

Different methods of Seed extraction

The selected fruits are harvested for seed in the same way that is picked for the market. There are several methods of extracting seeds namely:

- By rolling seeds in the hands
- By beating, walking, feeding, kneading for pulpy fruit like mango, mulberry, etc
- By direct sowing of seeds of some spp _ like in shisham, seeds are not separated from the pods rather pods are broken down into pieces and each piece is sown directly.
- By spreading in the sunlight _ especially for cones, capsules, and pods which become open on sunlight.
- By winnowing _ to separate grain from its husks chaff by tossing it in the air or blowing air through it
- By watering
- By floatation

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

- 1) Manual method
- 2) Fermentation method
- 3) Mechanical method
- 4) Chemical method
- 5) Juice and seed extraction method

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 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.

The benefits of this method are

- (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.

◆ Concentration of HCL varies from vegetables to vegetables its taken in following table:

Sr. no.	Crop name	HCL concentration	Time taken
1	Tomato	25 ml/1 kg of pulp	30 minutes
2	Brinjal	4 ml/1 kg of pulp 10 ml/1 kg of pulp 30 ml/1 kg of pulp	60 minutes 45 minutes 20 minutes
3	Water melon	1:6 (Acid: water ratio)	2 hour
4	Pumpkin	1:6 (Acid: water ratio)	5 minutes
5	Cucumber	100 cc/1 kg of pulp	30 minutes
6	Potato	10 ml/1 kg	20 minutes

CLEANING OF SEED:

After extraction of seed from fruit, some debris *i.e.*, parts of cones, capsules; pods, *etc* are also with seed. Moreover, some diseased seeds are also present. So cleaning of all the debris is necessary otherwise it will affect the germination.

Pre-cleaning

After collection and before storage the seed collected must be inspected to determine its conditions. In case of pods, it becomes more expeditious. Moist and fomenting pods must be spread out to dry and also require treatment with fungicide to avoid further fermentation.

Methods of Cleaning:

1. Water Method:

Put the seeds along with debris in the water. Seeds will settle down and debris will start floating on the surface. Remove the debris and let the dry.

2. Winnowing method:

Put the seeds along debris in the winnowing apparatus. Drop the material from some height in the direction of the wind as a result seeds will fall down on the ground and debris will blow off.

3. Hand picking:

If the debris which is mixed with seeds is easily removable then clean the seeds with hands.

4. Sieving method:

This method is applicable when the amount and size of debris are smaller than seed. In this method, seeds along with the debris are put in sieves and then by shaking, the debris pass through sieves and seeds remain in the site.