

## FRUITS, BENEFITS, PROCESSING, PRESERVATION AND PINEAPPLE RECIPES

Joy P. P. & Minu Abraham, Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India, Tel. & Fax: +914852260832, Email: prsvkm@gmail.com



### FRUITS

Fruits are nature's wonderful medicines packed with vitamins, minerals, anti-oxidants and many phyto-nutrients without which human body cannot maintain proper health and develop resistance to disease. They also contain pectin, cellulose which stimulates intestinal activities and energy giving substances like oils, fats and proteins. Many fruits have medicinal values. Fruits are a high-moisture, generally acidic food that is relatively easy to process and that offers a variety of flavor, aroma, colour and texture to the diet.

Fruits, eaten raw or consumed as fresh juice are an excellent way to retain and balance moisture level in a body. The low level of sodium in fruits plays an important role for people who avail of salt free diet.

Fruits are an important source of energy. Eating fruit provides health benefits — people who eat more fruits and vegetables as part of an overall healthy diet are likely to have a reduced risk of some chronic diseases. Fruits provide nutrients vital for health and maintenance of our body. However, their availability is seasonal and they are perishable. Hence, they need to be processed to make juices, squashes, jams, etc and preserved.



### BENEFITS

#### *Health Benefits*

- Eating a diet rich in fruits as part of an overall healthy diet may reduce the risk of heart disease, including heart attack, obesity, type 2 diabetes and stroke and may protect against certain types of cancers.
- Eating fruits rich in potassium may lower blood pressure and may also reduce the risk of developing kidney stones and help to decrease bone loss.
- Eating fruits that are lower in calories may be useful in helping to lower calorie intake.
- Fruits hydrate the body because they are made up of 90 - 95 percent water. Water is an important nutrient. It is responsible for transporting nutrients around the body, regulating body temperature, keeping joints moist and getting rid of waste products in the body.
- Fruits keep the body regular because they are rich in fiber, which is essential for the smooth movement of food in the body's digestive system. Fruits help maintain easy bowel action and eating fruits every day will prevent constipation.
- Fruits give the body energy because they contain carbohydrates, which are the body's main source of energy. Carbohydrates in fruits are mainly sugar, which break down easily and make a quick source of energy.

### **Nutrients**

- Most fruits are naturally low in fat, sodium, and calories. None have cholesterol.
- Fruits are sources of many essential nutrients that are under consumed, including potassium, dietary fiber, vitamin C and folate (folic acid).
- Diets rich in potassium may help to maintain healthy blood pressure. Fruit sources of potassium include bananas, prunes and prune juice, dried peaches and apricots, cantaloupe, honeydew melon and oranges.
- Dietary fiber from fruits, as part of an overall healthy diet, helps reduce blood cholesterol levels and may lower risk of heart disease. Fiber is important for proper bowel function. It helps reduce constipation. Fiber-containing fruits help to provide a feeling of fullness with fewer calories. Whole or cut-up fruits are sources of dietary fiber; fruit juices contain little or no fiber.
- Vitamin C is important for growth and repair of all body tissues, helps heal cuts and wounds and keeps teeth and gums healthy.

### **Pineapple: Nature's Healing Fruit**

- Pineapple is one of the popular fruits and is liked by majority of the people irrespective of their age group. Pineapple is an important food which can be eaten fresh or eaten in a processed form. It is composed of nutrients which are good for human health.
- Pineapples are nutritionally packed members of the bromeliad family. This delightful tropical fruit is high in the enzyme Bromelain and the antioxidant vitamin C, both of which play a major role in the body's healing process. Bromelain is a natural anti-inflammatory molecule that has many health benefits and encourages healing. Pineapple fruit is very low in Saturated Fat, Cholesterol and Sodium. It is a good source of Dietary Fiber.
- Pineapples are packed of vitamin C and fiber – important for the immune and digestive systems.
- Pineapples have anti-inflammatory effects which are good for those long hard days and those heroic sporting injuries.
- They contain the enzyme Bromelain which is thought to aid digestion
- It regulates the gland and found to be helpful in cases of goiter



### **Pineapples are beneficial for the treatment of the following**

- Dyspepsia (chronic digestive disturbance)
- Bronchitis (inflammation of the bronchial tubes)
- Catarrh (secretions from mucous membranes)
- High Blood pressure
- Arthritis (diseases of the joints)
- Intestinal worms
- Nausea (includes morning sickness and motion sickness).



## **FRUIT PROCESSING**

Fruits are highly perishable items which needs processing to make it durable. Fruit processing is any deliberate change in a fruit that occurs before it's available for us to eat. Processing methods extend the shelf life of fruits.

Fruit processing has three major aims:

1. To make fruit safe (microbiologically & chemically).
2. To provide good quality products with good flavor, color, texture and taste.
3. To make convenient fruits products

Fruits should be prepared for preservation as soon as possible after harvesting within 4 to 48 hours. As time passes spoilage increases rapidly. Fruit processing involves many steps.

