

Paper No.: 02

Paper Title: The Principles of the Food Processing & Preservation

Module No. : 09

Module Title: Canning and bottling of different food products

9.1 Introduction

General process and principle of canning has been explained in previous chapter. The basic processing steps are similar for fruits and vegetables in conventional canning but few processing steps are different. Most of acid foods (fruits, tomatoes and pickled vegetables) are canned in boiling water bath. Fruits and vegetables used for canning should be free from blemishes, insect damage or mechanical injury.

9.2 Canning of fruits

Fruit used for canning should be ripe, fresh, firm, and must be held in a cool place before canning. Both overripe and unripe fruits are rejected as overripe fruits give poor quality product and unripe fruits get shrivel and toughen during canning. Different fruits have specific requirements of syrup strength, types of cans, exhausting and processing time are given in Table 1.

- a) **Apple:** Different varieties of apple are subjected to canning are: Yellow newton, Jonathan, Baldwin, Russet and Delicious apple. Fruits are first washed with hand in dilute hydrochloric acid and further rinsed in cold water. After that, peeling and cutting is done into 0.31-0.63cm slices. Brine solution of 2-3% is used and blanching is done at 71-82 °C for 3-4 minutes. Blanching slices are filled into can follows a syrup addition, sealing, exhausting and processing. Pinhole is the major problem in canned apple especially in the warm climate.
- b) **Apricot:** Two types of apricots used for canning are yellow and white. Apricots are not peeled for canning they directly cut into halves and the stones removed. Canning of apricot is done largely in USA.
- c) **Mango:** Safaida, Dusehri, Alphonso, Badami, Benishan, Raspuri, Neelam, Mulgoa are the most important variety of mango for canning. Mangos are mostly used for making juice,

squash, nector, chutney and pickles. Plan cans are generally used; also 0.3-0.5% citric acid is added to the syrup for safe processing of can in open cookers.

- d) **Guava:** Canned guava has taste and aroma better than those of fresh fruit. Fully ripe guava with white flesh and seeds is selected for canning. Guava pulp has soft texture and do not darken during storage.
- e) **Grape:** Canning varieties of grapes are Muscat and Thompson seedless. Canning of grapes required lacquering, 20-40 degree brix syrup is used and loss of grapes is about 20% during canning.

S.No.	Fruit	Strength of syrup (° Brix)	Exhaust	Processing time (min)			Type of can
				A2	A2 ^{1/2}	Glass	
1.	Apple	55	Exhaust at 74-100°C, until temperature in center reaches to 74°C	25	35	25	Plain
2.	Apricot	55	-do-	-	20	-	Plain
3.	Mango	40	-do-	25	30	-	Plain
4.	Guava	40	-do-	20	20	25	Plain
5.	Grape	40	-do-	12	12	20	Lacquered

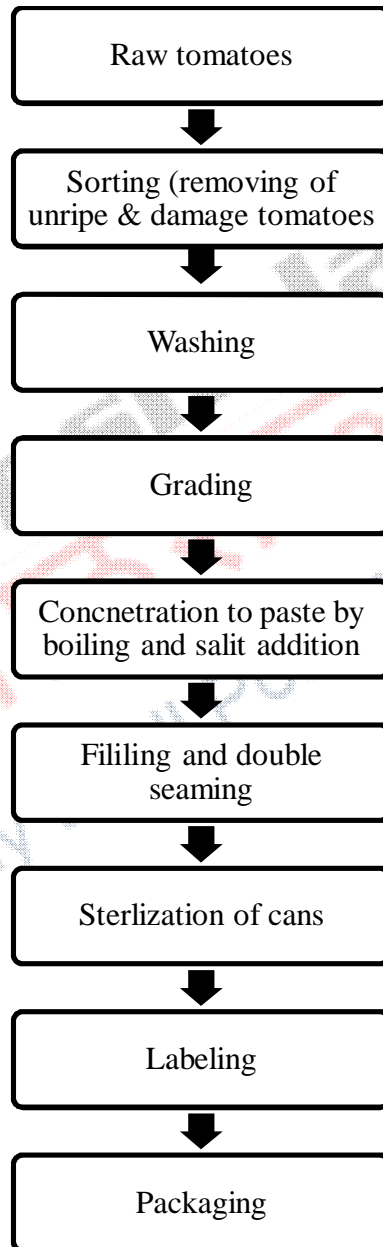
9.3 Canning of Vegetables:Vegetables such as pea, carrot, beetroot, tomato and asparagus canned in brine in their natural form or in curried style using spices, fat etc.Canned peas that include green as well as processed one have a good market in India. Different vegetables have specific requirements of brine solution, types of cans, exhausting and processing time are given in Table 2.

