Canning

The food material is hermetically sealed in a container subjected to thermal treatment sufficient to prevent spoilage and then it is cooled. The selection of heat treatment is depend on the type of food material and the type of microorganism which affects the food.

Canning was invented by Nicolas Appert in 1804. So that canning is also known as Appertization.

Foods such as fruits, vegetables, fish, meat etc can be canned.

⇒ Steps of Canning : Fruits and Vegetables.

Receiving
↓
washing
↓
Sorting
↓
Grading
↓
Blanching

↓

Peeling

↓

Cutting

↓

Filling

↓

Syrcping/Brining

↓

Exhausting

↓

Closing/seaming

↓

Sterilizing

↓

Labelling

↓

Storage.

1. Receieving

Collecting of raw materials from the field to the plant. Products that are more prone to spoilage to be stored at low temperature to minimize the attach of microbes. The receiving area of raw material should be separated

from the processing section/area.

2. Washing

Water is used as a soaking medium or direct spray will apply to remove the undesirable matter from the fruits or vegetables. It also removes chemicals/pesticides from the materials in some extent. This wash water may contains detergents or sanitizers. In some plants there is a combination of soaking and spraying of water applied to products are applied. Revolving drum is a usually using equipment for washing of fruits and vegetables. The sensitive fruits and vegetables like tomatoes may damage due to high pressure water spray, so that they are usually washed by floating in water basins.

3. Sorting

Sorting is the separation of cleaned products based on size, shape, color, density, texture etc.....

Several types of screens can be used to separate products based on their size.

→ Flat screens are for the separation of grains

and seeds.

→ Examples of some sorters / screens:
Fleet screens, drum screens, inclined screens, parallel belts, roller sorters, spiral separators, cylindrical separators, disc separators.

4. Grading
Grading is the classification of foods based on commercial values, product quality and official standards. Grading is done after preliminary sorting. grading is mostly done by hand but can also be done through machines. In case of berries, plums, olives, cherries (small sized) they are graded of a whole. while pears, apricots, apples generally cutting into two halves (large sized).

5. Blanching.
Blanching is a mild heat treatment to food to inactivate enzymes. It is a short thermal treatment to inactivate the natural food enzymes.

Advantages of Blanching
→ Expels the air from the product
→ Improves the quality

→ Soften the hard product.
→ ~~Improves the quality~~
→ Inactivate natural enzymes present in food.

Examples for some natural enzymes present in foods are:
→ Polyphenol oxidase (PPO) cause, browning
→ Pectinase _ soften
→ Peroxidase - Highly heat resistant.

There are two types of blanching based on the medium used; they are:
→ Hot water Blanching and
→ Steam Blanching.

Hot water Blanching
Hot water is used as the medium. Range is the temp.

Steam Blanching
Steam is used

→ Advantages of steam blanching.
* Reduce the loss of water soluble components
* Less waste.

→ Disadvantages of steam blanching.
* It is less effective for leafy vegetables.
* ~~More~~ Expensive than hot water blanching.

* The blanching time depends upon the product.
* eg: veg. is blanched about 2-3 mins.