### ***Cleaning and washing***

First, the fruits should be cleaned thoroughly to remove any adhering dirt or pesticide residues. This cleaning process usually involves washing the product with running water.

### ***Sorting***

To achieve a uniformly sized product, fruits and vegetables are sorted immediately after cleaning according to their size, shape, weight or colour. Sorting by size is especially important if the products are to be dried or heated, because their size will determine how much time will be needed for these processes.

### ***Peeling***

Many types of fruits have to be peeled in order to be preserved. This can easily be done with a stainless steel knife. It is extremely important that the knife be made of stainless steel because this will prevent the discoloration of the plant tissues.

### ***Cutting***

Cutting is important in order to get uniform pieces for heating, drying and packing. Fruits are usually cut into cubes, thin slices, rings or shreds. The cutting utensils have to be sharp and clean to prevent micro-organisms from entering the food.

### ***Blanching***

Blanching is a slight heat treatment, using hot water or steam that is applied mostly to fruits before canning or freezing. It is done by immersing fruits in water at a temperature of 90-95°C. The result is that fruits become soft and the enzymes are inactivated. Blanching is done before a product is dried in order to prevent unwanted colour and odour changes and an excessive loss of vitamins.



## FRUIT PRESERVATION

Fruit preservation is the process of treating and handling food to stop or slow down fruit spoilage, loss of quality, edibility or nutritional value and thus allow for longer fruit storage.

Preservation usually involves preventing the growth of bacteria, fungi (such as yeasts), and other micro-organisms as well as retarding the oxidation of fats which causes rancidity. Fruit preservation can also include processes which inhibit visual deterioration, such as the enzymatic browning reaction in apples after they are cut, which can occur after fruit cutting.

Many processes designed to preserve food will involve a number of fruit preservation methods. Preserving fruit by turning it into jam, for example, involves boiling (to reduce the fruit's moisture content and to kill bacteria, yeasts, etc.), sugaring (to prevent their re-growth) and sealing within an airtight jar (to prevent recontamination).

Maintaining or creating nutritional value, texture and flavor is an important aspect of fruit preservation.

### Preservation methods

#### *Drying*

Drying is one of the most ancient fruit preservation techniques, which reduces water activity sufficiently low to prevent bacterial growth. Drying is the partial removal of water from solid foods. It is one of the oldest methods of food preservation. It was traditionally carried out in the presence of sun.

#### *Refrigeration*

Refrigeration preserves fruit by slowing down the growth and reproduction of micro-organisms and the action of enzymes. Refrigerators should be set to below 4°C to control the growth of micro-organisms. This lowered temperature also reduces the respiration rate of fruits and retard the spoilage.

Commercial and domestic refrigerators improved the shelf life of foods such as fresh fruits and salads to be stored safely for longer periods, particularly during warm weather.

#### *Vacuum packing*

Vacuum-packing stores food in a vacuum environment, usually in an air-tight bag or bottle. The vacuum environment strips bacteria of oxygen needed for survival, slowing spoiling. Vacuum-packing is commonly used for storing dried fruits to reduce loss of flavor during oxidation.

#### *Freezing*

Freezing is also one of the most commonly used processes commercially and domestically for preserving fruit including prepared fruit stuffs which would not have required freezing in their unprepared state. Lowering the temperature below the freezing point of the product stops microorganisms from growing and reduces the activity of enzymes. Fruits are heat treated (blanched) before freezing to eliminate enzymes. Home freezers are held at -10°C,



commercial freezers are under  $-18^{\circ}\text{C}$ . At this temperature, the growth of micro-organisms is almost stopped.

### ***Pasteurization***

Pasteurization is a process of heating a product at a specific temperature for a controlled period of time to destroy the most heat resistant vegetative pathogenic organism. The process is also applied for fruit juices and juice products.

### ***Canning***

Canning involves cooking food, sealing it in sterile cans or jars and boiling the containers to kill bacteria.

### ***Importance of Sugar & Preservatives in Fruit Preservation***

Sugar is used to preserve fruits, either in syrup with fruit such as apples, pears, peaches, apricots, plums or in crystallized form where the preserved material is cooked in sugar to the point of crystallization and the resultant product is then stored dry. This method is used for the skins of citrus fruit (candied peel) and ginger.

Preservative / food additives can be antimicrobial; which inhibit the growth of bacteria or fungi, including mold or antioxidant; such as oxygen absorbers, which inhibit the oxidation of fruit constituents. Common antimicrobial preservatives include calcium propionate, sodium nitrate, sodium nitrite; sulfites (sulfur dioxide, sodium bisulfate, potassium metabisulfite, etc) and antioxidants which include BHA (Butylated Hydroxy Anisole) and BHT (Butylated Hydroxy Toluene).

