exporting petha in the city.
- The preservation of variety and choice of flavor as a petha criterion is the most common export commodity for countries around the world. Research and innovations are required in the petha industry.



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