VEGETABLE PREPARATION FOR PROCESSING

Simplot Australia brings earth's resources to life by carefully preparing the crops its harvests and processing the vegetables in its modern and efficient factories.

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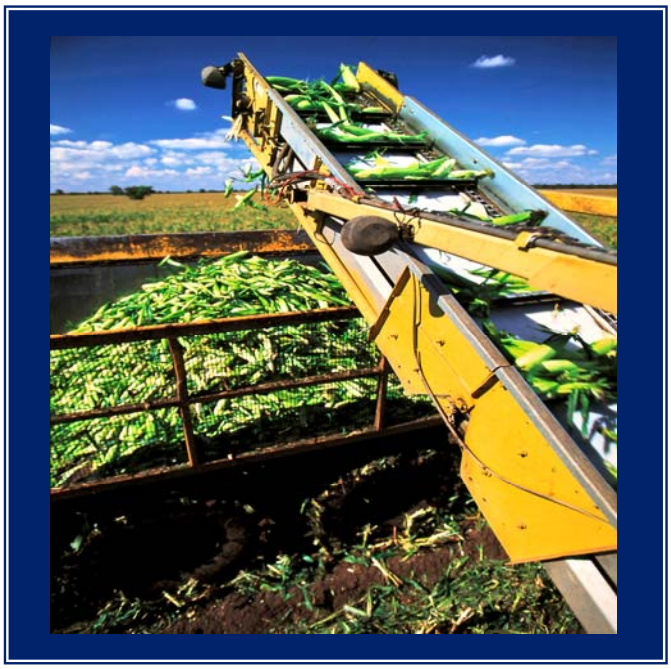

GROWING THE CROP

Our vegetable crops are grown under contract with farmers who can meet our strict quality controls. Some families have been supplying us with vegetables for several generations. We work with our growers on selection of the vegetables variety, the paddock and soil type to be used, the planting time, the fertilisers used and the harvest time. See our Growers section for more information.

Usually the price varies according to quality and is planned to provide the growers with the incentive to strive for material most suitable for processing.

MECHANICAL HARVESTING

Although there is still a good deal of hand operation still required in harvesting crops, mechanical harvesting is usual in food processing. Efficient machines are now available for pea veining, bean picking and the digging of most root vegetables.

CLEANERS

There are many types of cleaners used in the preparation of vegetables for processing. They are:

1. Washers
2. Air Cleaners
3. Screen Cleaners
4. Froth Flotation Cleaners

1. Washers

The first operation in vegetable preparation is a good wash in cold water distributed onto the moving product through high pressure jets. Water used in washing is chlorinated to control bacterial build ups.

2. Air Cleaners

These depend on a blast of air to remove light material, such as leaves, small stalks and other extraneous material.

3. Screen Cleaners

Various sized screens can be used to remove extraneous material which is larger and smaller than the particular product. These screens are usually made to vibrate to assist movement and separation.

4. Froth Flotation Cleaners

This type of cleaner employs a solution in which small bubbles of air are incorporated in a solution of oil and soap in water by vigorous agitation. By the principles of flotation, extraneous material and small broken pieces of product can be floated off and the sound material recovered.

PEELING

It is usual when processing vegetables to operate some sort of peeling operation. There are three main methods in use:

1. Abrasive Peeling
2. Lye Peeling
3. Steam Peeling

1. Abrasive Peeling

The washed product is fed through a peeler consisting of a series of rotating rollers coated with abrasive and supplied with water jets to flush away the unwanted material. In this manner, the outer surface, or skin of the root vegetable is ground away. Abrasive peeling is usually a continuous operation.

2. Lye Peeling

In lye peeling a hot caustic solution is used to dissolve away the skin of the vegetable. Modern peelers operate continuously and use a 12 - 15% solution at 60ºC for several minutes. The actual strength and time depend on the thickness and hardness of the skin to be removed. Potatoes and carrots are usually peeled in this way.

3 Steam Peeling

This is a batch operation and consists of sealing a quantity of vegetables in a pressure vessel and subjecting them to high pressure steam for 1 to 2 minutes. Steam pressures and temperatures up to 27kgs and 160ºC are common.

INSPECTING AND HAND TRIMMING

During preparation, when washing and peeling methods are used, it is normal to follow this with a visual inspection and

hand trimming where necessary.

BEAN SNIPPING

When processing green beans, it is usual to feed them through snipping machines. These are rotating slotted drums through which the beans are fed. The ends of the beans protrude through the slots to be cut off by knives as the drum rotates.

BLANCHING

All vegetables for canning and freezing are blanched. This is done by passing them through steam or hot water for a period of 1.5 to 6 minutes at temperatures varying from 88ºC - 100ºC. The time and temperature used depend on the size of the material being blanched and the distance to be penetrated to reach the centre.

The reasons for, and the results of blanching are:

1. vegetable material is washed
2. colour becomes brighter (freezing)
3. shrinkage and softening occurs (canning)
4. respiratory cellular gases (canning)
5. enzymes are inactivated (freezing)

The respiratory gases must be removed to prevent internal corrosion, and therefore reduced shelf life of the canned product.
Inactivation of the enzyme is necessary in frozen vegetables to prevent the development of off flavours during cold storage.

CUTTING TO SIZE

Vegetables are cut to size for the variety or uses by consumers in the home and for catering purposes. There are two main methods:

1. hand cutting - used for canned potato chunks
2. slicing, dicing, shredding - cutting machines are available which will slice, dice (cubes) and shred either plain or crinkle cut, used on beetroot, carrots, potatoes etc.

Other machines can be used to cut vegetables such as celery or beans, transversely to any length required. Longitudinal slicing of beans is also common.

FILLING

The method of transferring the prepared product into the can or bag depends on the nature of the material and the ease with which it can be handled.

Vegetables such as peas, broad beans, diced carrot, cut beans (25mm) can be filled from a high speed automatic filler.

Other less easily handled material, example, sliced beetroot, shredded carrot must be filled into the can by automatic tumble filler which must be operated at a relatively lower speed.

BRINING

After filling the can with product, brine is added to fill the remainder of the can. Brine is usually a weak salt solution to which sugar is sometimes added.

VISUAL INSPECTION

Most products need visual inspection at some stage during their preparation. Just when this takes place depends on the product and the nature of the material to be removed. The normal method is to deliver the product onto a slowly moving conveyor belt, alongside which the inspection personnel are placed.

QUICK FREEZING

There are several methods by which prepared, blanched vegetables can be quick frozen. These are:

1. Blast cabinets - batch operation. These are used for small volume production. The product is drained and spread on trays, which are then placed in mobile trolleys. Freezing takes place by blowing refrigerated air through the trays and over the product. A free flowing results from this method.

2. Plate frosters - batch operation. In this method, the prepared product is packed into packets, which are then placed on trays. These trays are stacked onto the freezing cabinets with movable refrigerated metal sections between each tray in a laminated form. The whole batch of product on trays and refrigerated sections are then compressed gently to give direct contact. When the required product temperature is reached, freezing is stopped and the batch unloaded

3. Tunnel freezing - continuous operation.
   - Woven mesh belt.
   - Fluidised bed.

Both these types are used in modern quick freezing plants. With the moving mesh belt freezer, the product is distributed evenly on the moving mesh belt and freezing takes place during movement through the tunnel by a down flow of refrigerated air. With the fluidised bed type, the refrigerated air flows up through the product as it is conveyed through the tunnel. Both types of tunnel freezing give a free flowing product