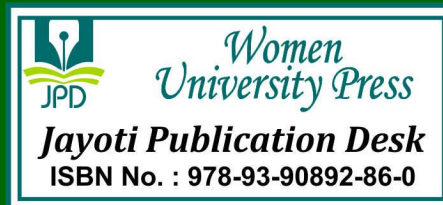




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# Home Scale Processing of fruits & Vegetables

VALUE ADDED FRUITS & VEGETABLES PRODUCTS

JV'n Prof. (Dr.) Pramod K. Raghav



**JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR**

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## Chapter 1

### **INTRODUCTION**

Fruits and vegetables are indispensable for mankind for maintenance of good health. Usually 50 to 60 nutrients are required for producing and maintaining optimum health. Broadly, these nutrients are (a) water, (b) carbohydrate, (c) fats, (d) proteins, (e) minerals and (f) vitamins. Quantitatively, the nutritional requirements of human beings and animals are expressed in terms of energy, proteins, minerals and vitamins. Whereas bulk of energy and protein are provided by staple food, the minerals and vitamins, also known as protective foods, are supplied by fruits and vegetables. In the context of Indian dietary and nutritional situation, fruits and vegetable acquire special importance because they form the major source of vitamins A and C, folic acid and minerals and calcium and iron. Therefore, there is a need for raising the availability of fruits and vegetables to common man by increasing production and avoiding wastage during glut in the market. The latter problem can be alleviated by preserving the surplus material at home level and cottage scale during such times. Preservation of these commodities shall provide cheap and quality products, help to utilize surplus produce, economize home budget, offset the glut in market during peak season and assure better return to the producer. Besides, it will serve as a hobby to utilize the spare time and give pleasure of enjoying fruits and vegetables during off season.

The art and science of preservation of fruits and vegetables is a great asset particularly to the common folk. Highly palatable processed food-stuff comes very handy to travellers, picnic goers and in parties. The preservation of fruits and vegetables helps us to preserve nutrition, add to the variety of food stuffs, make meals and snacks more attractive and provide convenient foods. Preservation can check wastage and spoilage of fruits and vegetables and even make use of culled, deformed, blemished and inferior fruits which normally do not find a place on the table and mostly go waste. Also, it would ensure better returns to the grower and meet the challenges of food shortages and provide employment opportunities in allied food industries like cold storage, refrigeration, sale stores, super markets etc. Above all, it provides rich, potent and balanced diet for health, balanced growth and normal working of human system.

No doubt, the practice of preservation of fruits and vegetables has been in vogue almost in every Indian house since long but it remained mainly confined to the preparation of pickles, preserves, chatneys, sharbats etc. The limited use of fruits and vegetables in Indian household is perhaps due to lack of sufficient knowledge regarding the preparation of tasty and nutritious products like juices, concentrates, squashes, jams, jellies, marmalades, sauces, canned and dried products etc. from these perishable commodities. Therefore, it is in our earnest interest to popularize fruit and vegetable preservation technology among the people from various walks of life so that the protective food stuffs can be preserved and used in off season.

The American slogan "We eat what we can and what we can't we cannum" holds paramount importance under Indian conditions where we have acute food problems and population explosion. Let us avoid the huge waste going on, particularly in fruits and vegetables which are of perishable nature, and strive hard in the right earnest to preserve these God given gifts for health and prosperity of our nation.

## Chapter 2

### **Spoilage Of Fruits, Vegetables and Their Products**

Fruits and vegetables are wholesome in their fresh state but they begin to deteriorate soon after harvest. The spoilage or deterioration may be attributed to two principal causes: chemical and biological. The most significant changes in food are due to biological factors especially micro organism which are present in air, water, on most foods on our hands and, in fact, they are ubiquitous. They are so small that they can only be seen through a microscope. There are three general groups of microorganisms that produce spoilage: (i) moulds, (ii) yeasts and (iii) bacteria.

#### **2.1 Moulds**

Moulding of food is a common sight in the kitchen. A slice of moist bread or a piece of orange left for a time becomes covered with a white or greyish cottony matter. This is the mould. They are members of the division of plant kingdom known as Thallophyta. They are devoid of chlorophyll and made up principally of mycelium and spores. These spores are numerous and may be compared with seeds in higher plants. The spores are light, resistant to drying, float about in the air and may alight on exposed food and multiply thereon.

They thrive best in close, damp and dark situations and require an adequate supply of warmth, moisture and air for their growth. They prefer sugar containing substances and may spoil jam, jelly, preserves and other sweet based products. Acid medium is favourable for their growth and therefore they grow nicely on pickles, juices etc. unless these are protected properly.

The moulds not only secure nutrient substance from food thereby lowering their food value but also produce odd by products which spoil the flavour, taste and texture of the food. They are especially characterized by their ability to elaborate a great variety of enzymes and this physiological qualification accounts for their ability to thrive on so many materials and in the presence of very small amounts of organic matter. Moulds are sensitive to heat; boiling quickly destroys both moulds and their spores. Some of the common mould are *Aspergillus*, *Penicillium*, *Rhizopus*, and *Helminthosporium*.

#### **2.2 Yeasts**

Unicellular fungi are usually thought of as yeast. They are non-motile, round or oval organisms, most of which reproduce or multiply by a characteristic process of "budding". The bud, when fully mature, breaks away from the mother cell and becomes independent and repeats the process of multiplication.

The yeasts grow luxuriantly under moderate temperature in solutions containing sugar and plenty of water. The chief economic importance of yeasts depends on their fermentation of sugars, converting them into alcohol and carbondioxide which is practically applied in the main factor

of alcoholic beverages and in baking. While in alcoholic fermentation carbon dioxide is a by-product, in baking it is the essential factor.

Sugar+Yeast=Alcohol+Carbon-dioxide Sometimes the cork of a juice bottle, in which fermentation may be going on is thrown out or the juice bottle is shattered to pieces with great force squirting the contents. It is due to carbon dioxide generated in the process of fermentation. Yeasts are very useful in making bread, beer, wine, vinegar and many other fermented products. They are undesirable when they grow on fruits, fruit juices, squashes, sharbat, honey etc. Like moulds they also destroy the appearance and whole-someness of fruits and fruit products.

Yeasts thrive best in light sugar solutions. Most of them usually do not develop in media containing more than 65 per cent of sugar or 0.5 per cent of acetic acid. During active fermentation yeast can be easily recognised by the formation of bubbles or foam at the surface of the product. Boiling destroys yeast cells and spores effectively. Some of the yeasts which grow on fruits are *Saccharomyces*, *Candida*, *Brettanomyces* etc.

### **2.3 Bacteria**

Bacteria are minute, unicellular microorganisms that are classed as plants. Although they are classed as plants, they ordinarily do not contain chlorophyll and are often capable of moving about independently in their environment.

They are known in great range of types and some of them are very harmful. They are widely distributed in nature. They are found within and upon our bodies, in the food we eat, the water we drink and the air we breathe. They can be spherical, nod-shaped and spiral shaped. They are much more difficult to be killed than moulds and yeasts and are the most common cause of food spoilage. They thrive best in nitrogenous food with slight acid content, while moulds and yeasts prefer sugar and acid food material.

There are different types of bacteria. Some have a very important function and perform very useful service but others have only harmful reactions. Diseases like typhoid, diphtheria, tuberculosis, pneumonia and diarrhoea are caused by different types of bacteria. In addition, enormous economic losses result from other kinds of bacteria that grow in food rendering it unfit for consumption. Some bacteria are even responsible for causing food poisoning. Bacterial action may cause decomposition of food, evolution of gases, swelling or bulging of cans, blowing off of corks, nasty putrid smell, acid and other toxic substances and diseases. Decomposition of foods by bacteria is through production of enzymes by them.

The bacteria reproduce by "fission" that is when one cell or bacterium is fully developed, it divides in the middle making two bacteria, when these two are developed they divide again making four cells and so on. They vary greatly in shape and size. The rate of bacterial growth is so quick that it is almost incredible.

The growth of bacteria is controlled by a number of external factors. They must have proper kind of food material, heat, pH reaction, moisture and oxygen. Some bacteria are anaerobes, i. e. they cannot grow in presence of free oxygen.

If any of these factors is limited, growth is retarded to some extent. However, with given food, the one factor that has the most immediate affect on bacterial growth is temperature. Some thrive best at 37°C, that is, the temperature of the human body, while others grow better at 21CC. Low temperatures do not ordinarily kill bacteria but

merely check or stop their growth and as soon as the temperature is raised above the minimum point, they resume growth. Some other types are more heat resistant and hardy and flourish well at about 45°C. High temperatures are much more injurious to bacteria than low ones and this is the basis of the process of Pasteurization.

Many forms of bacteria produce spores even under adverse circumstances, e. g. Bacillus, Clostridium etc. Such spores are difficult to destroy without application of strong heat continuously for a long time.

The destruction of bacteria is the cheif point in canning. Moist heat is fatal to their growth. They can be killed by heating at a temperature of 1 21 °C for 30 to 40 minutes. Both the vegetative and spore forming types of bacteria are very sensitive to acids and can be easily killed in their presence at a temperature of boiling water. It is owing to the acid content that fruit products are easily processed at 100°C or less, whereas most of the vegetables, being non-acidic, have to be processed ai a temperature of 116°C.

Ciostiidmm botudnum deserves special mention. This bacterium is of great importance in the spoilage of canned foods. It is a fairly common soil organism. It is spore forming type and flourishes in absence of air. ft develops in improperly processed canned foods and is highly poisonous. The most important plant pathogenic bacterium is Xanthomonas spp.

## **2.4 Enzymes**

Enzymes are substances produced by living cells that are capable of bringing about chemical changes without undergoing any change themselves. All ceils probably produce some type of enzymes. Therefore, besides the aforesaid microorganisms, the enzymes also bring about changes in fruits and vegetables, These enzymes produce normal ripeness of fruits and vegetables but if their activity is not checked, they causa staleness and decay. The turning of the cut or the wounded surface of apples to brownish colour on exposure to air is also due to an enzymic action. Enzymes can be easily inactivated by heat. Some enzymes are only active in the presence of air and heating coupled with exhaustion of containers helps to protect the product.

The chemical composition of fruits and vegetables also plays a role in food spoilage under certain conditions. Since all foods are essentially made up of chemical elements and compounds, they



undergo chemical changes that are independent of any biological factors. Atmospheric oxygen and even sun light cause certain foods to undergo various undesirable changes. Various methods of food preservation have been used to slow down the physical and chemical degradation of fruits and vegetables due to various factors mentioned above so as to preserve the food supply, to keep surplus food for future use and to make available a great variety of food for consumption any time of the year.

## Chapter 3

### **Principles of Preservation**

The art of preservation of food is as old as civilization itself. Drying in the sun, cooking, smoking, pickling in salt and burying in snow were the methods adopted by the primitive man. In the preservation of fruits, vegetables and their products, the fight is against microorganisms and enzymes and efforts are made to minimize their activities.