### ***Pickling in Fruits***

Pickling is a method of preserving fruit in an edible anti-microbial liquid. Pickling can be broadly categorized into two categories: chemical pickling and fermentation pickling.

In chemical pickling, the fruit is placed in an edible liquid that inhibits or kills bacteria and other microorganisms. Typical pickling agents include brine (high in salt), vinegar, alcohol, and vegetable oil, especially olive oil but also many other oils. Many chemical pickling processes also involve heating or boiling so that the food being preserved becomes saturated with the pickling agent. Common chemically pickled fruits include mango and lemon.

In fermentation pickling, the food itself produces the preservation agent, typically by a process that produces lactic acid.

## **STORAGE**

Always store the preserved food in a cool place, at a temperature below  $20^{\circ}\text{C}$ . Keep glass bottles and jars out of light. The storage area has to be dry and with a consistent temperature. Moisture will make tins rust.



**Materials Used in Fruit Processing and Preservation****Fig 1: Steel bowl****Fig 2: Teaspoon (tsp) & Table spoon (tbsp)****Fig 3: Nonstick pan****Fig 4: Cup****Standard Measurements**

|         |                |
|---------|----------------|
| 1/4 tsp | 1 ml           |
| 1/2 tsp | 2 ml           |
| 1 tsp   | 5 ml           |
| 1 tbsp  | 15ml (3 tsp)   |
| 1/4 cup | 50 ml          |
| 1/3 cup | 75 ml          |
| 1/2 cup | 125 ml         |
| 2/3 cup | 150 ml         |
| 3/4 cup | 175 ml         |
| 1 cup   | 250 ml (225 g) |



## PINEAPPLE RECIPES

### 1. JUICE



Pineapple juice tastes best when chilled and it is an ideal fruit drink to consume during the hot summer days. Fresh pineapple juice contains about 75% of vitamin C. It acts as a natural antioxidant. It promotes cell growth and tissue repair. Pineapple juice also contains vitamin B6, which helps our body to regulate blood sugar and also promote a healthy immune system.

#### Ingredients (For 750 ml of juice) = 725 g

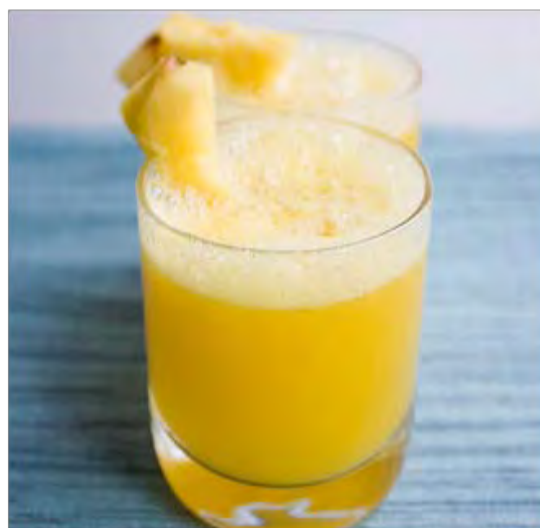
|          |             |
|----------|-------------|
| 500 gram | Pineapple   |
| 250 gram | Sugar       |
| 250 ml   | Water       |
| 1/2 cup  | Crushed ice |



**Fig 5: Ingredients for Juice**

#### METHOD

- ❖ Peel the skin and cut into small pieces.
- ❖ Blend the pineapple pieces, sugar and required amount of water in a blender.
- ❖ Then filter it to get the clear juice.
- ❖ Transfer into glass and add some crushed ice.
- ❖ Serve chilled.



**Fig 6: Juice**

### 2. PINEAPPLE JUICE CONCENTRATE

Pineapple juice concentrate is prepared from fresh, ripened pineapples to provide the essential flavour and nutrition, in a convenient, ready to use ingredient form for processed beverage and food applications.

The juice concentrate is derived when the fruit juice is evaporated and water is removed, yielding a thicker liquid product, which is a concentrate of the original fruit juice. The product having less water is easier to handle, easier to store, and because of its higher solids content, becomes easier to stabilize. These products do much better under frozen and even refrigerated storage conditions.



**METHOD**

- ❖ Peel the skin and cut pineapple into small pieces.
- ❖ Blend the pineapple pieces in a blender.
- ❖ Then filter it to get the clear juice.
- ❖ Cook the pineapple juice with sugar and citric acid.
- ❖ Boil it well by stirring continuously.
- ❖ When the sugar dissolves completely, add dissolved sodium benzoate.
- ❖ Take off from fire and allow to cool.
- ❖ Pour into sterilized bottles and seal.

