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Extraction and cleaning of seed - Getting the seed safely out of the fruit and remove non-seed part

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Extraction and cleaning of seed –

Getting the seed safely out of the fruit and remove non-seed parts

What is extraction?

Seeds are usually enclosed inside the fruits, and extraction is the way we get them out. Extraction is done to reduce the volume, remove covers that may reduce seed viability (e.g. soft, decomposing fruit pulp) and attain seed units that are easy to sow afterwards. The method and what unit we extract (botanical seed or the seed with some attached fruit cover) depends on the fruit type. The seed is practically defined as the smallest extractable unit. It is usually the same as is deposited after natural seed dispersal.

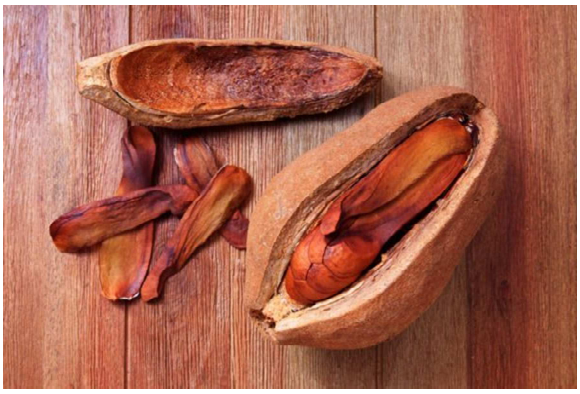

Figure 1. Entire fruits, with seeds and extracted seed of Mahogany.

Extraction methods

The methods depends on whether seeds are dry (e.g. legume pods), or soft / wet (e.g. fleshy fruits like berries). Dry fruits that do not open at maturity (indehiscent) need mechanical treatment.

Dehiscent dry fruits: Dehiscent fruits open by drying. For most species, outdoor sun drying is adequate. Fruits may be dried on a tarpaulin or other sheet, or on extraction trays. Some difficult fruits like some cones may need artificial heating to open fully. Most seed remain attached to the fruits after their opening, and gentle tumbling or raking is necessary to detach the seed.

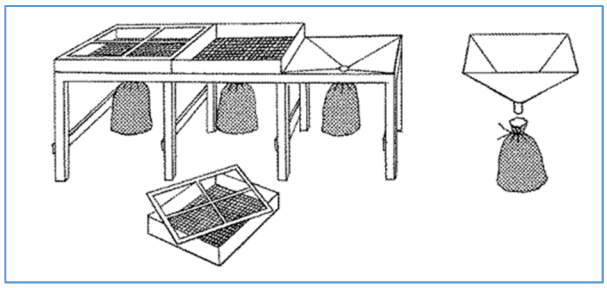

Figure 2. Drying devices to extract and collect seeds of dry dehiscent fruits and cones. The fruits are dried in open trays in the sun and seeds can be collected in tied-op bags

Indehiscent dry fruits: They are dried like dehiscent fruits. Then the fruits are pounded, beaten or thrashed to split open or break the fruits in pieces from where seeds can be extracted. Some seeds like *Hagenia* are enclosed in a papery cover and seeds can be extracted by mechanically rubbing the fruits between the palms of the hands to tear the fruit cover.

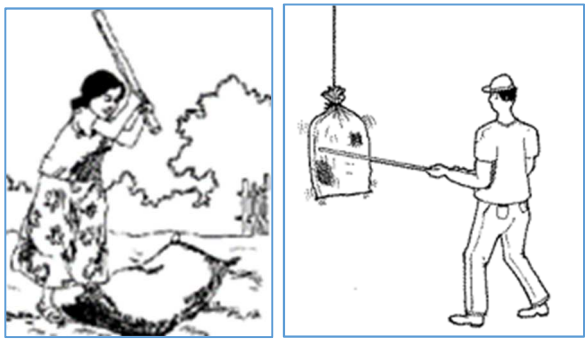

Figure 3. Indehiscent fruits can be split up by beating bags with sticks.

Fleshy fruits: Fleshy fruits are de-pulped by soaking in water followed by rubbing or water pressure cleaning.