The principles of preservation may be classified under two heads: short term preservation and long term preservation. The period of short term preservation is limited, while the products preserved by long term preservation may remain safe for considerable period. It is possible that in long term preservation a product may keep well for a pretty long period and even for an indefinite period as far as microbial spoilage is concerned, but slow chemical changes, however, may render the food inedible, if kept for an unduly long period. A brief description of the methods of preservation is given below.

#### **3.1 Short Term Preservation**

Absence of infection. This is accomplished by taking care in handling the fruits and vegetables during harvesting, grading, packing, carting and also resorting to general cleanliness in all the processes of preservation. It should be remembered to preserve the skin of the fruits in a sound unbroken condition because the bruises and the soft parts of fruits readily catch mould infection.

Fruits and vegetables are generally dusty and they should be washed and wiped to reduce the number of microorganisms to increase their keeping quality.

**3.2 Refrigeration** It is generally known that food keeps well for a comparatively longer period in winter than in summer. It has been established that the temperatures less than 10°C check the growth and activity of most microorganisms as well as retard chemical degradation of food by enzymes. In refrigerators and cold storages, fruits and vegetables can be kept in good condition for days or weeks depending on the commodity.

**3.3 Exclusion of Air** The exclusion of air often prolongs the keeping qualities of fruit products. Most fermented products, such as, wine, fermented vegetables etc. must be sealed in air-tight containers to prevent the growth of aerobic bacteria, (bacteria which grow in the presence of air) which would spoil them.

**3.4 Exclusion of Moisture** Moisture is necessary for the development of microorganisms. The actual growth of mould and other organisms on or in food takes place in the juice of the product. If the concentration of dissolved solutes in the juice or sap exceeds 70 per cent the product usually keeps well. If moisture collects on the surface of a dried product or other products, it forms a solution resulting into lower per cent of dissolved solutes than is necessary to prevent

growth of microorganism and than the growth of spoilage organisms follows. Exclusion of moisture is, therefore, one of the short term preservation methods.

### **3.5 Long Term Preservation**

Chemical preservatives. Chemical preservatives like benzoic acid added in the form of sodium benzoate and sulphur dioxide in the form of sodium or potassium metabisulphite at the concentration of 0.1 per cent and 0.07 per cent, respectively, can preserve most fruit juices, squashes and pulps rich in fruit acids. In a simple form sodium benzoate may be added at the rate of 1 gram and metabisulphite 0.7 gram for every 1 kilogram of the finished product.

**3.6 Household Preservatives** Sugar used at concentration of 70 per cent or above permanently preserves most foods such as jams, jellies preserves etc. It acts by osmosis and not as a true microorganisms poison.

Salt acts both by osmosis and as a microorganism poison. About 15 per cent of salt is sufficient to preserve most products.

Acetic acid of vinegar acts as a microorganism poison and is much more effective in this regard. About 2 per cent of acetic acid will prevent the spoilage of most products. Salt and acetic acid are utilised in the preservation of various products like pickles, sauces and chatneys etc.

**3.7 Drying** Preservation by drying depends upon reducing the moisture content to the point at which the concentration of dissolved solids in the product is about 70 per cent or above and this prevents the growth of microorganisms and also inhibit the action of enzymes. Drying in sun is the oldest and cheapest method of preserving fruits and vegetables.

**3.8 Fermentation** This is one of the oldest methods of preservation. Decomposition of carbohydrates by microorganisms or enzymes is called fermentation. By this method, the foods are preserved by organic acid formed by microbial action. Alcoholic, acetic and lactic are three important kinds of fermentations in the food industry. The keeping quality of alcoholic beverage vinegars and fermented pickles depends upon the presence of alcohol, acetic acid and lactic acid, respectively. Care should be taken to seal the fermented products from the air to avoid further unwanted or secondary fermentation. Wines, beers, fruit vinegars, fermented drinks fermented pickles etc. are prepared by these processes.

**3.9 Pasteurization** This term has been coined after the name of Louis Pasteur, a great French Chemist and Bacteriologist. It is a heat process that not only kills many organisms but also greatly weakens those not killed. This also inactivates the enzymes which may otherwise cause spoilage. Pasteurization refers to the heat treatment applied to acid and some non-acid liquid products like fruit juices, vinegar, wines, beers etc. and usually involves the application of temperature below 100°C.

Fruit juices are usually pasteurized at temperatures ranging from 65 to 85°C. Higher temperatures adversely affect the flavour.

**3.10 Processing** The term processing or sterilization by heat means the complete destruction by heat of all forms of life in the product sterilized and is applied to solid canned packs of fruits and vegetables. In commercial practice not all cans of food are sterile. But they usually do not spoil because the conditions in the can are not favourable for the growth of the organisms concerned. The acidity may be high or

oxygen may be lacking. Therefore, the term “processing” is preferable to the term “sterilization” in case of canned foods.

Most fruits and some of the vegetables like tomatoes etc. are acidic and therefore, their canned products are easily preserved by processing at 100°C. Vegetable products on the other hand are low in acid or are non acidic, may have high protein and contain spore-bearing bacteria and are therefore, processed at 116.6°C by enclosing the cans in strong retort (autoclave) by using steam under pressure. The temperature and timing of processing, however, varies with different products and sizes-of-containers.

## Chapter 4

### Processing of Apple, Almond and Amla

#### 4.1 Apple Jam

3 kgs apples

Salt solution (containing 1 tbsp salt and 1 litre water)

2 level tsps citric acid (or juice of 4 lemons)

3 kgs sugar

Select firm, ripe, fresh fruit. Over-ripe fruit must be avoided. It is better to blend two different varieties, for such a blend will give a better flavour.

Peel the fruit with a stainless-steel knife. Put the peeled apples in the salt solution. Now wash the fruit and cut into halves, removing the cores. Then cut into very small pieces. Place the cut fruit in 1 litre water, along with the acid or squeezed lemon- juice, in a stainless-steel or aluminium pan. Collect the peels and cores, tie them in a cloth bag and place in the pan. (These cores and peels are rich in pectin, which they give out on heating.) Cook till the fruit becomes tender. Remove the bag of peels after squeezing out the extract.

Add the sugar and stir the mass until the sugar is dissolved. Boil the whole mass briskly. To test if the jam is ready for setting, you can try out either of the following tests:

(a) Plate test: For this test take a spoonful of the boiling jam on a plate and allow it to cool. If it sets on cooling, and there is no water separating out of it, the jam is ready to be bottled.

(b) Sheeting test: For this test lift some jam in a ladle and allow it to fall. If it falls in drops, then it is still watery and not yet ready. If it falls in sheets or flakes it is ready to be bottled.

(c) The bottles or jars should be thoroughly cleaned and sterilized. There should be no moisture inside.

(d) Once the hot jam is bottled allow it to cool so that it sets. If you want to keep the jam for a long time and see that no mould forms over it, you can pour melted paraffin wax on it. This will form a wax layer and prevent any mould from attacking the jam. Cap the jam bottles and store in a cool place.

(e) Quantity of jam prepared: 4½ kgs.

#### **4.2 Apple and Mint Jelly**

2 kgs apples

1 bunch of mint (pudina)

1       tsp citric acid (or juice of 2 lemons)

2       kgs sugar

a few drops of green colour. Select bright green apples, as those with a red skin do not give good colour. Wash and cut the fruit into small pieces. Add 1 litre water or enough to cover the fruit. Add a few sprigs of mint leaves and simmer on the fire. Add acid or lemon-juice. Heat till the fruit is soft. Now strain the extract through a jelly bag or through layers of thick cloth, so as to get a clear extract. Add sugar to the extract, and stir till it dissolves. Boil a few mint leaves rapidly for 5 minutes and squeeze them over the boiling jelly; alternately, you can add some finely chopped mint leaves to the boiling jelly. Add a few drops of green colour (though it must be added that the trend all over the world today is to avoid synthetic colours and essences). Continue boiling briskly till the jelly sets; then remove from fire. To help evenly distribute the mint in the jelly, allow it to cool in the pan until a thin skin begins to form. Then stir it gently and pour it into sterilized bottles, sealing them air-tight.

*Quantity of jelly prepared: 3 kgs.*

#### **4.3 Candied Apples**

4       kgs apples

5       kgs Sugar

Peel the apples and keep them in a salt solution to prevent discolouration. Remove cores with a coring knife or cut the apples in slices. Boil the apples in water till they become soft, then puncture with a fork. Prepare a 30 per cent syrup by combining sugar and water at the ratio of 3 parts of sugar to 7 parts of water. For a large quantity of syrup, mix 3 kgs of sugar to 7 litres of water.) Heat the syrup to dissolve the sugar.

6       Place the fruit in the sugar syrup. Boil for 15-20 minutes, then set it aside for 24 hours. After that, add 1 kg of sugar and heat for 15-20 minutes. Once again, set aside for 24 hours. Finally add another 1 kg of sugar and heat till you get a thick consistency ( a 2-tar or two-thread consistency). Now drain off the syrup, and allow the fruit to dry. Pack it in jars and cap air-tight.

*Quantity of apples prepared: 6½ kgs.*

#### **4.4 Apple Morrabba (Preserve)**

4 kgs apples

5 kgs sugar

4 tsps salt in 1 litre water

1 level tsp citric acid {or juice of 3 lemons}

Select apples of the Amri or Golden Delicious variety. These make excellent morrabbas as they do not lose their flavour. Peel the fruit with a stainless-steel knife and dip in a common salt solution (containing 20 gms or 4 teaspoons of salt in 1 litre of water).

Meanwhile, heat some water in a pan and when about to boil, put the peeled fruit in it. Cover the pan and boil for 3-5 minutes, until the fruit becomes soft. Then puncture the fruit all over its surface with a steel fork. (This is necessary for the uniform

penetration of sugar syrup into the fruit.) Place apples and 3 kgs. sugar in alternate layers in a pan—first place one layer of fruit, then cover it with sugar. When all the apples and sugar have been laid out thus, you will find syrup being formed in the pan. Now set the apples aside for a day. On the second day add another 1 kg of sugar and boil the entire mass vigorously for about 5-7 minutes.

On the third day, add another 1 kg of sugar and cook the entire morrabba for about 5-10 minutes. Allow the temperature to rise to 106-107°C. (You can test this with a thermometer.) Now remove from heat and add citric acid (dissolved separately in a little water) or lime-juice into it. Mix thoroughly. Allow the apples to cool. Pack in clean, dry jars or cans. Store in a cool, dry place.

*Quantity of morrabba prepared: 7½ kgs.*

#### **4.5 Apple Jelly**

1 kg apples

1 kg sugar

3 gms or ¾ tsp citric acid

It is preferable to select the small Gola variety of apples since they are rich in pectin and acid (both important for making good jelly). Cooking apples may be used, but when used alone they are insipid. Spices such as ginger or lemon peels are desirable when making jelly with cooking apples. Use firm, ripe apples. Avoid over-ripe or under-ripe ones. Wash the apples thoroughly; trim off blemishes or mould-affected spots. Slice apples in rings or cut into small pieces to allow easy extraction of pectin, acid and so on. Add just enough water to cover the fruit. (This is usually 1 litre for every 1 kg of fruit.) Boil the apples gently for an hour. It is better to break the fruit to get a good extract.

