Seed extraction methods in vegetable crops

Seed separation from fruit is a specialized job. A slight negligence while extracting the seed can considerably damage its viability and vigour besides physical appearance. The in-situ germination can also occur due to improper extraction technique. The seed can be separated by following methods.

(1) Acid Method

In this method the fully ripened matured fruits are harvested and crushed to pulp. The pulp is taken in plastic container or wooden container or cement tub of convenient size and the commercial HCL added. The acid and pulp are mixed thoroughly and kept for as such time. During this period, corrosiveness of the acid removes the mucilage adhering to the seed and makes the seed free of pulp. Then, the seeds are washed 4-5 times thoroughly with water to make free of acid, otherwise the remnants of the acid spoil the embryo of the seed. The seed extraction is quicker in this method. Seed are also bright in colour with good germinability and free from fungal attack. The different extraction methods found that the seed recovery percentage was higher in acid method irrespective of varieties. Germination was highest in 2.5% HCL with 30 minutes soaking duration. Concentration of HCL was 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 hours
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

(2) Fermentation Method

The fruits are crushed in a non-metallic container and kept as such for fermentation for 2-3 days. It has been observed that 2 days fermentation of fruits is the best for getting quality seed. During fermentation the seeds get detached from the adhering pulp and settles to the bottom of the container. The seeds are separated, washed thoroughly and dried under shade to the desired moisture level. The seed recovery is less compared to other method of extraction. The seeds become dull coloured due to fermentation of the pulp and also due to the fungal load in the seeds. In situ germination may occur due to long period of fermentation. These are method used in vegetables like, Tomato, Brinjal, Cucumber, Water melon, Musk melon, etc.

(3) Mechanical Seed Extraction

This method is mainly used in vegetables like, Tomato, Brinjal and Chilli. In Tomato, the known weight of ripened tomato fruits is fed into the pulper machine. The pulp containing the seed is collected separately from the outlet, washed in water and then shade dried. In Brinjal, pulpers can also be used for crushing the fruits. Before using pulpers sufficient quantity of water is added and after pulping stirred well. Treatment combination of 2 mm concave clearance + 8.5 m/s cylinder peripheral speed + 1.76 of per hour feed rate produced the highest seed rate extraction (3.327 kg/hr) on extraction of seed with vegetable seed extractor. In chilli, dried chilli fruits fed through the feed hopper of seed extractor are subjected to the beating action and thereby the seed are separated and discharge through the outlet. The seed separated from hulls manually. The seed extraction efficiency was of as 96%.

(4) Alkali Method

Fully ripened matured fruits are harvested and crushed to make pulp. In Tomato, to hasten the fermentation process 0.5% sodium bicarbonate (500 g dissolved in 10 l of warm water is added to the pulp and allowed to remain for a day. Then, the seeds are separated and washed free of alkali with water.

(5) Citric Acid Method

In this method for seed extraction using 30 g of citric acid for one litre of pulp with digestion duration of 2 hour removes the gelatinous coating of seed without affecting the germination and vigour of seeds. But this method found to affect the storability of seed and used in only in tomato.

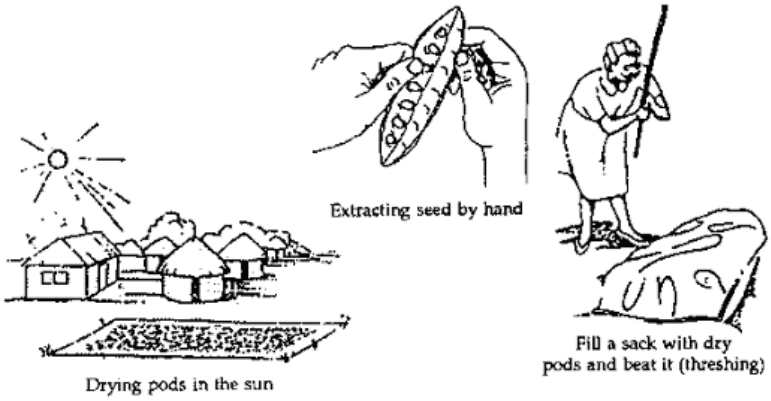
(6) Modified acid Method

Freshly harvested fruits are pulped using water. The peals and pulp are removed leaving the wet seed with mucilage. Ten kilograms of fruit, yield 1 kg of wet seed. Forty ml of commercial HCL is added to this and allowed to react

for 20 minutes with constant stirring. The seeds are then washed and dried. This method saves acid without affecting the seed recovery and seed quality. It's used in Tomato, Water melon and Musk melon.

(7) Dry Method

The fully matured and dried fruits are harvested and dried in the sun for 2-3 days. After extraction of seed, the seed are dried in the sun between 8.00-11.00 Am and 2.00-5.00 Pm to bring out the original moisture content. Example like, Chilli, Okra, Sponge gourd, Ridge gourd, etc.



(8) Directly Harvesting of Matured Pod Method

The pods are picked at maturity level and dried under sun for 2-3 days to reduce the pod moisture content to 15-16%. Then the pods are beaten with pliable bamboo stick extract the seeds. Excessive drying and heavy beating should be avoided to reduce mechanical injury to the seed. Excessive mechanical injury results in lowering of seed quality. This method mainly used in Okra, French bean, Lablab bean, Cow pea, Cluster bean, etc.

(9) Manually Seed Extraction Method

In which the fruits are cut into longitudinal bits and seeds are removed manually. Remnants of the pulp are washed and the seed are dried. This method

also greatly influences seed storability. Example like, Water melon, Musk melon, Pumpkin and Bitter gourd.