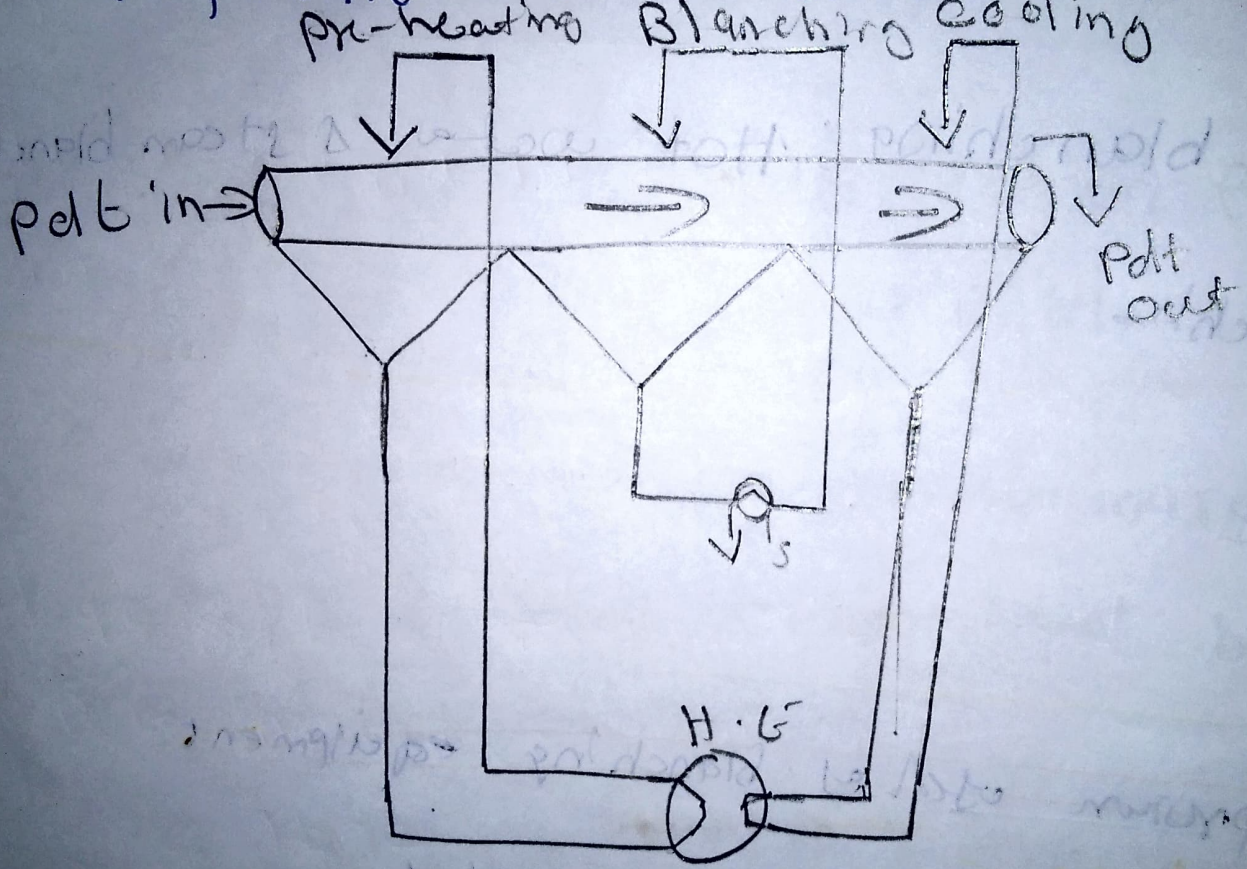
Types of Food	Temperature	Time
Carrots	90°C	3-5 min.
Green beans	90-95°C	2-5 min.
Peas	85-90°C	2-7 min.
Peppers	90°C	3 min.

Steam Blancher

This is the equipment used for steam blanching. It consist of chain/belt conveyor, vegetables move through it. It transports the products slowly through the steam chamber followed by air/water for cooling. The resident time depends upon the size of the products varying from 2-10 minutes.

Rotary hot water blancher is used in hot water blanching.

Equipment : steam blancher



6. Peeling

Peeling is the process of removal of skin.

Two types of peeling:

→ wet peeling: Lye peeling & High pressure water/steam peeling.

→ Dry peeling: Flame peeling abbreation, machine peeling etc...

Wet peeling.

* Lye peeling.

The veg./fru it is dipped in 1-2% caustic soda for a time of 30s. – 2 min. The hot lye loosens the skin from the flesh under heat. The traces of alkali (lye)

can be removed by dipping it in a weak citric acid solution. Peach, carrots and apricots ~~can be~~.

* High Pressure water/Steam peeling.
Blanching is used for this purpose.
Temp: 90-95°C. for 10-60 s.

Dry peeling

* Flame Peeling
It is used ~~fruits~~ for vegetables having papery skin. Eg: onion. The food is exposed to gas flame (temp: 1000°C) for a short time. The skin only should be burned not damage to flesh.

* Abbreation
This is the process of rubbing the food on a rough surface, so that thin layer of the skin.

* Machine peeling
Peeling is done by machines.

7. Cutting
Cutting is the size reduction of fruits followed by peeling. Different types of cutter

are used they are: slicers, dicers, shredders. etc...

8. Filling
Before filling, the can should be cleaned. The can should be washed with water or subjected to steam jet to remove any adhering dirt. The cans should not be filled fully. A minimum space should leave on the top of the can, this space is headspace.

9. Syrruping / Brining.
Sugar serup is for fruits and brine (salt solution) is for vegetables. Temp. is 79-82°.c.

10. Exhausting
This is the process of removal of air from the can.
→ Advantages
* Helps to avoid contamination of tinplate, pinholing during storage.
* Avoid oxidation
* Improves the food color, flavour, texture etc.
* Retain nutrients.

* Prevents the bulging of cans.
* Prevents the growth of microbes.
* prevents the development of acidic products during sterilization.

The equipment for exhausting is steam exhaust box/ steam blancher. Temp: 60-80°C for 5-7min.