**Fig 7: Pineapple juice concentrate****3. SQUASH**

Pineapple squash should be prepared from fully matured and ripe pineapple fruits free from insect infestation, diseases etc. For preparing this juicy and delicious pineapple squash, firstly clean the pineapple and peel the skin thickly. Grate the pineapple and filter the grated pineapple through a clean cloth and collect the juice out of it and keep it aside. Squash is a concentrated form of fruit drink. The pineapple squash is generally diluted 2-3 times with water at the time of consumption and chilled with ice cubes and served. Preparing the Pineapple squash is very simple and easy.

**Ingredients (For 500 ml of squash = 475 g)**

|         |                                |
|---------|--------------------------------|
| 1 cup   | Pure fresh pineapple juice     |
| 2 cups  | Sugar                          |
| 1 cup   | Water                          |
| 1 tsp   | Citric acid                    |
| 1/8 tsp | Yellow food colour             |
| 1/8 tsp | KMS (Potassium metabisulphite) |

**Fig 8: Ingredients for Squash****METHOD**

- ❖ Bring sugar and water to boil in a deep vessel.
- ❖ Simmer to make sticky syrup, which is not one thread.
- ❖ Add dissolved citric acid, take off from fire.
- ❖ Cool and add juice, dissolve KMS.
- ❖ Stir till well blended.
- ❖ Pour into sterilized bottles and seal.
- ❖ Refrigerate opened bottle.

**Serving:** Add 1 tbsp of squash in 150 ml water and serve.

**Fig 9: Squash**



#### 4. JAM

Pineapple jam is made from mature pineapple fruit which is boiled with sugar and other ingredients. For preparing pineapple jam the selection of fruit is very important. Pineapple must be perfectly ripe. The young fruit contains acids and could affect jam quality. It is unsuitable, if it contains large amount of water and unattractive color.

Pineapple jam is a nutritious spread on various foods. The pineapple jam can be eaten as a spread on toast and as a filling for bread, buns, biscuits, cakes, and other pastries. It can be used to make ice creams, yogurts, milk shakes and cocktails.

##### Ingredients (For 350 g of Jam = 375 ml)

|            |                    |
|------------|--------------------|
| 250 gram   | Pineapple          |
| 250 gram   | Sugar              |
| 1/2 tsp    | Citric acid        |
| 1/2 tsp    | Pectin powder      |
| 1/4 tsp    | Lemon yellow color |
| 1/2 tsp    | Pineapple essence  |
| 2 1/2 cups | Water              |



**Fig 10: Ingredients for Jam**

##### METHOD

- ❖ Cook the pineapple pulp with water on a low fire.
- ❖ Stir it continuously with a wooden ladle.
- ❖ While it boils slowly add sugar into it. Boil it well by stirring continuously.
- ❖ Add pectin powder and stir continuously.
- ❖ When the jam is done, add citric acid, lemon yellow colour and pineapple essence to it
- ❖ Remove from fire and pour into a bottle. When the jam cools, close the mouth of the bottle



**Fig 11: Jam**

To test whether the jam is formed, pour some jam on a dry plate. Allow it to cool and tilt the plate. If the jam is ready, it will fall in flakes.

#### 5. KESARI

Semolina (rawa) kesari is simple South-Indian dessert mainly prepared during festive and special occasions. Adding fruits make it tastier. Fresh pineapple chunks are being used for this recipe. Pineapple kesari is a delightful delicious South Indian sweet Recipe.



**Ingredients (For 500 g of Kesari = 525 ml)**

|             |  |
|-------------|--|
| 1 cup       | Rava   |
| 1/2 cup     | Ghee   |
| 500 gram    | Fresh Pineapple                                  |
| 2 cups      | Water  |
| 1 1/4 cup   | Sugar  |
| few         | Cardamoms powdered                               |
| 2 tbsps     | Cashew nuts and raisins<br>(fried in 2 tsp ghee) |
| A pinch     | Salt   |
| A few drops | Pineapple essence                                |

**Fig 12: Ingredients for Kesari****METHOD**

- ❖ Cut, slice pineapple and grind partially; powder cardamom.
- ❖ Heat a pan (no ghee), put the rava into the pan and heat it until golden brown with constant stirring. Put the rava into a dry plate.
- ❖ Put 1 tea spoon of ghee from 1/2 cup given, fry cashew nuts, raisins and keep.
- ❖ In the same frying pan, add rava, fry for 2 seconds; add 2 cups of water, mix well and bring to boil; boil in low flame, till rava is half cooked; add ground pineapple pieces, mix well and cook for few seconds.
- ❖ Add sugar, cardamom powder and mix well; add ghee, stir well, cook till the mix is thick and leaves the sides of the pan.
- ❖ Transfer kesari onto a big bowl and Garnish with fried cashew nuts and raisins; serve hot or cold.

**Fig 13: Kesari****6. PICKLE**

Pickles are generally spicy; they can also be made sweet by adding sugar. Spicy pickles are very important item in Indian meal. Fruits can also be used for making pickles. Pickling may also increase the shelf life of food. Fruits, such as papaya and pineapple are also sometimes pickled.