(10) Floatation Method

To separate the sinkers and floater, floatation technique is used. The immature seeds can be removed as floaters. Example like, Bottle gourd, and Other big seed vegetables.

(11) Wet Method

This method of adopted for sweet pepper. The fruits are crushed and seeds are separated mechanically from remainder of the fruit pulp and debris. The crushed material is usually passed into a revolving cylindrical screen which allows separation of seed and debris.

Seed Curing of Vegetables

The harvested crop is piled up in small heaps for curing either on a tarpaulin or cement floor and covered with a tarpaulin or hay to reduce rapid drying of branches. Curing with branches helps the unripen seed to ripen slowly, improves the colour of seed and also reduced shattering losses in the field. After 4-5 days the heap is turned upside down and allowed to cure for another 4-5 days. Care should be taken if the harvesting is done in wet humid period, the stock should not be kept as such for more than 4-5 days. This method is used in Cabbage and Cauliflower. Heaps are covered with paddy or wheat straw to protect from direct sunlight. If it rains, the heaps should be provided with tarpaulins. More time for curing may be required in heavy treatment soil as compared to sandy loam.

Seed Drying of Vegetables

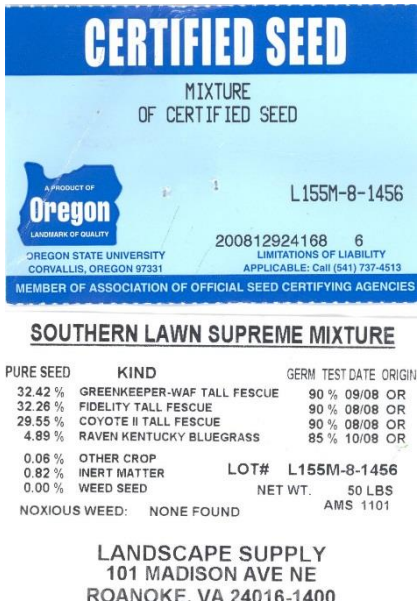
Seeds contain natural moisture, which at harvest time is often higher than the optimum required for the maximum potential life and best germination. The amount of moisture in the seed is probably the most important factor influencing the longevity and germination capacity of the seed. After the seed is detached from the mother plant, its moisture content is a function of relative humidity, and it is at equilibrium with that of the surrounding air. Seeds of fleshy fruits such as, Tomato, Cucumber and Melons, have much higher moisture content at harvest, and may absorb more water during their wet extraction process. On the contrary, seeds formed in fruits, which become desiccated during the ripening process, are relatively dry at the time of harvest, e.g. Onion, Amaranthus, Brassicas, etc. Under humid tropical conditions, the freshly harvested vegetable and flower seeds may have a moisture content ranging from 18 to 35% , which must be reduced to a 'safe level'.

Seed label for certified seed production

- Label No.
- Crop
- Variety
- Lot number
- Inspected date, month and year
- Expiry date, month and year
- Germination percentage (minimum)
- Physical purity (minimum)
- Genetic purity (minimum)
- Net weight
- Organic certification logo

- Organic seed producer label.
- Name and address of the producer who offers for sale sells or suppliers.

Basically, in the developing countries, certified seed production is a lucrative business opportunity for the entrepreneurs. However, the business demands proper planning, dedication and willingness to work long hour.


CERTIFIED SEED

MIXTURE
OF CERTIFIED SEED

A PRODUCT OF Oregon LANDMARK OF QUALITY

L155M-8-1456

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MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

SOUTHERN LAWN SUPREME MIXTURE

PURE SEED	KIND	GERM	TEST DATE	ORIGIN
32.42 %	GREENKEEPER-WAF TALL FESCUE	90 %	09/08	OR
32.26 %	FIDELITY TALL FESCUE	90 %	08/08	OR
29.55 %	COYOTE II TALL FESCUE	90 %	08/08	OR
4.89 %	RAVEN KENTUCKY BLUEGRASS	85 %	10/08	OR
0.06 %	OTHER CROP			
0.82 %	INERT MATTER	LOT#	L155M-8-1456	
0.00 %	WEED SEED	NET WT.	50 LBS	

NOXIOUS WEED: NONE FOUND

AMS 1101

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101 MADISON AVE NE
ROANOKE, VA 24016-1400

Packaging part of the produced seeds

It is very important to choose a right material and a right packaging technique to retain the growing capacity of the seeds. Spending higher costs here is not at all a problem since this is the place which decides profits and loss your company. If the seeds are poorly packed and they get spoiled even before they reach the customers, it is a huge loss. Or say, the seeds reached the customers but haven't germinated due to harmful effects of the material in which they were packed. Your company's reputation will be negative and automatically the next move of the customers will be to choose your competitive seller in the industry. Best material to use for packing is paper. Modulate the paper into any desired way to store your seeds but try not to seal it completely making the seeds inactive.

Where to sell?

Selling seeds to agricultural firms is a direct business. This does not need attractive packing and directions, since they are well educated as to how to use those seeds. In such cases, as already mentioned packing can be done by adopting family packaging system having multiple units in one pack. Partnership with agricultural sectors and official bodies might ensure regular flow of business due to supply orders. Public users are those who have gardening as their hobby and or anybody who buy in smaller units for personal use. Online selling is one best idea to sell seeds. This is because, most of the people try to ease their work by just ordering things online. This product is something which is not available everywhere and so people will obviously try to find it online. And for these users, varieties are must. They do not grow for any business purpose which stresses on one single type.