Now strain through a thick, coarse cloth. Felt or flannel bags are best for filtering, since you will get a clean extract which is necessary for a clean, good jelly. Do not squeeze the pulp as a cloudy extract will come out. Allow sufficient time and you may just tilt gently to let it drain. (A second extract can also be obtained by using half the quantity of water than that previously used, and simmering again with the pulp for half an hour. Strain and filter this extract for half an hour. The two extracts may be mixed together, or alternatively, two grades of jelly can be prepared with these two extracts.)

**Pectin test:** In order to decide upon the amount of sugar to be added to the extract, you have to test the richness of the pectin in the extract. This is determined by a test called the pectin test.

The thicker the extract, the more pectin is it likely to contain.

Take 1 tsp of the extract and add 2 tsps of methylated spirit (or rectified spirit) to it. With the addition of spirit, a clot is formed. Watch if this clot is firm or not.

If the clot is firm and compact, for every 1 litre of extract add 1 kg of sugar. If the clot is not firm add  $\frac{3}{4}$  kg of sugar, and if the clot is poor in consistency, add only  $\frac{1}{2}$  kg of sugar to every litre of extract.

Add citric acid by first dissolving it separately in a little water. If the apples are a sweet variety, add 3 gms of acid per litre of extract; if, however, the fruit is tart (or sour), the quantity of acid should be reduced.

Boil the mixture of apple extract, sugar and acid. Watch for the end point or setting point by the plate or sheeting test (see page 1). The finishing point can also be tested by putting a little jelly in a tumbler containing water. If the product is not ready it will mix into the water. If it is, it will fall intact to the bottom of the tumbler.

(Once I prepared apple jelly in a 5-star hotel, using only peels and cores, which they were throwing away, You can conveniently use the same, instead of actual fruit.)

*Quantity of jelly prepared: 1½ kgs.*



#### **4.6 Apple Chutney**

1 kg apples

150 gms onions

1 medium-sized pod of garlic

75 gms ginger (chopped)

30 gms salt

10 gms chillies

1 tsp garam masala powder

½ kg sugar

500 ml vinegar (or 30 ml glacial acetic acid)

The Golden Delicious or Amri apples are best for this recipe. Wash the apples well. Peel them and cut into small pieces. Chop the onions and garlic very fine. Add a little water to the apples and boil in a pan. Allow them to soften for a while. Mix in the rest of the ingredients, except for the sugar and vinegar. Stir and heat again. Add sugar and vinegar. Continue boiling till the mixture thickens. Pack the chutney hot into sterilized and dry bottles.

*Quantity of chutney prepared: 1 kg.*

#### **4.7 Apple and Ginger Jam**

3 kgs apples

2 level tsps citric acid {or juice of 4 lemons)

2 tsps ginger

3 kgs sugar

Peel, core and cut the apples in small pieces. Place pieces in a pan and cover with 1 litre water. Tie the peels and cores in a small piece of muslin cloth (as they contain

valuable pectin). Place this bag in the pan, at the side. Add lemon-juice (or acid) and the ground ginger. Add sugar and stir till it gets dissolved. Boil briskly till the jam sets.

See page 1 for plate and sheeting tests.

*Quantity of jam prepared: 4½ kgs.*

#### **4.8 Dried Apple Rings**

Any good variety of apples {of the desired quantity)

Peel and core the apples and remove blemishes. Cut into rings, each about ½ cm (  $\frac{1}{4}$  inch) thick.

Put these rings on a stick by passing the stick through the centre of each ring. This can also be done on a metal knitting needle. Set the sticks in the oven in a manner so as to allow air to pass around each ring. Set the temperature below 65CC (150°F). In the initial stages you can judge the degree of heat by using a thermometer; later, you can judge by feeling the oven with your hand—Leave the apple rings in the oven for a period of 6 hours, or till done. To test if they are ready, press some of the rings together in your hand. If they are sufficiently dried they will be-springy enough—and will separate out, when passed together. Now remove them from the oven and leave in the open air for about 12 hours. But remember—the air should be dry, not humid. Now pack the rings in a jar or tin and store in a dry place-

#### **4.9 Almond Syrup**

1½ kgs sugar

1-gm citric acid

100 gms almonds

½ cup rose water

a small pinch saffron strands

5-6 large cardamoms {powdered)

Mix the sugar with 1 litre water. Heat to dissolve, and continue to boil for a while. Separately, mix the citric acid into a tablespoon of water. Add this solution to the syrup and continue boiling. Soon, a scum will rise to the surface. Remove this to obtain a clear syrup. Blanch the almonds in boiling water and remove the skins. Grind to a fine paste with the rose water in an electric mixie blender. Pass this milky mixture through a muslin cloth to obtain a clear, milky extract. Once again grind the pomace left in the muslin cloth. If you do not have a mixie, any other method of grinding will do, so long as you are able to get a fine milky almond extract. Mix the sugar syrup and the milky almond extract. Add the cardamoms. Boil this mixture for a while. Dissolve saffron strands in a tablespoonful of hot water and add to the syrup. Now pour boiling hot syrup in bottles which have been sterilized and kept dry. Cork or cap-tight. Pasteurize the filled bottles in boiling water for 30 minutes. Now take the bottles out and store in a cool place.

*Quantity of syrup prepared: 2 kgs.*

#### **4.10 Amla Morrabba**

1 kg amlas

1½ kgs sugar

5 gms (1 tsp) citric acid

salt solution containing 20 gms salt in 1 litre water

Select large amlas, preferably of the best Banarasi variety available. Wash them thoroughly and prick all over with a stainless-steel fork. Soak them in one litre of salt water (containing 20 gms of salt, which is a 2 per cent solution). Change this salt water every day, replacing it every time with a 2 per cent salt solution. After soaking for 3 days, remove the amlas from the salt solution. Wash thoroughly in running water, so as to completely remove the salt residue.

To prepare the syrup, mix 1 kg sugar, citric acid and ½ litre water. Bring to a boil, then strain through a muslin cloth. Add amlas into syrup and boil them in it for 10 minutes. Now remove from fire and set aside for one night. Next day, add ½ kg of sugar and boil again, till you get a one-thread (one-tar or 65 per cent sugar) consistency. Once again, leave the amlas in this syrup for one night. On the third day, add another ½ kg of sugar and boil the amlas till a two-thread (two-tar) consistency (75-80 per cent sugar consistency) is reached. The morrabba is now ready for packing in jars or cans. Sterilize the jars or cans before use. Also, make sure they are perfectly dry. Fill the containers with the morrabba and cap or seal. Store in a cool place.

*Quantity of morrabba prepared: 2 kgs,*

#### **4.11 Amla Chutney**

1¼ kgs amlas

1 kg sugar

40-50 gms salt (or according to taste)

15 gms ginger

15 gms garlic

25 gms spices (cardamoms, cinnamon and cloves in equal measure)

15 gms red chillies 200 ml vinegar (or 10 ml glacial acetic acid)

Select mature amlas and steam them for 15 minutes in a pressure cooker, preferably at 10 lbs pressure. Remove the seeds and pass them through a mincer to get a fine pulp or puree. You can use an electric mixer also.

Add sugar and salt to the pulp and also water (equal to 1 of the pulp). Set the mixture aside for half an hour, so that the sugar and salt seep thoroughly into the pulp. Meanwhile, chop the ginger and garlic into thin pieces. Add them to the pulp, then cook the mixture over fire. Tie the spices loosely in a muslin bag and immerse into the mixture. Cook to a desired consistency (usually, a 65-70 per cent sugar consistency is achieved in the final product). Remove from fire and add the vinegar. Fill this hot chutney into glass jars. Allow to cool for a while, then secure the lids tightly.

*Quantity of chutney prepared: 7¼ kgs.*

## Chapter 5

### **Banana Home Scale**

#### **5.1 Banana Jam**

1 kg banana pulp

1 kg sugar

5 gms. (1 tsp) citric acid

#### **Processing**

Peel the bananas. Cut them into small pieces, or better still mince to a pulp. You can also puree them in a mixie (the idea, really, is to get a fine pulp). Divide the sugar into equal parts. Mix one part well with citric acid and add to the banana pulp. Heat over a brisk fire. Carry out the plate test or the sheet test (see page 1) to make sure the jam is ready.

Put the hot, boiling jam into dry, sterilized bottles or jars. Allow to cool. If you want the jam to last a long time, and avoid any mould forming on top, melt some paraffin wax and pour over the jam to set a layer of wax over it. Then cap the bottles or jars and store in a cool place.

Quantity of jam prepared: 1 kg 200 gms.

#### **5.2 Banana Chips**

Raw bananas (of the quantity desired)

Select raw bananas which have as little a sugary taste as possible. Nendran or any other variety will do. The bananas should be completely free from blemishes. Remove any dirt or extraneous matter sticking to the fruit by rubbing it with a piece of clean cloth.

Peel the fruit and cut the bananas into slices, each 2 to 3 mm thick, using a sharp stainless-steel knife. Do not use an ordinary iron knife, or the banana pieces will get black stains. Keep the peeled fruit as well as the slices immersed under water containing 1 per cent potassium metabisulphite (1 gm in one litre of water, i.e., about 1 tsp in one litre of water).

Sulphuring (optional): Sulphuring is necessary only when you intend to keep these chips over very long periods (otherwise, you can dry them without sulphur). Spread the banana slices evenly over trays, about 300-500 gms of slices per one square foot of tray. Trays made of bamboo sticks or

teak-wood strips are the best. Place 10 such trays in a sulphuring box for one dish containing sulphur.

Place the slices (treated or otherwise) in the sun for drying. Or place them in a home drier. If you are using a home drier, dry at a temperature of 60-62° C. When the slices become bone dry, they can be broken into small bits by hand. Now fry these chips in oil or fat and serve like potato chips. You can also powder the dry chips and mix this banana flour which results with other cereal flours for various preparations.

## Chapter 6

### **Date Value Added Products Home Scale**

#### **6.1 Date Chutney**

½ kg dates  
(seedless)

½ litre vinegar (or 25 ml glacial acetic acid)

1 onion

4 garlic flakes

½ kg sugar

1 tsp garam masala

½ tsp chilli powder

1 tblsp salt

Chop the dates in small pieces and boil in a little vinegar or acetic acid. Chop the onion and garlic and mix with the sugar, garam masala, chilli powder, salt and the rest of the vinegar. Boil till you get a thick, well-cooked mass of chutney. Pour this hot into sterilized bottles. Allow the bottles to cool for a while. Cover them with sterilized caps and seal air-tight. Store in a dry and cool place.

*Quantity of chutney prepared: 1 kg 300 gms.*

## Chapter 7

### **GINGER, GRAPE and GUVAVA PROCESSING**

#### **7.1 Ginger Candy**

1 kg ginger pieces

1½ kgs sugar

1 tsp (5 gms) citric acid

When buying the ginger, choose fibreless pieces; this quality of ginger is particularly available during winter. The ginger should be large-sized—fat, not small, and preferably a new crop, coming in the month of November (usually from Darjeeling).