**Ingredients (For 500 g pickle = 525 ml)**

|          |                      |
|----------|----------------------|
| 250 gram | Pineapple            |
| 3 tbsps  | Coconut oil          |
| 1 tsp    | Ground mustard seeds |
| 1/2 tsp  | Mild chilli powder   |
| 1/4 tsp  | Turmeric             |
| 50 gram  | Green chilly         |

**Fig 14: Ingredients for Pickle**

|          |                             |
|----------|-----------------------------|
| 25 gram  | Small onion                 |
| 50 gram  | Garlic                      |
| A few    | Springs fresh curry leaves  |
| 1/4 tsp  | Black pepper, finely ground |
| 100 gram | Sugar                       |
| 100 ml   | Vinegar                     |



Fig 15: Pickle

**METHOD**

- ❖ Cut the pineapple into eight long wedges, and then remove the tough core from each wedge. Chop each pineapple wedge into small pieces, about the size of a dice.
- ❖ Heat the coconut oil in a saucepan, add the spices and fresh curry leaves; when they fizzle add the pineapple.
- ❖ Add the sugar and vinegar and cook gently until the mixture is thick and slightly jammy.
- ❖ Transfer pickle into a bowl.

**7. HALWA**

Pineapple halwa is a pineapple flavored mouth watering sweet dish. It is a delicious dessert dish which can be served as a snack or after meal. It is very tasty and easy to prepare.

**Ingredients (For 400 g of Halwa = 425 ml)**

|           |                     |
|-----------|---------------------|
| 1-1/2 cup | Pineapples (grated) |
| 150 gram  | Sugar               |
| 1/2 cup   | Khoa (grated)       |
| 1/2 cup   | Milk                |
| 1/2 tsp   | Cardamom Powder     |
| 1/2 glass | Water               |
| 2 tbsp    | Ghee                |
| 2 or 3    | Almonds             |



Fig 16: Ingredients for Halwa

**METHOD**

- ❖ Take water in a pan and heat it on a medium flame. Now add the grated pineapple in it for boiling.
- ❖ Then add sugar and ghee. Stir continuously. Then add milk and Khoa and mix gently till the water evaporates.
- ❖ Cook it for at least 10 minutes at low flame
- ❖ Now remove from the flame and sprinkle cardamom powder.
- ❖ Finally garnish with almonds and serve hot.



Fig 17: Halwa

## 8. CANDY

Candy is a very sweet food. Sugar syrup and fruits are its basic ingredients. Pineapple candy is one of the delicious fruit products and increases the shelf life of candy by drying process.

### Ingredients (For 500 g of candy): 525 ml

500 gram Pineapple (moderate size)

250 ml Water

4 cups Sugar



**Fig 18: Ingredients for Candy**

### METHOD

- ❖ Peel the pineapple; remove eyes, core and wash
- ❖ Slice into cubes.
- ❖ Prepare the syrup, 2 parts sugar to 1 part water.
- ❖ Boil the pineapple in the syrup for 20 minutes.
- ❖ Soak in syrup overnight.
- ❖ Strain and wash well in water.
- ❖ Dry in solar drier for 16-20 hours.
- ❖ Let cool.
- ❖ Roll over sugar and wrap in cellophane.
- ❖ Put in plastic bags; seal open end of bag with the flame of a candle.



**Fig 19: Candy**

## 9. PUDDING

Pineapple pudding is a healthy dessert, as it is made up of pineapple fruit. The fresh ingredients make the dessert even more delicious. For pudding, the pineapple used should be fresh or canned. The best two ingredients of the pineapple pudding dessert are the crushed pineapple and the fresh cream. Pineapple Pudding is a very tasty and easy recipe.

### Ingredients (For 1 kg of pudding = 1.025 liter)

250 gram Pineapple

10 Slices soft white bread

100 gram Soft butter

350 ml Milk

1 tbs Lime juice

1/4 tsp Ground nutmeg



**Fig 20: Ingredients for pudding**



|          |                    |
|----------|--------------------|
| 1/4 tsp  | Ground cinnamon    |
| 1/4 tsp  | Ground clove       |
| 2 large  | Egg white (beaten) |
| 2 large  | Egg yolk (beaten)  |
| 250 gram | Granulated sugar   |
| 1 tsp    | Vanilla essence    |
| 1 tsp    | Cardamom powder    |
| 50 gram  | Raisins            |



**Fig 21: Pudding**

### **METHOD**

- ❖ Preheat oven to 350°F (175°C).
- ❖ Cook the pineapple with half cup of water and 2 tbsp of sugar and drain it. Keep the pineapple aside.
- ❖ Heat a pan, put the milk into the pan and allow to boil with constant stirring.
- ❖ When the milk is boiling add the bread powder and cook it for 10 minutes. Keep aside for cooling.
- ❖ In a medium mixing bowl, combine butter, sugar and egg yolk. Mix well. Add ground cinnamon, nutmeg powder, ground cloves, cardamom powder and vanilla essence. Add cooked pineapple to it. Beat until well mixed.
- ❖ Pour over cooled milk and bread mixture. Fold the beaten egg white little by little to this mixture.
- ❖ Place it in a pudding dish and sprinkle with raisins and cashew nuts.
- ❖ Bake in the preheated oven for 45 minutes, until the surface is golden brown.

