

Threshing methods

Threshing/Extraction

- ❖ Threshing involves beating or rubbing the plant material to detach the seed from its pod or fruit. The detached seed is then winnowed to remove chaff, straw and other light material from the seed.

Traditional threshing methods

- ❖ Seed has to be extracted from dry seed heads (e.g. onion, lettuce, brassicas), dried fruits (chilli, pepper and gourds) or from fleshy fruits like tomato, cucumbers and melons in which the seeds are wet at the time of extraction.
- ❖ Threshing may be carried out by flailing, beating or rolling the seed containing material to separate it from other plant debris or straw.
- ❖ It may be performed manually, with animals or mechanically. Hand threshing is simplest and can be a cheaper method if sufficient labour is available.
- ❖ Seeds may be hand rubbed, beaten against a solid wall or on the ground with sickle or flail. Thickness or depth of the plant material being threshed should be sufficient to avoid damage to the seeds.

1. Mechanical threshing

- Various types of threshing machines with adjustable cylinder speeds are available for extraction of vegetable seeds.
- The cylinder clearance, concave mesh size, airflow rate and screen size greatly influence the efficiency of these machines.
- Every care must be taken to avoid damage to the seed during mechanical threshing, by properly adjusting the speed of the beaters, the width of the gap between the beaters and the concave, the airflow and the sieve sizes.

Hand threshing for dry seed separation

- Common method mostly performed by women labour. Relatively cheap, easy and make use of surplus local labour. Usually adopted for threshing high value vegetable seeds. Hand threshing may be done in the following ways.
- **a. Rubbing**
- Rubbing seeds materials with a pressure in an open-ended trough line with ribbed rubber (bamboo contained). This method is quite suitable for pod materials such as brassicas and radish.
- **b. Beating**
- The seed materials is beaten with the help of wooden pliable sticks repeatedly with a tolerable force as the seeds are separated but not broken.
- **c. Flailing**
- Specially designed instruments are used for separating the seeds from the plants. e.g. Sweet corn.

Hand threshing for dry seed separation

d. Rolling

- Seed materials is rolled on threshing floor or tarpaulin repeatedly and seeds are easily separated.

e. Walked on

- The seed material is spread on the threshing floor and children or other persons are asked to walk on the seeds materials till the seeds are separated.
- Seeds which have been hand threshed are usually still mixed with the plant debris and further separation is done by winnowing or sieving.

Seed extraction from wet or flashy fruits

The selected fruits are harvested for seed in the same way that is picked for the market.

The seeds extraction from wet / flash fruits can be done by the following methods.

- Manual method
- Fermentation method
- Mechanical method
- Chemical method
- Juice and seed extraction method

Seed extraction from wet or flashy fruits

1. Manual Method

- (a) Maceration e.g., watermelon,
- (b) Crushing e.g., brinjal,
- (c) Scraping e.g., cucumber
- (d) Separated e.g., muskmelon,
- (e) Scooping e.g., pumpkins and
- (f) Extraction e.g., squashes.

• 1.1. Dry Extraction

- Dry extraction is done either manually or mechanically.
- Manual extraction is by beating with pliable bamboo stick or by beating against a hard surface.
- Threshers (LCT) are used for mechanical extraction.
- In this method care should be taken to avoid mechanical injury.

- **1.2. Wet Extraction**

- It is normally practiced in fleshy fruits of vegetables like tomato, brinjal, bittergourd, snakegourd and ashgourd.
- Among these, extraction is easier in brinjal and ashgourd as the fleshy pulp's interference is less. Seeds are separated with pulp and are washed with adequate water and for removing the sliminess; seeds are washed with 0.1% HCl for 2-3 minutes.
- In chillies, dry extraction using curry powder grinder is preferable than soaking in water and squeezing off the fruit rind. In tomato seed extraction is done either by fermentation method or acid method. Alkali method (Na_2CO_3) and citric acid method are also available but are not practiced widely.

- **3. Fermentation Method**

- Fruits with pulp and seed are squeezed and kept as such for 24-48 hours. The seeds will settle down. Decayed pulp and immatured seed will float. The settled seeds are washed with more of water. The seeds are shade dried and then sun dried before using. Care should be taken to avoid germination of seed during fermentation. The seeds will be dull in colour.

4. Chemical method

- **i. Alkali method**

- This method is relatively safe and can be used for small quantities of seed in cooler temperate areas where the fermentation method is not used.
- The pulp containing the extracted tomato seed is mixed with an equal volume of a ten per cent solution of sodium carbonate (washing soda).
- The mixture is left for up to 48 hours at room temperature and after washed out in a sieve and subsequently dried. This method is not suitable for commercial seed production as sodium carbonate tends to darken the testa of the seed.

- **ii. Acid method**

- Acid method is often favoured by large commercial seed producers as it produces a very bright clean seed. Addition of 30ml of hydrochloric acid per litre of seed and pulp mixture, stirred properly and left for half an hour then the seeds are washed thoroughly with water, sieved and dried.

Benefits of chemical method

- (i) seed extraction and drying is done on the same day
- (ii) higher seed recovery
- (iii) the problems of low and high temperatures are avoided
- (iv) discoloured seed resulting from fermentation is entirely avoided and
- (v) remove external seed borne pathogens.