11. Closing/Seaming

Seaming is done in double seamers. In this two operations are required.

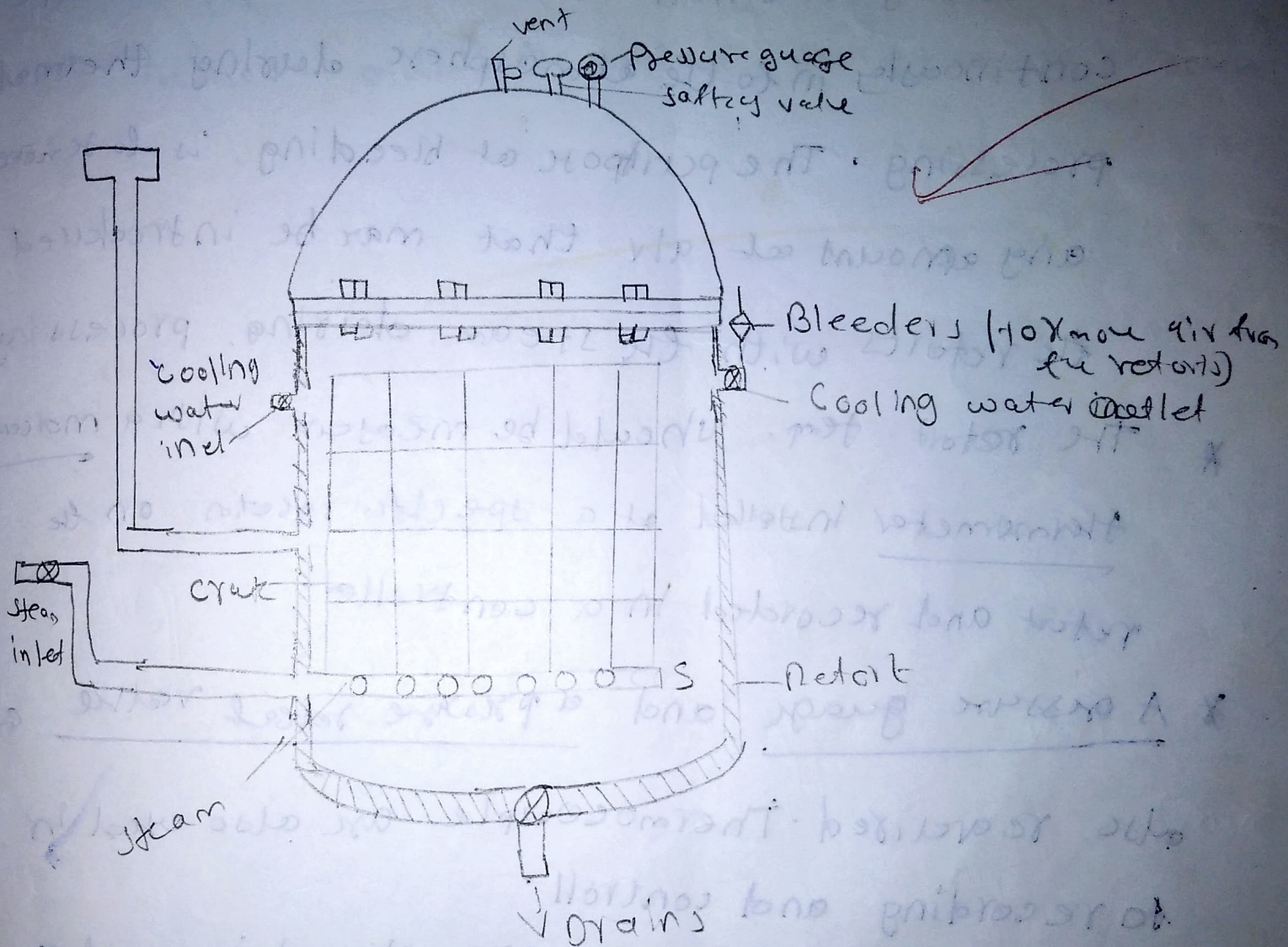
12. Sterilization

Hermetically sealed containers are subjected to heat treatment. Heat treatment is depends upon the type of food. Acid foods (pH < 4.5) are processed upto 100°C. Low acid foods (pH > 4.5) are processed at temp 116-125° at 250 kpa/cm².

Retorts are the equipment used to stallize cans. Different types of retorts are available:

→ still retorts

*Mainly used in food industries.



*A Thermometer is connected near bleeders to check the temp.

* Vent : remove air from steam

sealing

↓

processing

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Packaging / Labeling.

Effects of canning

- Flat sour
- toxins spoilage.

clostridium botulinum

spoilage bacteria.