### **10. PAYASAM**

Payasam / Kheer is an Indian sweet dessert. Pineapple payasam is made with pineapple, chowery (Sago) and milk. Nuts such a pistachio, cashew and almonds along with raisins, saffron and cardamom are roasted in ghee and added to give a rich feel, taste and good appearance.

#### **Ingredients (For 1 liter of payasam = 975 g)**

|          |                |
|----------|----------------|
| 250 gram | Pineapple      |
| 3/4 cup  | Grated jaggery |
| 50 gram  | Chowari        |
| 2 tbsp   | Ghee           |
| 1/2 cup  | Water          |



**Fig 22: Ingredients for Payasam**



|    |      |                            |
|----|------|----------------------------|
| 1  | cup  | Coconut milk (first milk)  |
| 2  | cups | Coconut milk (second milk) |
| 2  | tsp  | Cardamom powder            |
| 15 | gram | Cashew nut                 |
| 10 | gram | Raisins                    |



**Fig 23: Payasam**

### **METHOD**

- ❖ Roast the nuts and raisins in 1 tablespoon of ghee and keep it aside.
- ❖ Boil the pineapple pieces in a thick bottom pan, along with a little water.
- ❖ When the pineapple is done, add the ghee and fry it well.
- ❖ Add grated jaggery and cook till the color changes to dark brown.
- ❖ When it is nicely done, add the third extract of the coconut milk and cook till the payasam is thick and add cardamom powder.
- ❖ Lower the flame and add the second extract followed by the first extract.
- ❖ When the first extract begins to boil, add the washed chowari.
- ❖ When the chowari is cooked and payasam is nicely done, remove from flame.
- ❖ Add the roasted cashew nuts and raisins.
- ❖ Remove from flame and allow cooling.

## **11. PULISSERY**

Pulissery is a traditional Kerala dish made using yogurt (curd) and grated coconut. Sour curd is used for making pulissery and vegetables or fruits are often added to pulissery to balance the sourness.

### **Ingredients (For 1 liter of Pulissery = 975 g)**

|        |      |                           |
|--------|------|---------------------------|
| 2      | cups | Pineapple cut into pieces |
| 2      |      | Green chili               |
| 2 or 3 |      | Curry leaves              |
| 1/2    | tsp  | Turmeric powder           |
| 1      | cup  | Yogurt / Curds            |
| Salt   |      | to taste                  |

### **Grind to Paste**

|        |      |                          |
|--------|------|--------------------------|
| 1      | cup  | Grated coconut ( fresh ) |
| 1/2    | tsp  | Jeera / cumin seeds      |
| 2      | pods | Garlic                   |
| 2 or 3 |      | Curry leaves             |
| 2      |      | Green chilli             |



**Fig. 24: Ingredients for Pulissery**

**For Seasoning**

|         |                 |
|---------|-----------------|
| 1 tsp   | Mustard         |
| 4       | dry red chilli  |
| 1/4 tsp | Fenugreek seeds |
| A few   | Curry leaves    |
| 1 tbsp  | Coconut oil     |

**Fig 25: Pulissery****METHOD**

- ❖ Clean and cut the pineapple into small pieces.
- ❖ Cook the pineapple pieces along with a little water, turmeric powder, chilli powder, & salt until it turns to soft and tender.
- ❖ Grind and make a paste of coconut, jeera, 2 green chilli, 2 - 3 curry leaves with little water
- ❖ Add to the cooked pineapple. Also add whipped yogurt, mix well and bring to a boil. Cook for a minute. Take off from stove.
- ❖ For seasoning - heat oil in a pan, add mustard. When it pops, add fenugreek seeds, whole red chilli and curry leaves. Add to the pulissery.
- ❖ Serve as a side dish with rice.

**12. PINEAPPLE UPSIDE DOWN CAKE**

Cakes can be made using flour and fruits as filling. Butter and sugar enhance its taste, sweetness and appearance. Cake also contains protein nutrients from eggs that are used as a binder for all ingredients. Cake is an excellent source of fats and oils through its shortening and frosting. Fruits like pineapple, carrots and apples, can be incorporated as filling or the body of the cake.