Peel the ginger and cut into shapes of your choice (chips, cubes, round pieces or even sticks.) But preferably, cut the ginger into equal slices with a sharp knife, each slice 3 mm thick. Wash the slices well. Put in a pressure cooker and cover with enough water to dip them. Add 2 gms of citric acid and pressure cook for 20 minutes on fire. Remove from fire and separate from the water. Prepare the sugar syrup by mixing 1¼ kgs of sugar, ¾ litre of water and the rest of the citric acid. Heat the syrup to a single boil, then filter through a cloth. Add the ginger pieces to this syrup. Boil for a further 20 minutes.

2 Now set the ginger and syrup aside overnight. Next day heat again to a boil till you get a one-thread consistency (65 per cent sugar syrup). Once again, set aside overnight. Boil again till you get a two-thread consistency (75-80 per cent syrup). Now remove from fire and strain through a sieve. Spread the ginger in a thali (tray) when cool and spread the rest of the sugar (250 gms) over

it. Leave this way for 1 day, then store in a jar and seal.

*Quantity of candy prepared: 2 kgs.*

#### **7.2 Grape Juice**

5 kgs grapes

25 gms sugar

Pick a good quality of grapes, preferably the pink or violet varieties, such as the Bangalore blue (Concord) grapes. Take only fully ripe grapes and not under-ripe or decayed ones. Place the grapes in a little water, say 1 cup to 5 kgs of grapes. Heat over a low heat (75° C) until the fruit becomes soft. To test if the fruit is soft, press it between spoon and pan. If it crushes easily it has softened; if not, it slips away as whole. Now strain the juice through a layer of thick cloth (khardar or cheese cloth). Add 25 gms of sugar. You can add more, if the grapes you bought were tart or sour in taste. You needn't add any sugar if the grapes were very sweet to begin with.

Heat the juice to a single boil. Pour it while very hot into dry sterilized bottles. Fill the juice right to the top, leaving only little space. Now cap the bottles. Put the hot bottles in warm water and sterilize them in boiling water for 15-20 minutes. Then cool them, as quickly as possible, without letting the bottles break. Store in a cool, dry place. Quantity of juice prepared: approximately 3 litres.

### **7.3 Grape and Apple Jam**

½ kg grape pulp (without seeds)

½ kg apple pieces (or pulp)

1 kg sugar

½ tsp citric acid (or juice of 1 lemon)

Use a good variety of grapes. The best you can use are the violet-coloured Bangalore blue (Concord) grapes. Cut them in halves and remove the seeds. Heat them for a while in ¼ litre water. Add the apples, cut in fine pieces (or pureed in a mixie). Add sugar and citric acid. Now boil briskly till you get a setting point. (See page 1 for test to make sure jam is ready.) Now pour it hot into bottles. Allow to cool for a while. Then cap the bottles tight. Store in a cool and dry place.

This is a recipe from Los Angeles, California.

*Quantity of jam prepared: 1½ kgs.*

### **7.4 Guava Juice**

3½ kgs sugar

1 kg guava puree

10 gms (arabic) gum



2 gms (1 tsp) sodium benzoate

Mix the sugar with  $\frac{1}{2}$  litre water and bring to a boil. Add guava puree. Mix the (arabic) gum in a little water. Heat it gently to let it dissolve. Add this solution to the main guava puree and sugar mixture and stir. The use of gum is recommended as it serves as a stabilizer. (This, however, is a household recipe and not for large-scale preparation and marketing.) Fill the hot syrup (at 87-90°C) in the bottles. Cap the bottles. Sterilize them in boiling water for 5-10 minutes. If you put the syrup in bottles at a lower temperature, then you have to sterilize them longer, say for about 20-30 minutes.

*Quantity of syrup prepared: 5 kgs.*

### **7.5 Guava Jelly**

1 kg guavas

5 gms (1 tsp) citric acid

$\frac{3}{4}$  kg sugar

Wash the fruit well. Cut into round slices. Add  $\frac{1}{2}$  tsp (2½ gms) citric acid to one litre of water. Add this water to the fruit, keep it on fire and bring to a boil. Slow fire and cover with a lid. Cook for half an hour. When a little cool, filter through a muslin cloth and collect an extract; you will get about 1 litre of extract. Now add the sugar, along with  $\frac{1}{2}$  tsp (2½ gms) of citric acid, to the extract. Cook this on the fire till a jelly is obtained. Try out the sheet or plate test (see page 1) and when ready remove from fire. Throw out the scum forming on top with the help of a spoon and fill the hot jelly into small, wide-mouthed bottles. Keep the bottles open for 12 hours. Pour molten paraffin wax over the jelly. Allow to cool and lid. Store in a cool and dry place. (Covering with wax is necessary only when you want to store the jelly for some months.)

Quantity of jelly prepared: 1 kg 250 gms.

### **7.6 Guava Toffee**

1 kg guava pulp

1 kg sugar

3 gms citric acid

100 gms butter

3 gms salt

¼ tsp edible orange-red colour (optional)

(This toffee, too, can be prepared from the pulp left over after preparing guava jelly.) Pass the guava pulp through a soup strainer after taking out the extract for making jelly. Add sugar, citric acid, butter and salt. Cook the toffee till it leaves the bottom of the pan. Add the colour. Turn out the toffee on a greased tray and flatten the same to the thickness desired. Allow to cool and cut into small pieces of a size of your choice.

Quantity of toffee prepared: 1 kg 250 gms

## Chapter 8

### **PROCESSING of JAMUN and JACKFRUIT**

#### **8.1 Jamun Squash**

1 kg juice of fresh Jamuns

1 kg sugar

5 tsps (25 gins) citric acid

2 gms sodium benzoate (preservative)

When buying jamuns select fully ripe fruit. Wash thoroughly to remove any dust or dirt. Now crush the fruit between the palms of your hands, without breaking the seeds. Warm the crushed fruit over fire (say to a temperature of 60°C in case you have a thermometer) for 5-10 minutes. Extract the juice from the crushed fruit through a sieve or strainer, then pass it through a muslin cloth.

Separately, prepare a syrup by mixing the sugar in 1/4 litre of water. Heat gently, so that the sugar mixes well in water. With a spoon or ladle remove the scum that rises to the surface. Add citric acid mixed in a small amount of water. Mix well into the sugar syrup. Now add the jamun juice to the syrup. Mix well again. Now dissolve sodium benzoate in a small quantity —of water in a cup. Add this solution in the prepared squash. Bottle in clean, dry and sterilized bottles. Cap tight. This squash makes a very delightful drink, and will prove a pleasant surprise to your guests.

*Quantity of squash prepared: 2¼ litres.*

#### **8.2 Jackfruit Squash**

1 kg jackfruit (kathal) bulbs or pulp

2kgs sugar

8 tsps citric acid

½ tsp (2.5 gms) potassium metabisulphite

Remove the seeds from the bulbs, then cut the fruit into small pieces. Add f litre of water and heat for 10-15 minutes till the fruit is soft. Pass through a sieve or strain to get a smooth puree. In another pan, take ¾ litre of water, add the sugar and heat to a boil. Remove scum from the surface with the help of a ladle or spoon. Give only a short boil, then combine this sugar syrup with the pureed jackfruit. Mix well. Separately, add citric acid to a little water, say half a cup. Stir to dissolve. Mix this solution to the squash to give it the necessary tartness.

In the same way mix the potassium metabisulphite in a little water and add to the prepared squash. Store in dry, sterilized and clean bottles. Cap with clean caps.

From this squash you can make 16 glasses—or more, depending on your taste. Quantity of squash prepared: 3¾ kgs.

#### **8.3 Jackfruit Jam**

1 kg jackfruit (kathal) bulbs

¾ tsp citric acid

$\frac{3}{4}$  kg sugar

Cut the jackfruit bulbs into very small pieces. Add  $\frac{1}{4}$  litre water and boil the fruit for 15-20 minutes till soft. Now mix in the citric acid and sugar; heat briskly, till a setting point is reached. You can test if it is set by placing a spoonful of the jam in a plate; if it sets it will not flow freely on the plate (see page 1 for test). Technically (if you have a thermometer) the finishing point is  $105^{\circ}\text{C}$  ( $221\text{-}222^{\circ}\text{F}$ ). Do not over-cook.

Fill the jam in hot, clean, sterilized and dry bottles or cans. Allow to cool, then cap or seal. After this the tins can be further processed (i.e., sterilized) in boiling water for a period of 5 minutes.

Instead of pure jackfruit jam you can, using the same method, prepare a mixed fruit jam, combining mango, pineapple or banana pulp to the jackfruit pulp.

*Quantity of jam prepared: 1 kg 100 gms.*

#### **8.4 Jackfruit Preserve (Morrabba)**

1 kg jackfruit (kathal) bulbs

1 kg sugar

$\frac{1}{4}$  tsp (1 gm) citric acid

Combine the sugar with  $1\frac{1}{2}$  litres of water. Heat over fire, bringing to a boil; this gives an almost 40 per cent sugar syrup. Also dissolve the citric acid in this syrup with the usual precautions: of dissolving the acid first in a small amount of water, and then adding the solution to the syrup. Heat the syrup for a few minutes, remove the scum forming on top in order to get a clear syrup, and cover the bulbs in the syrup. Heat for about 15-20 minutes. Leave aside overnight so that the bulbs absorb the sugar. Next day, heat a while longer so that the strength of the sugar syrup reaches a 65 per cent (ek-tar or single-thread) consistency.

Once again, set aside for 24 hours. On the third day boil again to a do-tar (two-thread) consistency, or a 75-80 per cent sugar strength.

The final preparation can be packed in glass jars in the form of preserve (morrabba) or the syrup can be drained out through, a sieve and the fruit allowed to dry to form jackfruit candy.

*Quantity of morrabba prepared: 1 kg 500 gms.*

#### **8.5 Jackfruit Chutney**

1 kg jackfruit (kathal) bulbs

25 gmsgaram masala (2 tsps each of cardamoms, mace, cinnamon and black peppercorns)

2 tsps chilli powder

25 gms onions

5-7 gms garlic

$\frac{1}{2}$  tsp citric, acid

$\frac{1}{3}$  kg sugar

$1\frac{1}{2}$  tsps salt

100 ml vinegar or 1 tsp (4 ml) acetic acid

Remove the seeds from the jackfruit bulbs, then cut the bulbs into small pieces. The garam masala (consisting of cardamoms or big illaichi, mace or javitri, cinnamon or dalchini and black

peppercorns) can be used as powder or as whole. Chop the onion and garlic into pieces. Tie all the spices, onion and garlic in a small muslin cloth bag. Tie the bag loose. Dissolve citric acid in a little water and add to the fruit pieces. Also add about ½ litre of water.

Now boil the mixture in a pan for about 15-20 minutes, in order to soften the fruit. Place the spice bag into the pan and boil till the mixture turns very thick. Now add the sugar and salt and cook further till the chutney becomes thick again.