S.No.	Vegetable	Strength of brine (%)	Exhaust	Processing time (min)			Type of can
				A2	A2 ^{1/2}	Glass	
1.	Asparagus	2.25	Exhaust at 90-110°C for 7-10min, until temperature in center reaches to 77°C	20	24	30	Plain
2.	Carrot	2.25	-do-	20	25	40	Plain
3.	Mushroom	2	-do-	25	35	25	Plain
4.	Peas	2	-do-	40	45	40	Sulphur resistant
5.	Tomato	2	-do-	25	30	-	Plain

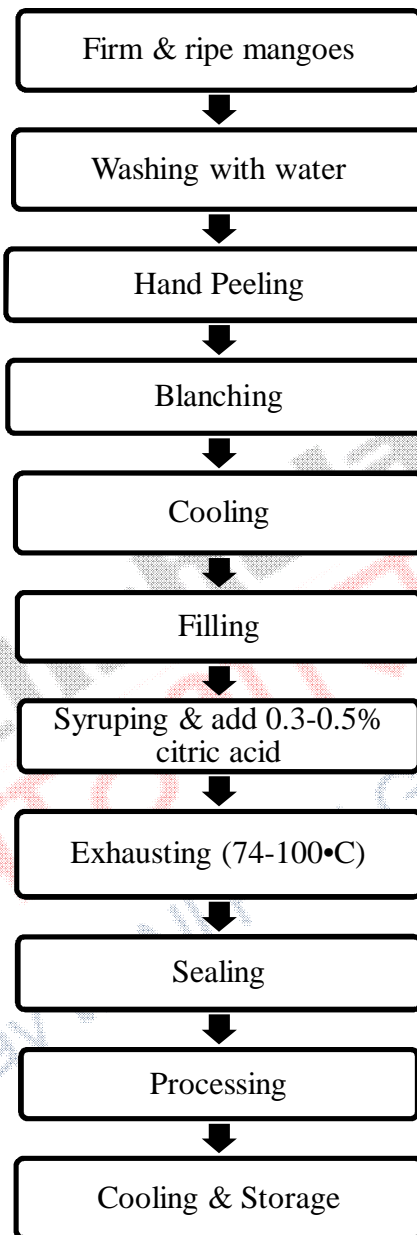
- a) **Asparagus:** Asparagus used for canning should be of tender texture usually of two types: green and white. Firstly washing is done immediately after harvesting and then graded for size. Blanching is done for 2-3 minutes in boiling water bath. Sulphur resistant can and 2% brine solution are used for canning.
- b) **Carrot:** Yellow variety carrots are used for canning purpose and tender carrot are selected. Mechanical peeling and grading of carrot is done, after that blanching for 5-13 minutes to inactivate the enzymes. Sometimes sugar is also added along with the brine.
- c) **Mushroom:** Greater care is need for the selecting of mushroom for canning purpose as both, poisonous and non- poisonous varieties are present in nature. Edible mushroom (non-poisonous) are bleached to a pale color in a solution of sodium sulphite and citric acid. Blanching is done for 4-5 minutes and plain can with 2% brine solution is used.
- d) **Peas:** Peas used for canning should be firm, uniformly ripe and should retain their green color after processing. Also they should have good texture and flavor. Peas are shelled by pea-podding machine and graded on the basis of size or density. Graded peas are blanched for 2-5 minutes and 2% brine solution is added. Processing is done for 40-45 minutes in retort at 10psig and then cooled.
- e) **Tomato:** Tomato should be ripe, medium size, regular shape and uniform color and should be free from blemishes for the purpose of canning. Tomatoes are first washed,

scalded or steamed for 2-3 minutes, to facilitate the removal of skin. There are about 30-35% loss during processing of tomato. Tomatoes are fairly acidic having 4.2 pH, so pressure processing should be avoided.

Flow chart for canning of tomato



Flow chart for canning of mangos



Flowchart for canning of mushroom