**Ingredients (For 1 kg cake = 1.025 liter)**

|         |                 |
|---------|-----------------|
| 1 cup   | Maida           |
| A pinch | Salt            |
| 1 tsp   | Baking powder   |
| 1tbsp   | Vanilla essence |
| 1/4 cup | White sugar     |
| 1/4 cup | Butter          |
| 1 large | Egg             |
| 1/4 cup | Low fat milk    |

**Fig. 26: Ingredients for upside down cake**

**For topping:**

|            |                                       |
|------------|---------------------------------------|
| 1 1/2 tbsp | Butter                                |
| 1/4 Cup    | Cup brown sugar                       |
| 4-5        | Pineapple slices (tinned and drained) |
| 6-7        | Glazed cherries                       |

**Fig 27: Upside down cake****METHOD**

- ❖ Preheat oven to 175°C. Grease and flour a round baking pan. Prepare the topping by melting butter in a pan and add brown sugar. As the sugar melts and foams, cook on medium flame for a minute and pour into the baking pan. Over this sugar layer, place pineapple slices and in the center of each pineapple piece place a glazed cherry. Keep aside.
- ❖ Sieve Maida, baking powder and salt in a bowl.
- ❖ In another bowl, cream butter and sugar. Use a hand blender to make a smooth creamy mixture. Add the beaten egg and combine well. Add vanilla essence and combine.
- ❖ Fold the Maida mixture little by little alternating with milk. Do not over beat; just fold them dry till there is no trace of any flour.
- ❖ Pour batter over the fruit layer. Bake in pre heated oven for 45 minutes or till a tooth pick inserted into the cake comes out clean. Place on a wire rack to cool, slice and serve at room temperature.

**13. PINEAPPLE BALL**

Pineapple ball is a simple snack dish made with semolina or rava. It is a popular sweet which is prepared from ghee, sugar, rava, cardamom and dry fruits. It can be served any time of the day.

**Ingredients (For 500 g of ball = 525 ml)**

|           |  |
|-----------|--|
| 1 cup     | Rava   |
| 1/2 cup   | Ghee   |
| 500 gram  | Fresh Pineapple                                  |
| 1 tsp     | Seasame  |
| 1 1/4 cup | Sugar  |
| 1/2 tsp   | Cardamoms (powdered)                             |
| 2 tbsp    | Cashew nuts and raisins<br>(fried in 2 tsp ghee) |

**Fig 28: Ingredients for pineapple ball**



**METHOD**

- ❖ Cut the pineapple into small pieces and cook it with low fire.
- ❖ Grind the pineapple to make a paste.
- ❖ Add ghee to the heating pan. Put the rava into the pan and heat it until golden brown with constant stirring. Put the rava into a dry plate.
- ❖ Put 1 tea spoon of ghee from 1/2 cup given, fry cashew nuts, raisins and keep. Fry seasame in low fire.
- ❖ Prepare the syrup, 2 parts sugar to 1 part water.
- ❖ Boil the pineapple in the syrup for 5 minutes and add rava to it.
- ❖ When it reaches in the form of making ball add cashew nuts, raisins, powdered cardamom and seasame. Make balls of convenient size and serve into a bowl.

**Fig 29: Pineapple ball****14. PINEAPPLE ICE-CREAM**

Ice cream is a frozen dessert usually made from dairy products, such as milk and cream, and often combined with fruits or other ingredients and flavours. Most varieties contain sugar, although some are made with other sweeteners. Pineapple ice cream is a sweet summer treat that is easy to make at home.

**Ingredients (For 1 liter of Ice-cream = 975 g)**

|         |                   |
|---------|-------------------|
| 1 litre | Milk              |
| 1/4 cup | Custard powder    |
| 1 tin   | Condensed milk    |
| 1/2 cup | Pineapple         |
| 1/4 cup | Sugar syrup       |
| 2 drops | Pineapple essence |

**METHOD**

- ❖ Boil the milk, custard powder and condensed milk to make the custard.
- ❖ Heat the pineapple with sugar syrup till the pineapple gets well cooked.
- ❖ Mix the custard, cook pineapple and add the pineapple essence to it.
- ❖ Beat the mixture well using an egg beater.
- ❖ Convert it to an ice-cream tray and freeze it for 4 – 6 hours.
- ❖ Serve it chilled.

**Fig 30: Ingredients for Ice-cream****Fig 31: Ice-cream**

## 14. PINEAPPLE LIME

**Ingredients (For 750 ml pineapple lime = 725 g)**

|       |           |
|-------|-----------|
| 500 g | Pineapple |
| 250 g | Sugar     |
| 50 ml | Water     |
| 250 g | Lime      |



**Fig 32: Ingredients for pineapple lime**

### METHOD

- ❖ Peel the skin of pineapple and cut into small pieces.
- ❖ Cut the lime into small pieces.
- ❖ Blend the pineapple pieces, lime, sugar and required amount of water in a blender.
- ❖ Then filter it to get the clear juice.
- ❖ Transfer into glass and add some crushed ice.
- ❖ Serve chilled.