Just about 5 minutes before finishing add the acetic acid or •vinegar, then cook. Remove the cloth bag containing the spices (the sugar by this time reaches a 68-70 per cent strength. Fill the chutney into dry, sterilized and clean jars or bottles. Allow to cool, then cap.

Quantity of chutney prepared: 1 kg.

## Chapter 9

### Home Scale Processing of Lemon

#### 9.1 Lemon Squash

800 ml lemon-juice

1 kg and 400 gms sugar

¼ gm potassium metabisulphite

1 pinch citric acid

Take plump, well-ripened lemons. Wash them and cut into halves. With the help of a lime squeezer extract their juice or simply squeeze it out with your thumb and fingers.

Separately, dissolve sugar into 1 litre of water, heating the mixture a little over fire. You can make it a clearer syrup by adding a pinch of citric acid into it. Soon a scum will come up while boiling, which can be removed with the help of a ladle or spoon.

Now add the lemon-juice to this hot syrup. Allow to cool. In a cup take a small portion of the squash and mix the potassium metabisulphite into it. Stir and add to the main squash. Mix well.

Bottle the squash in clean, sterilized and dry bottles. Cap and secure tight. Store in a cool and dry place.

*Quantity of squash prepared: 3 litres.*

#### 9.2 Lime-juice Cordial

Lime-juice cordial is different from lemon squash in the sense that the squash is cloudy in appearance and the cordial clear and sparkling. For the latter, therefore, you have to store the juice for a month or so, so that the cloud settles down.

3 litres lemon-juice

½ tsp potassium metabisulphite {preservative}

5 kgs sugar a  
little milk

Squeeze the juice from the lemons with the help of wooden squeezers or as mentioned under the lemon squash recipe. Mix half the preservative in a spoonful of this juice and stir to dissolve. Add to the main juice and stir. Store this juice for a month or so. Then decant the upper, clearer layer of the juice. Heat the sugar with 4 litres of water and boil. Add a little milk, then boil again. Remove the scum in order to get a crystal- clear syrup. Now add the month-old juice to this syrup, along with the remaining part of the preservative, dissolved already in a spoonful of water. Stir. Store in sterilized and dry bottles in a cool place.

*Quantity of lemon-juice cordial prepared: 12 kgs.*

## Chapter 10

### **PROCESSING of MANGO, MALTA ORANGE and MIXED FRUITS**

#### **10.1 Mango Morrabba**

1 kg mango slices

1 tsp salt

½ tsp citric acid

1¼ kg sugar

Select fully developed, firm, but slightly under-ripe fruit. Soft and fleshy mangoes should not be taken, whether ripe or underripe; only firm, ripe mangoes should be used.

Wash the mangoes thoroughly. Peel with a sharp stainless-steel knife. Cut into large and neat slices. Prepare a salt water solution by mixing 1 tsp salt in some water. Leave the mango slices in this salt solution while peeling, so as to prevent their turning brown.

Now put these slices in a muslin cloth and dip them in boiling water for 5 to 10 minutes, so that the slices become soft and easy to prick. Spread the fruit on a clean piece of cloth and puncture with a fork or bamboo prickers.

Mix the citric acid into the dry sugar. In a pan spread the mango slices and this sugar in alternate layers. Use ¾ kg sugar with 1 kg mango slices this way. Set aside for 24 hours; at the end of this time, some water will have oozed out. To this add ¼ kg of sugar and heat the whole mixture for 10 minutes.

After this, set aside once again for 24 hours. Next day, add another ¼ kg of sugar and boil till you get a two-thread consistency. This morrabba has a 75-80 per cent sugar strength. Quantity of morrabba prepared: 1 kg 600 gms.

#### **10.2 Ripe Mango Squash**

5 kgs mango pulp

9 kgs sugar

200 gms citric acid



15 gms potassium metabisulphite {preservative}

Select well-ripened mangoes. Choose from the table varieties, or any juicy variety. (There are so many available in our country.) Wash the fruit well. Extract the juice by softening; the mangoes between the palms of your hands, or after peeling, them with a stainless-steel knife and cutting them into pieces. Prepare a smooth puree by passing them through a fine sieve-(or strainer). Preferably, use a stainless-steel strainer.

Now mix the sugar with 8 litres of water. Heat to a boil. Add; the citric acid by first dissolving it separately in a cup with a little water and then mix to the syrup. Now mix the sugar syrupy and mango puree well. Add the preservative, again dissolving it first

in a little water or syrup and then mixing with the squash.. Store in hot, sterilized bottles. Cap the bottles tight and keep-in a cool, dry place.

*Quantity of squash prepared: 22 kgs.*

### **10.3 Green Mango Squash**

1 kg green mangoes {grated}

2 kgs sugar

2 tsps (10 gms) citric acid

½ tsp (4 gms) potassium metabisulphite (preservative)

Wash and peel the green mangoes. Run them on a grater. For every 1 kg of this grated mango add 2-3 litres of water. Boil this mixture till the grated mangoes are completely soft and mashed. (It takes about 15 minutes over slow fire to soften them.) Cool this pulp. Now run the mixture in a blender or mixie or through a soup strainer (sieve). One kg of mangoes boiled with water give about 2 kgs of pulp.

Prepare a sugar syrup by heating 2 kgs of sugar with 1 litre of water. Stir so that sugar dissolves completely, and bring to a boil. Add the citric acid and stir. Filter through a muslin cloth, and allow the syrup to cool. Add the mango pulp, mix well, then add potassium metabisulphite at the rate of 800 mg per 1 kg of squash, i.e., a total of 4 gms (1 tsp) for the present quantity of green mango squash. This should be done by first mixing the metabisulphite in a little water, and then adding to the squash. Fill the squash into sterilized bottles, leaving a 2½ cm (1") space from the top. Cap and seal tight.

*Quantity of squash prepared: 4 kgs.*

#### **10.4 Mango Jam**

½ kg mango pulp (from ripe mangoes)

1 kg sugar

1 tsp citric acid

6-8 gms pectin (optional)

Soften and mash the mangoes with your hands and extract the pulp. Strain the pulp through a stainless-steel sieve. Weigh the strained pulp. Add half the sugar, along with citric acid, to the pulp and heat over fire. Cook for five minutes, then add the remaining sugar along with the pectin powder, if any.

Stir till the jam is set—which should be confirmed through a plate or sheet test (see page 1), because mango jam is not of very thick consistency.

Quantity of jam prepared: 1½ kgs.

#### **10.5 Mango Chutney with Raisins**

1 kg mangoes {sliced}

15 gms red chillies

10 gms ginger {chopped fine}

200 ml vinegar {or 10 ml glacial acetic acid}

50 gms almonds {optional}

100 gms raisins

1 kg sugar

30 gms salt

10 gms cinnamon (dalchini)

Wash mangoes well. Peel and cut them into small pieces. Grind chillies and ginger to a paste along with the vinegar. Blanch and peel almonds in hot water. Now cut the almonds in slices. Immerse the mangoes in a little water and cook them till soft. Wash the raisins. Remove the stems and clean them. Now add the sugar to the mangoes and stir. Add salt and the spice mixture in vinegar into this, then the cinnamon (powdered). Continue heating till you get the right consistency.-Pack hot in bottles. Quantity of chutney prepared: 1 kg 500 gins

### **10.6 Frozen Mangoes**

1 kg mango slices

1 tsp salt or ¼ tsp potassium metabisulphite

½ litre syrup (with 40 per cent sugar consistency)

1 Vitamin C tablet (300 mg)

Buy mangoes of any good variety, such as Alphonso. Prepare a salt solution with 1 tsp salt in a litre of water. Cut the mangoes into slices, cubes or any regular shape. Immerse the pieces in salt solution. This prevents unnecessary browning of the fruit. If you can get potassium metabisulphite, make a solution of this preservative with water by dissolving 1 tsp in 1 litre of water, and dip the pieces in this solution instead of in the salt solution.

After some time drain the solution and wash the mangoes quickly under [running water to remove excess salt or chemical. Arrange these pieces in a jar, rigid polyethylene container or a simple polyethylene bag. Now cover with a 40 per cent syrup (i.e., a syrup in which 1 cup of sugar and 1 cups of water are stirred to a boil, as well as clarified with a pinch of citric acid or a little milk). You should also add 1

Vitamin C pill (300 mg) in this syrup. Cover the syrup to 1 cm below the top of the container. Keep these containers in the coolest part of your deep freeze and allow them to freeze. Use them as and when required, particularly during the off-season.

*Quantity of frozen mango prepared: 1 kg 500 gms.*

### **10.7 Dried Mango Cake**

Ripe mangoes (of the quantity desired)

Extract the pulp of ripe mangoes and strain the juice through. Spread some of the pulp on a piece of clean cloth and put it out in the sun. When dry, spread a second layer over this and continue sunning. Now spread a third layer and continue this way till all the pulp is over. When the whole

cake is absolutely dry, take it out of the cloth. If this is difficult sprinkle some water on the wrong side. Store the cake in a dry place and expose to the sun from time to time to prevent any mould forming over it.

### **10.8 Salted Green Mangoes**

1 kg tender green mangoes (with soft centres)

1 kg ordinary kitchen salt

Wash the mangoes and wipe them dry. Slice into quarters, or if they are small, leave them whole. Take a clean jar and in it spread the salt and raw mangoes in alternate layers. Fill to the brim in this order, and make sure the final layer is that of salt. Cork tight and tie with a clean cloth.

If desired you may add in some green chillies also. Shake the bottle once or twice a day. Use after one month.

*Quantity of mangoes prepared: 2 kgs.*

### **10.9 Malta Orange and Lemon Marmalade**

1 kg malta oranges

2 lemons

2 kgs sugar

Wash the fruit. Remove the outer portion of the peel. Also peel out the white, thick peel which immediately covers the fruit. Cut this white peel into thin pieces and tie in a muslin bag. Now cut the fruit into thin slices. Separately take a portion of the yellow pith. Cut it to shreds in water for 10 minutes. Cover the fruit with 2½ litres of water. Hang the bag containing the rest of the pith (white skin) on the side of the pan. Cover the pan. Boil the contents for 1½ hours. Squeeze the muslin bag containing the pith.

Add the sugar and boil further till you get a setting point. You can try out the sheeting test (see page 1) to make sure.

Pour the marmalade into bottles. Allow to cool and set. Cap and seal air-tight.

*Quantity of marmalade prepared: 3 kgs.*

### **10.10 Malta Orange Marmalade**

1 kg malta oranges

1 kg sugar

½ tsp citric acid

These oranges have a thick skin. The outside thin layer of the skin is yellow, while the thicker portion of the inner skin (pith) is white in colour; it is the outer portion of the skin which contains pectin. And it is this pectin which sets the marmalade. The yellow outer skin is utilized as shreds. Cut the thin yellow skin into shreds (which will later be added to the marmalade and suspended in it). Cover these shreds with water in a pan and boil for 10 minutes. These shreds are now ready, through you will need only a portion of them. Throw away the water. Cut the oranges into thin slices. Cover with sufficient water. Boil for 20-30 minutes. Obtain a clear extract by passing it through a thick layer of cloth or jelly bag made of felt cloth.