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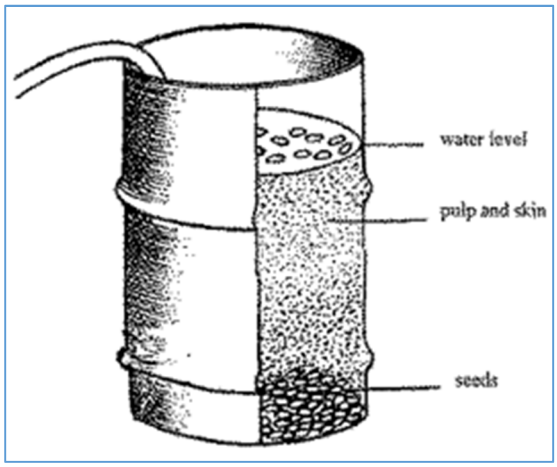


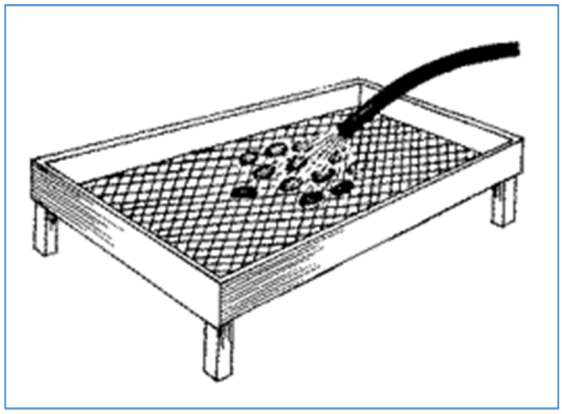


Figure 4. Upper: Fleshy fruits may be soaked in water in drums for few days. During stirring, empty seeds and fruit flesh can be skimmed off while heavy seeds tend to collect at the bottom. Lower: The remaining flesh can be cleaned with pressurised water on a wire mesh tray

Figure 6. Several species of Sapotaceae have mucilagous mesocarp.

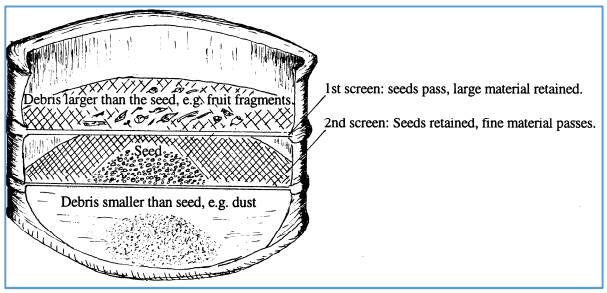
Mucilaginous pulp can be removed by using sifted wood- or charcoal-ash mixed with water for cleaning.

Damage to seed during extraction

Beating and thrashing indehiscent dry fruits frequently result in mechanical damage to seed coats. For small fruits where bulk is not a problem and the fruit do not cause serious germination restriction, extraction may be avoided and the whole fruits sown. Prolonged soaking before depulping can cause anoxia, and rubbing to remove pulp can cause mechanical damage.

Cleaning and drying

Fruit pars should be separated from seeds. Large pieces may be removed by hand. Smaller impurities may be removed by sifting or winnowing. Seeds should be dried to optimal storage conditions after extraction. Especially depulping by wet extraction cause seeds to imbibe and they must subsequently be dried. Desiccation sensitive seeds should only be slightly dried and then preferably sown immediately.



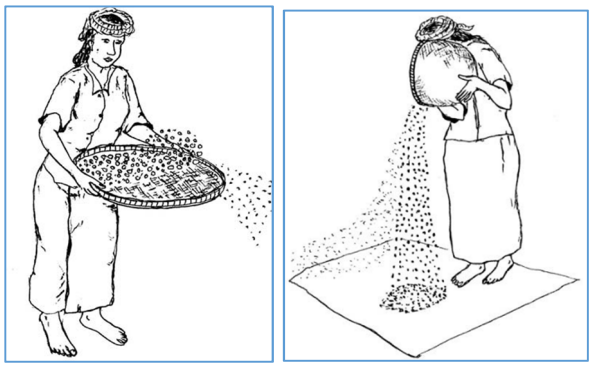


Figure 7. Seed cleaning by sifting on wire meshes. Large debris are withheld by large mesh opening, seeds retained by intermediate mesh size and dust and soil fragments are collected at the bottom. Below: Winnowing by using natural wind that blows away light material. Air currents can also be created by using propeller fans

Summary, do's and don'ts

Do:

- Remove as much fruit parts as possible to achieve small separate units preferably with only one seed inside.
- Adapt the extraction method to the fruit type, wet – dry, dehiscent – indehiscent.

Don't:

- Don't use excess mechanical force to extract seed as this will break or damage the seeds.
- Don't expose fruits to prolonged soaking in water which may cause fermentation.

Selected Readings.

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Note: This DB was written as extension material for PATSPO project in Ethiopia