**Fig 33: Pineapple lime**

## 15. TROPICAL PINEAPPLE COLADA COCKTAIL

**Ingredients For Tropical Pineapple Colada Cocktail**

|         |                 |
|---------|-----------------|
| 2 cups  | Pineapple juice |
| 1 cup   | Pineapple       |
| 1/2 cup | Rum             |
| 1/2 cup | Coconut cream   |
| 2 tbsp  | Palm sugar      |
| 1 cup   | Crushed ice     |



**Fig34: Tropical Pineapple Colada Cocktail**

### METHOD

- ❖ Put all ingredients in a blender and blend until smooth.
- ❖ Transfer to a serving jug and serve immediately over crushed ice.

## 16. PINEAPPLE VODKA

**Ingredients for Vodka**

|          |                 |
|----------|-----------------|
| 250 gram | Fresh pineapple |
| 250 gram | Vodka           |



**Fig 35: Pineapple Vodka**



## METHOD

- ❖ Pour vodka over the pineapple until all the fruit is covered.
- ❖ Place a lid and then store in the fridge for ten days.
- ❖ Peel and cut your fresh pineapple into chunks, then place these in a glass container that has a lid.

## 17. WINE

Wine is an alcoholic beverage made from fermented grapes or other fruits. Wines made from fruits besides grapes are usually named after the fruit from which they are produced (for example, pomegranate wine, apple wine and pineapple wine) and are commonly called fruit wine.

Pineapple wine is made from the juice of pineapples. Fermentation of the pineapple juice takes place in temperature-controlled vats and is stopped at near-dryness. The result is a soft, dry, fruit wine with a strong pineapple flavour.

### Ingredients For Wine

|        |           |
|--------|-----------|
| 1 kg   | Pineapple |
| 2 kg   | Sugar     |
| 10 cup | Water     |
| 2 tbsp | Yeast     |

## METHOD

- ❖ Wash the pineapples and cut into small pieces. Don't remove its skin.
- ❖ Boil it for about 5 minutes with water and 1 kg sugar.
- ❖ When cool, add yeast and store in an air tight mud vessel for 20 days.
- ❖ Stir the content daily with a wooden ladle.
- ❖ After 21 days, filter the wine through a fine cloth. Do not squeeze the contents. Add the remaining sugar and store it for another 21 days without stirring.



**Fig 36: Wine**

## 18. VINEGAR

Processing pineapple into vinegar is a good way of turning over ripe, blemished or surplus fruits, discarded cores, peels and trimmings into money.

Although not as popular as coconut vinegar, pineapple vinegar is already being exported in small quantities.

Pineapple vinegar can be produced by alcohol and acetic acid fermentation.



### Alcohol fermentation

- ❖ Wash the pulp of the ripe fruits.
- ❖ Mix well and one part mashed fruits with three parts of water.
- ❖ Press the mixture through a cheese cloth with double thickness.
- ❖ Add 1.5 kg of sugar for every 9 liters of the diluted juice, and pasteurize it at 65°C for 20 minutes.
- ❖ Cool and transfer the mixture in a suitable container.
- ❖ Add two tablespoon of yeast.
- ❖ Cover the container with the clean cheese cloth or loose cotton wad.
- ❖ Allow the solution to ferment from four to seven days until no more carbon dioxide bubbles form.
- ❖ Strain the liquid through the clean cheese cloth to remove the yeast and other solid materials.
- ❖ Pasteurize the alcoholic liquid at 65°C and allow it to cool.

### Acetic acid fermentation

- ❖ To the alcoholic solution, add 2 liters of the mother vinegar or starter for every volume of the formulation indicated above.
- ❖ Mother vinegar may be obtained from the National Institute of Science and Technology (NIST), Orissa or elsewhere.
- ❖ Set it aside undisturbed for one month or until maximum sourness (acidity) is obtained.
- ❖ To develop desirable aroma and flavour, allow the vinegar to age in the barrels, or earthen jars filled to capacity.
- ❖ Filter the vinegar and pasteurize it to kill microorganisms before bottling the product.
- ❖ If clear vinegar is desired, add the well-beaten white of two eggs for every 10 liters of vinegar and stir it until the egg white coagulates.
- ❖ The clear vinegar is obtained by filtering.

## CONCLUSION

Pineapple is a tropical fruit which is consumed fresh or in a processed form. It contains nutrients which are good for human health. It also contains antioxidants and protease. It is useful against malignant cell formation, thrombus formation and inflammation.

Processed pineapples are consumed worldwide and processing industries are trying out or using new technologies to retain the nutritional quality of the pineapple fruit. This is to meet the demand of consumers who want healthy, nutritious and natural products. Pineapple wastes from these processing industries can be utilized to produce methane, animal feed and manure.