To this extract, add one kg of sugar mixed with citric acid. Boil till it reaches 218°F. Now add some orange peel shreds "boiled earlier. Once again continue boiling briskly and confirm by the sheeting test (see page 1) that the marmalade is ready.

Put hot marmalade into sterilized and dry bottles. Allow to cool, so that the marmalade sets. Cap and store in a cool place.

*Quantity of marmalade prepared: 1½ kgs.*

### **10.11 Mixed Fruit Jam—1**

1 kg papaya pulp

1 kg pineapple pulp

1½ kgs plum pulp

1 kg banana pulp

½ kg passion fruit juice (or pulp)

5 kgs sugar

25 gms citric acid

30 gms pectin (if available)

colour or essence of your choice (if desired)

This delicious jam was commonly prepared in Ooty till about 10 years ago.

Passion-fruit grows in the Nilgiris. Malavalapalayam bananas come from the Palani hills. Pineapples come from nearby Trichur in Kerala. Plum pulp provides a rich quantity of pectin. All the fruit is cut into small pieces. If a mincer is available it is run through it to get a fine pulp. If the fruit is in small pieces, you need about  $\frac{3}{4}$  litre of water to break them with a ladle into a mushy pulp; the fruit should be further heated in this water, and with the help of a ladle, broken into a fairly uniform mass.

Mix half the sugar with citric acid uniformly and the other half with pectin, if available. To the soft fruit pulp add the sugar mixed with citric acid. Keep stirring and cook over fire for 5 minutes. Add the remaining sugar mixed with pectin. Cook throughout over a brisk fire, till the setting point is reached. This can be ascertained by the plate test (see page 1). Remove from fire. Add colour or essence of your choice, if you wish. Pour the hot jam into bottles or jars. Allow to set. If you want to avoid mould formation, you can put a layer of wax over the jam. Cup and store. Quantity of jam prepared:  $7\frac{1}{2}$  kgs.

### **10.12 Mixed Fruit Jam—II**

$\frac{1}{2}$  kg apple pieces or pulp

$\frac{1}{2}$  kg mango pulp

$\frac{1}{2}$  kg banana pieces or banana puree

$\frac{1}{2}$  kg pineapple pieces or crushed pineapple

2 kgs sugar

2 tsps (10 gms) citric acid

12-15 gms pectin {if available}

Peel the various fruits and wash them thoroughly. Cut into small pieces. If you have an electric mixie, prepare a puree of these fruits. (If you have pectin, it will help set the jam quickly. But remember that some fruits such as apples and plums are a very rich source of pectin; as such, in a mixed fruit jam you can include these fruits in greater proportion.) Now mix half the-sugar well with the citric acid and another half with pectin, if you intend to use the latter. If you have made a puree of the fruits in a mixie, you do not need any water. Otherwise, take small pieces of the fruit

in a little water, keep them over, fire and crush them with a heavy spoon or ladle so as to soften; them. In case you are using fruit puree, you can add half the sugar with the citric acid into it. Cook the mixture over a brisk fire. After 5 minutes add the remaining sugar (with pectin, if available). Once again, cook over a brisk fire. Now finish off by-trying out the sheet test or plate test (see page 1). Fold hot jam. into sterilized and dry bottles. Allow to cool and set. Now cap\* and store in a cool place.

*Quantity of jam prepared: 3 kgs.*

### **10.13 Tutti-Fruitti Jam**

¼ kg pineapple pieces

¼ kg apple pieces

¼ kg pear pieces or chopped cherries

¼ kg gooseberries (chopped)

1 kg sugar

1 level tsp citric acid (or juice of 2 limes)

Wash, peel and cut the fruits into pieces. Add a little water. Keep the pan on fire in order to soften the fruits, then press them under a ladle or large spoon. Add the sugar and citric acid. Instead of the citric acid you can add lime-juice. Now heat over a brisk fire, till you get the gelling or finishing point (see page 1). Now the jam is ready for pouring into bottles. Pour it hot into well sterilized and dry bottles. Allow the jam to cool. Secure the caps tight, and store in a cool, dry place.

*Quantity of jam prepared: 1 kg 500 gms.*

## Chapter 11

### Home Scale Processing of Orange

#### 11.1 Orange Marmalade

$\frac{3}{4}$  kg orange pulp

$\frac{1}{4}$  kg grapefruit pulp

2 kgs sugar

$\frac{1}{2}$  tsp citric acid (or juice of one lemon)

Santra oranges have less pectin; therefore, combine the orange pulp with the pulp of grapefruit. Boil the shreds of the skin (outer peel) of 8 grapefruits.

Use santra orange segments along with their white pith or peel. Cut into pieces. Cut the grapefruit (along with the white peel) in slices. Mix the fruit. Now cover with water. Also add the citric acid or lemon-juice. Boil in a covered vessel to avoid loss of nutrients; however, add a little water to make up for the water evaporated. Boil for about 1 hour. Now strain through a jelly bag or a multiple layer of thick pieces of khadar cloth in order to get a clear extract. Add the sugar to this extract. Now boil briskly till the marmalade reaches a setting point (test by sheeting test explained on page 1). Pour the hot mass into dry, sterilized bottles. Allow to cool for a while. Cap and secure tight. Store the jars in a cool, dry place.

*Quantity of marmalade prepared: 3 kgs.*

#### 11.2 Orange Squash

1 kg orange juice

2 kgs sugar

75 gms citric acid

$\frac{1}{4}$  tsp orange-red food colour

3 gms potassium metabisulphite

$\frac{1}{2}$  tsp orange essence



Mix 1 litre of water with the sugar. Bring to a boil. Add the citric acid, then filter the syrup through a muslin cloth. Cool, then add the juice, colour, potassium metabisulphite (dissolved first in 3 tps of cold water) and orange essence. Fill into bottles 2½ cms below their rim. Cap, then seal the bottles by dipping the neck of the bottle from top in molten paraffin wax.

*Quantity of squash prepared: 4 kgs.*

### **11.3 Orange and Lemon Squash**

½ litre orange-juice

½ litre lemon-juice

2 kgs sugar

40v gms citric acid

2 gms potassium metabisulphite (preservative)

Select a good quality of oranges and lemons. You can use malta, sathgudi or santra oranges. Squeeze out the juice.

Dissolve sugar in 1 litre of water and boil over fire. Clarify it by adding a little (1-2 gms) citric acid into it. Allow to boil and remove the scum by means of a ladle or spoon. Now add both orange and lemon-juice into the hot syrup. Separately, dissolve potassium metabisulphite in a little water in a cup. Add this preservative to the main squash. Stir well. Pour the squash into well-sterilized, dry bottles. Cap the bottles secure. Store in a drv and cool place. This is a recipe from Queensland, Australia.

*Quantity of squash prepared: 4 kgs.*

## Chapter 12

### **Papaya, Phalsa, Pineapple and Pomegranate Processing**

#### **12.1 Papaya Jelly**

½ litre extract of raw papaya

½ litre extract of ripe papaya

3 gms citric acid

1 kg sugar

The method of preparing this jelly is essentially the same as that stated under apple jelly, except that at first you must get the extract of raw papayas with the help of water in which citric acid is added. It is the raw papayas which contain pectin, which is best extracted by boiling in acidified water.

To get an extract of ripe papayas, the boiling should be done for a short time, say 15-20 minutes.

Combine the two extracts in equal proportions. Add the sugar. Mix citric acid in, a little water, then add to the papaya mixture. Cook till the; jarrijis ready (see page 1 for tests).

*Quantity of jelly prepared: 1½ kgs.*

#### **12.2 Papaya Syrup**

1 kg papaya puree (or pulp)

7 kgssugar

5 gms (or 1 tsp) citric acid

sodium btnzoate (1000 p p.m. on the final weight of the syrup)

Prepare papaya puree or pulp as stated in the papaya jelly recipe earlier, by passing the same through a fine sieve.

1 Mix all the ingredients stated above into 2½ litres of water. Heat them to bring the mixture to a boil. Boil for about 5 minutes only. Put this hot syrup in clean, sterilized bottles and

cap well, or use crown corks. Cool the bottles in a pot under running water and store in a cool place.

*Quantity of syrup prepared: 10 litres.*

### **12.3 Frozen Papaya Puree**

Ripe papayas (of any desired quantity)

1 Vitamin C tablet

Select well-ripened, good quality papayas, of an excellent orange-red colour inside. Peel them, then clean the insides well. Cut into small pieces and mash quickly. Run

through a strainer or a sieve and get a good smooth puree or pulp. Heat immediately. Boil for 1-2 minutes only, then cool quickly by keeping the pan (containing the puree) in water and stirring the pulp quietly.

By giving one quick boil, kill the enzymes; otherwise, if it remains hot, the puree will gel and become difficult to handle. Add 1 pill of Vitamin C (200 mg per litre of puree) and stir to dissolve it. Now you can put the puree in rigid plastic HDP (polyethylene) containers, filling them to 1 cm from the top edge. Store in freezers. Frozen puree can be used later in various products such as papaya nectar, syrup, jam, ice-cream or other products.

To freeze, store in a home freezer at as low a temperature as possible. Remove from the freezer after it is frozen and keep in a very cool place, so that it remains frozen.

### **12.4 Phalsa Syrup**

1 kg phalsa fruit

1 kg sugar

¼ tsp sodium benzoate

Wash the fruit well. Put them in a squeezer (mincer or screw type). You can also squeeze the juice by putting them in a piece-of cloth and pressing out the juice with the hands. You will get about half a kilogram of juice from 1 kg of fruit. Now add the sugar to it, and keep it over slow fire. Dissolve it by gently stirring the sugar in the juice. Put sodium benzoate preservative in a

tablespoon of water. Dissolve it in this water and add this solution to the syrup. Put very hot syrup into sterilized and dry bottles. Cork and keep in a cool, dry place.

*Quantity of syrup prepared: 1 kg 300 gms.*

### **12.5 Bottled Pineapple Juice**

1 litre juice (from Kew pineapples)

25 gms sugar

Take fully ripe and mature fruit; even when you buy semi-mature fruit, allow them to ripen till they acquire a golden colour. The Queen variety of fruits in N.E. India in the Khasi and Jayanta hills make a very rich juice. The Kew variety in the Malabar Coast also make good juice.

Wash, peel and cut the fruit into pieces. Run these pieces through a small hand juice- extractor, where the juice flows on one side and the pomace comes out through a central opening.

Separately, sterilize bottles in hot, boiling water for about 12-15 minutes. Keep a false bottom (say a piece of wire mesh) in the pan; place bottles on it, and cover with water. Put the pan on fire and boil bottles for 15-20 minutes. Take them out carefully, and keep them upside down. Excess water will run out, and the bottles will become dry. Similarly, sterilize the caps; you can use a pair of tongs for the purpose, but keep in mind that these tongs should also be sterilized.

Now heat the juice and boil it for a few minutes. While juice from the Queen pineapples does not require any addition of sugar, you can add 25 gms of sugar per litre of juice got from the Kew variety. Dissolve sugar in the juice. Pour very hot juice into bottles Secure the caps tight. If you have added very hot juice in bottles, there is no fear of spoilage as the bacteria will not multiply. However, if the temperature has gone down to 70-80°C, sterilize the filled bottles again in boiling water for 10-15 minutes.

Cool the bottles gradually, so that they do not break. Keep in a cool and dry place.

*Quantity of juice prepared: 1 litre.*

### **12.6 Frozen Pineapple Juice**

1 litre juice (from Kew pineapples)

25 gms sugar

1 Vitamin C (500 milligrams) tablet

Extract the juice, following directions given in the recipe on bottled pineapple juice. Add 200 to 500 milligrams of Vitamin C (ascorbic acid). This prevents the colour from turning brown. Add sugar in the case of juice from Kew pineapples. No sugar is needed for the Queen variety of pineapple juice. Now heat the juice and bring it to a quick boil. Boil for about 5 minutes. Cool it quickly, preferably in a sink containing water.

Pour the juice into rigid plastic containers or bottles, leaving 6 mm of head space from the top edge of the containers. Secure the covers tightly over the containers. Keep them in deep-freeze units and let them freeze.

Frozen juice has a far better flavour than canned juice, since tinned juice is heated for a longer time in the canning process and it loses, therefore, its subtle flavour.

*Quantity of juice prepared: 1 litre.*

### **12.7 Pineapple Morrabba**

1 kg pineapple cubes

1¼ kgs sugar

½ tsp citric acid

1 tsp salt

Cut the fruit into cubes. Put them into a 2 per cent salt solution (10 gms of salt and ½ litre of water). Wash and boil them until the pieces become soft. Prick them with a fork for the easy penetration of sugar syrup. Now mix citric acid well into ½ kg of sugar. Place pineapple cubes and sugar in alternate layers, using the sugar with 1 kg of cubes on the first day. Keep the mixture overnight. Next day heat the mixture, adding

¼ kg more of sugar. Heat for about 10 minutes. Once again keep it aside for another

24 hours. Next day put ½ kg of sugar again and boil further till you get a 2-tar consistency (75-80 per cent sugar strength).

If you want to use the product as morrabba, then leave the fruit in the syrup, but if you want to use it as candy, strain it through a sieve and allow the pieces to dry. And again, if you want crystallized pieces, then roll the pieces in sugar and let them be layered all over with it. Again allow them to dry for a few hours. Now pack in a jar. Cap and secure air-tight.

*Quantity of morrabba prepared: 1 kg 600 gms.*

### **12.8 Pineapple Squash**

1 litre pineapple juice

2 kgs sugar

3 gms citric acid

2½ gms (½ tsp) potassium metabisulphite a few drops essence

Squeeze the juice as stated under the bottled pineapple juice recipe. Mix 1 litre of water with the sugar. Heat to dissolve. Add 1-2 gms of citric acid to help clarify the syrup. The scum will come on the top when the syrup is boiling; now remove it with the help of a ladle or a spoon. Strain the syrup through a thick layer of cloth. Add the juice to the hot syrup. Allow to cool. Add the preservative by stirring it in a small quantity of water first, so as to dissolve it. Mix this solution along with essence into the squash. Put the squash in clean, dry, sterilized bottles. Cap the bottles. Store in a cool and dry place.

*Quantity of squash prepared: 4 kgs.*

### **12.9 Frozen Pineapple Chunks**

1 kg pineapple cubes or chunks

2 cups sugar

1 tablet ascorbic acid (Vitamin C)

Frozen pineapples make an excellent dessert, since they retain a far better flavour as frozen pieces than as a canned product.

Take fully ripe, mature fruit. Avoid over-mature fruit. Wash the pineapples well. Hold the fruit by its crown and remove the peels with the help of a sharp, stainless-steel knife; remove the eyes by making diagonal incisions. Now slice them into regular pieces, and again cut these rings into cubes or a shape of your choice. Prepare a 40 per cent sugar syrup by combining about 2 cups of sugar with 3 cups of water. Heat to dissolve the sugar. You can clarify the syrup by adding a small amount (say 1 gm) of citric acid. On heating the scum comes to the surface; remove it with a spoon. Allow the syrup to cool. Add ascorbic acid to the syrup.

Place the pineapple pieces in rigid plastic HDPE (high density polyethylene) containers or glass jars. Cover with syrup, leaving a 1.5 cm space at the top (i.e., below the top edge). Now secure the covers air-tight, so that there is no leakage.

Freeze in a deep freeze. Use when required.

*Quantity of pineapple prepared: 1 kg 800 gms.*

### **12.10 Sweet and Spicy Pineapple Chutney**

1 kg pineapple pieces

1 onion (chopped)

10 gms garlic

1tblsp garam masala (powdered cinnamon, cloves, black pepper, cardamoms)

40 gms ginger

½ kg sugar

50 gms salt

2 tsps chilli powder

200 ml vinegar (or 15 ml glacial acetic acid)

Buy fresh, ripe fruit. Chop the onion and garlic. Powder the cinnamon, cloves, black pepper and cardamoms. Slice the ginger. Hold the pineapple by its crown and peel with a sharp stainless-steel knife; remove eyes by making diagonal incisions on the surface of the peeled fruit. Cut the fruit into small pieces. If the core is soft enough you can use it; otherwise discard it. Cook and crush pieces in a small amount of water. Add the sugar and salt. Heat to dissolve them. Then add the sliced ginger, garlic and onion pieces. Cook further. Add the spices and red chilli powder. Some people do not add these spices directly, but tie them in a muslin bag and keep this bag dipped in the chutney mixture on the side of the pan during the cooking process. You can decide whichever way you like. Add vinegar or glacial acetic acid. Cook gently on fire till you get a fairly thick consistency. Pour it hot into sterilized and dry bottles. Allow to cool. Cap it tight. Keep in a dry and cool place.

*Quantity of chutney prepared: 1 kg.*

### **12.11 Pineapple Jam**

1 kg pineapple pulp (got from 1½- to 2 kgs of pineapples)

800 gms-1 kg sugar

1 tsp (4 to 5 gms) citric acid

6-8 gms pectin powder

1 \_  
tsp food colour  
8

tartarazine and indigo carmine, optional (harmless edible yellow colour)

½ tsp pineapple essence

The pineapples should be just ripe; they should not be overripe, nor under-ripe. The amount of sugar to be added depends upon taste; some people prefer a more sweet jam, so you may put 1 kilogram of sugar for every kilogram of pineapple pulp. When more sugar is added, the flavour of the product will not be very prominent. Actually, sugar is divided into two parts and added at different stages. If a sweeter product is desired, then only 4 gms of citric acid is added per kilogram of sugar; if a more tart (sour) jam is desired then 5-6 gms may be added; normally 4 gms are fine. The quantity of pectin depends upon the sugar taken and the maturity of the pineapple. If sugar taken is 1 kilogram and the pineapple is medium-ripe, then 6 gms of pectin powder is added. If pineapple is raw or over-ripe, then 8 gms of pectin are taken.

Remove the peel of the pineapple. Remove the eyes of the pineapple. Grate the pineapple with a stainless-steel or aluminium prater (do not use the inner hard core portion). The core can be crushed and its juice used for making syrup or squash.

Take the weight of the grated pulp; add water at the rate of ¼ litre to 1 kg of the pulp. Heat it over fire till it is soft. Cooking is done over brisk fire. Take sugar according to the weight of the pulp. Divide the sugar in two equal parts; to one part mix well the citric acid; and to another part, mix the pectin. To the soft pulp add half the amount of sugar along with the citric acid. Keep stirring. Cook for 5 minutes. Add the remaining sugar and pectin (mixed already).

Cook till the end point (see page 1). Finally, add the colour and essence. Mix well and immediately pour into sterilized and dry bottles.

*Quantity of jam prepared: 1¼ to 1½ kgs.*



### **12.12 Pomegranate Syrup**

¼ litre pomegranate juice

1½ kgssugar

½ tsp citric acid

1 pinch edible strawberry-red food colour

Get good quality pomegranates. Peel and separate the luscious sparkling, violet- coloured pomegranate grains. Now put these in a muslin cloth and press out the juice. Boil the sugar in ½ litre of water. Dissolve citric acid in 1 tblsp water. Put this solution to the sugar syrup. Boil further. A scum comes on the top- Remove this with the help of a spoon in order to get a clear syrup. Add the pomegranate juice to this syrup and give it a quick boil. Similarly, dissolve the strawberry food colour in a tblsp of hot water and add to the syrup. Use only permitted food colour; do not use any other. Now pour the hot pomegranate syrup into sterilized and dry bottles. Cork tight and store the bottles in a cool place.

Quantity of syrup prepared: 2½ kgs.

## Chapter13

### **Raisin Chutney**

#### **13.1 Raisin and Date Chutney**

½ kg raisins

½ kg dates (chuharas)

½ kg tamarind (imli)

½ kg sugar

25 gms salt.

1 tsp chilli powder

Boil imli with enough water to get an extract. Set this extract aside. Cut dates into small pieces. Mix the dates, raisins, sugar, salt and chilli powder with the imli extract. Heat to a required consistency. The chutney can be eaten immediately.

*Quantity of chutney prepared: 1½ kgs.*

## Chapter 14

### **Strawberry Products**

#### **14.1 Strawberry Jam**

1 kg strawberries

$\frac{3}{4}$  kg sugar

Take ripe strawberries; avoid over-ripe and under-ripe ones. Remove the stems and green leaves. Wash well, but do not soak while washing. Place in a pan and crush some berries, say half of them. Keep the pan over fire, and bring them to a boil as soon as possible. Continue boiling rapidly, stirring constantly till almost a jam-like thickness is obtained. Remove from fire and stir in the sugar. Boil again, as rapidly as possible, on fire. Constant stirring is very important while you get a boil. Cook to the required thickness. When the required end point is reached (see page 1) remove from fire and stir for 2 to 3 minutes. Pour immediately into clean, dry jars. When cool, pour a layer of melted paraffin wax over this, if you plan to store the jam for use later. If, however, it is to be used shortly, allow it to cool and cap. Store in a cool place.

*Quantity of jam prepared: 1 kg. 100 gms.*

#### **14.2 Frozen Strawberries**

Ripe strawberries (of the quantity desired)

sugar

Select firm, ripe strawberries. Wash these berries, a few at a time, in cold water. Lift them gently out of the water and drain. Remove the stems, green hulls and other foreign matter. Slice the strawberries, each into two long pieces. Now cut to any shape of your choice.

Place the berries in a shallow pan. Sprinkle sugar over them at the ratio of 200 gms for every kg of berries. With the help of a flat spoon, turn the berries again and again till the sugar gets dissolved and a syrup is formed. Pack the berries in a wide-mouthed container, leaving about 1 cm of head space, i.e., fill till 1 cm of space is left at the top.

Place small pieces of butter paper or cellophane on the top of the berries. Press the berries down into their syrup. Press the lid firmly to make it air-tight. Place the containers in a home freezer, preferably at 0°F.

The process of freezing should take a minimum time. It should be a speedy process, at any rate, and not take more than 24 hours. If the process is not a fast one the product may spoil before it is frozen.

Frozen strawberries with sugar make an excellent dessert. Strawberries are available in the market only for a short period. Therefore, you can stock them in frozen form for a long period afterwards. Almost any container will do for storing in the freezer. Polyethylene (low density or high density) containers can be used conveniently also. If the process is not a fast one the product may spoil before it is frozen.

## Chapter15

### **Tamarind Processed Products**

#### **15.1 Bottled Tamarind Pulp**

1 kg tamarind fruit

Tamarind pulp can be preserved in bottles, to be used for bhelpuri or for seasoning other preparations such as chat, sambhar, amti, dal, sweet and sour chutney and so on.

Take 1 kg of tamarind fruit. Boil it with 1 litre of water. Heat for about 3 5-20 minutes. Get an extract. You can concentrate this extract again for 15-20 minutes. Now put it boiling hot into bottles, preferably small ones (8-ounce bottles) for this purpose, so that you can use small servings at a time. You can, however, use large beer bottles also.

Cap the bottles tight. Now turn them upside down. Sterilize for 10 minutes in boiling water. Now allow the bottles to cool slowly at room temperature. Store in a cool, dry place.

*Quantity of pulp prepared: 300 gms.*

#### **15.2 Mulligatawny (Tamarind and Pepper Water Paste)**

½ kg tamarind salt to taste

150 gms cumin seeds

75 gms peppercorns

1 tsp coriander seeds

10 garlic cloves

1 large onion (chopped)

2 tbsps vegetable oil

1 tsp mustard seeds

2 handfuls curry leaves

1 gm sodium benzoate (preservative)

Soak tamarind in a litre of boiling water for one hour. Extract thick pulp out of it and add the salt. Roast cumin seeds and grind them along with peppercorns, coriander seeds, garlic, and chopped onion. Add this mixture to the tamarind pulp. In the oil, splutter mustard seeds and fry curry leaves. Add them also to the pulp. Cook the pulp till it becomes thick. For the sake of preservation heat the whole pulp, and add sodium benzoate: take a small amount of pulp in a cup, add and dissolve sodium benzoate into it and add it back to the main pulp. Heat this pulp, then put it in sterilized, dry and clean bottles. Cover with a clean cap.

Cool and store preferably in a refrigerator; half a teaspoon of this in a tumbler of hot water makes an excellent appetizer before meals.

*Quantity of paste prepared: 300 gms.*

## Chapter16

### Vinegar Products

#### 16.1 Sweet and Spicy Vinegar

¼ kg sugar

1 tsp salt

1 tsp garam masala powder

1 tsp black pepper powder

50 ml glacial acetic acid

Dissolve the sugar in 1 litre of water. Add the salt, garam masala and pepper powder. Boil for about 10 minutes. Strain and sieve out the spices. Add glacial acetic acid, and stir to dissolve. You can use this vinegar as a base for different fruit preparations, as well as for cooking.

*Quantity of vinegar prepared: 1 litre-*

#### 16.2 Spicy Vinegar-II

25 gms mace (javitri)

15 gms cloves (laung)

25 gms cinnamon (dakhini)

5 gms peppercorns

15 gms ginger

15 ml glacial acetic acid

Weigh the spices. Tie them in a piece of muslin cloth. Put the glacial acetic acid in ¼ litre of water, then stir to mix; now you get a sour, clear vinegar. To this vinegar add the bag of spices in a saucepan, preferably a stainless-steel one. Boil over fire. Now set aside for about 2 hours. Remove the bag containing the-spices.

Vinegar is an excellent preserver of foods and you can use this vinegar to pickle and preserve many vegetables and fruits.

Quantity of vinegar prepared: ½ litre

## Chapter 17

### **Walnut and Watermelon Products**

#### **17.1 Walnut Pickle**

Ripe walnuts (of the quantity desired)

Walnuts are grown in Kashmir. Do not pick on walnuts with a hard shell; in fact select them before the shells have begun to form. If you prick them with a needle or a fork you can feel if the shell has formed. (The shell usually forms opposite the stalk, about  $\frac{1}{2}$  cm from the end.) Prepare brine (salt solution) at the ratio of  $\frac{1}{2}$  kg of salt to 5 litres of water. Cover the walnuts with this brine solution. Soak them for several days. Then change the brine and soak the nuts for another week. Now drain the water. Spread the nuts on a tray and leave them for about a week in open air until they become black. (They actually turn black in about one day.) Now pack the walnuts into jars and cover them with sweet and spicy vinegar (see recipe on page 92). Set aside for a month, or longer, before use. Stains from walnuts on your clothes are very persistent. So exercise the necessary precautions.

#### **17.2 Watermelon Peel Candy**

1 kg cubes of melon peel

$\frac{1}{2}$  tsp lime (chuna) in 1 litre water

$1\frac{1}{4}$  kg sugar

$\frac{1}{2}$  tsp citric acid

When you have eaten the pink (or red) portion of the watermelon, do not discard the white peel. This can be crystallized and turned into a delicious fruit candy. Cut the white peel into cubes or any other shape, throwing the green skin away. Now keep the cubes in lime water (chuna) for about 1 hour. Then wash off the excess lime and prick the cubes with a fork. Boil them for 10-15 minutes. Take 1 kg cubes and 1 kg sugar and put them in alternate layers. It is preferable if you mix citric acid with sugar.

Heat the peel and sugar for 10 minutes. Now set aside for 24 hours. Add  $\frac{1}{4}$  kg of sugar and again heat the mixture for 10 minutes. Set aside for another day. Again, on the third day, add  $\frac{1}{4}$  kg of sugar till you get do-tar (2-thread) consistency. In order to separate the candied fruit run the mixture through a sieve and strain out. Further, in order to crystallize the fruit, roll it in dry sugar.

Allow the pieces to dry. Place them in a jar and secure cap tight.

*Quantity of candy prepared: 1¾ kgs.*

## **Apples**

### **Glossary**

Apples grow in Kashmir and Uttar Pradesh. They can be turned into excellent jams and jellies. Since they are rich in pectin they can be combined with various other fruits and turned into delicious jams. Called sev in Hindi and Oriya, the apple is referred to as safar chand in Marathi, safarjan in Gujarati and tsoonth in Kashmiri.

## **Almonds**

Though expensive, the almond or badam is the most popular of dried fruits, and makes the most perfect of syrups.

## **Amlas**

These are richest in Vitamin C, and are freely available in many parts of India. They can be turned into pickles and chutneys, and added to many Indian curries to increase their nutritional value. Called amla in Hindi and Gujarati as well, it is referred to as anvla in Marathi and nellikai in the South Indian languages.

## **Bananas**

A popular fruit, bananas have a soothing effect on the stomach. Mashed banana can be fed to babies. In Kerala dry banana powder is made and given to babies. Called kela in many Indian languages, in Tamil and Malayalam it is called vazha pazham.

## **Dates**

These come mainly from Arabia. Wild dates are grown in many parts of India, and are called khajur in many Indian languages (including Hindi), eethapazham in Malayalam and kharjoora pandu in Telugu.

## **Ginger**

Adrak or ginger is available in most parts of India almost all the year round. The best ginger for preparing candy is the fibreless ginger usually available in winter.

## **Grapes**

Grapes make excellent wine. Called angoor in many Indian languages, and draksha in South Indian languages.



### **Grapefruit**

Segments of grapefruit can be peeled and canned suitably. This fruit is a rich source of Vitamin C. In Hindi and Gujarati it is called chakotra, be'danna in Marathi and Kashmiri and mundri pazham in Malayalam.

### **Guavas**

Rich in Vitamin C, India produces some of the finest guavas in the world, which come from Allahabad. They are also grown in other parts of the world. Called amrud in Hindi, peru in Marathi, koya pazham in Tamil and perkka in Malayalam.

### **Jamun**

The juice of jamuns (jambu fruit) preserves very well. Called naga pazham in South India and jambhool in Marathi.

### **Jackfruit**

Grown in large quantities in the coastal areas of India, jack-fruit papadats are popular in Kerala, as are jackfruit pickles, chutnies and jams. Jackfruit bulbs can also be canned suitably and preserved. Called phanas in Hindi and Marathi. chakka in Malayalam, panasa in Telugu and kanthal in Bengali.

### **Lemons**

Lemons or sweet limes are ideal for squashes, cordials and marmalades. In Hindi they are known as bara nimbu, limbu in Marathi, pati lebu in Bengali and naranga in Malayalam.

Like the lemon, the lime too makes excellent squashes, cordials and pickles. It is called neembu in Hindi, musumbe in Marathi, cherunaranga in Malayalam, lebu in Bengali and nimbe in Kannada.

### **Mangoes**

One of the most popular fruits in India, mangoes make some -of the most delicious jams, pickles, jellies and morrabbas. Commonly called aam in Hindi and Bengali, amba in Marathi, keru in Gujarati and mam pazham in Malayalam and Tamil.

### **Malta orange**

Popularly known as malta, this fruit, along with oranges, gives a wonderful sense of freshness to squashes and marmalades.

### **Oranges**

These can be turned into squashes, syrups and marmalades. Called santra in Marathi, Gujarati and Punjabi, and madhura naranga in Malayalam. In Bengali it is known as kamala lebu.

### **Papaya**

Papaya marmalade is a rare, delightful recipe. It is called papita in Hindi and Punjabi, papaya in Gujarati, popai in Marathi and bappayi pandu in Telugu.

### **Phalsa**

Pronounced falsa in most Indian languages, this makes a very unusual syrup. **Pineapples** These are rich in vitamins and mineral salts. They are grown in "various parts of India such as Assam, Meghalaya and Kerala. It is known as. ananas in various Indian languages including Hindi; kayitha chakka in Malayalam; anasi pazham in Tamil and anasa pandu in Telugu.

### **Pomegranate**

The pomegranate is best preserved as syrup. It is called anar in Hindi and Punjabi, dalimb in Marathi and mathalam pazham in Malayalam and Tamil. In Kashmiri it is known as daan.

### **Raisins**

Made by drying grapes, there are as many varieties of raisins as there are grapes. Called kishmish in Hindi.

### **Strawberry**

It is grown in the mountainous areas of India. In Kashmir it is known as istabari. **Tamarind** Tamarind or imli is the pod-like fruit of the tree of the same name. Ideal for a sweet and sour drink.

### **Vinegar**

Made from beer or weak wine, vinegar (called sirka in Hindi) is itself a preservative. Excellent as a base for many delicious drinks.

### **Walnut**

In Bengali, Gujarati, Hindi, Punjabi and Sindhi it is known as akhrot; in Marathi it is known as akhrod; and in Oriya as akhoot.

### **Watermelon**

In Bengali this is tarmuj, in Gujarati and Hindi tarbuj, in Kannada kallangadi, in Kashmiri he'nd wend; in Malayalam it is thannir mathan, in Marathi kalingad, in Oriya tarvuja, in Punjabi tarbuja, in Tamil darbusini and in Telugu called puchakayi.

-Watermelons make good drinks and can be bottled suitably.



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