ROHINI

COLLEGE OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF AGRICULTURAL ENGINEERING

AI3601 POST- HARVEST TECHNOLOGY

Dr. A. ARUL MARCEL MOSHI,

ASSOCIATE PROFESSOR / MECH.

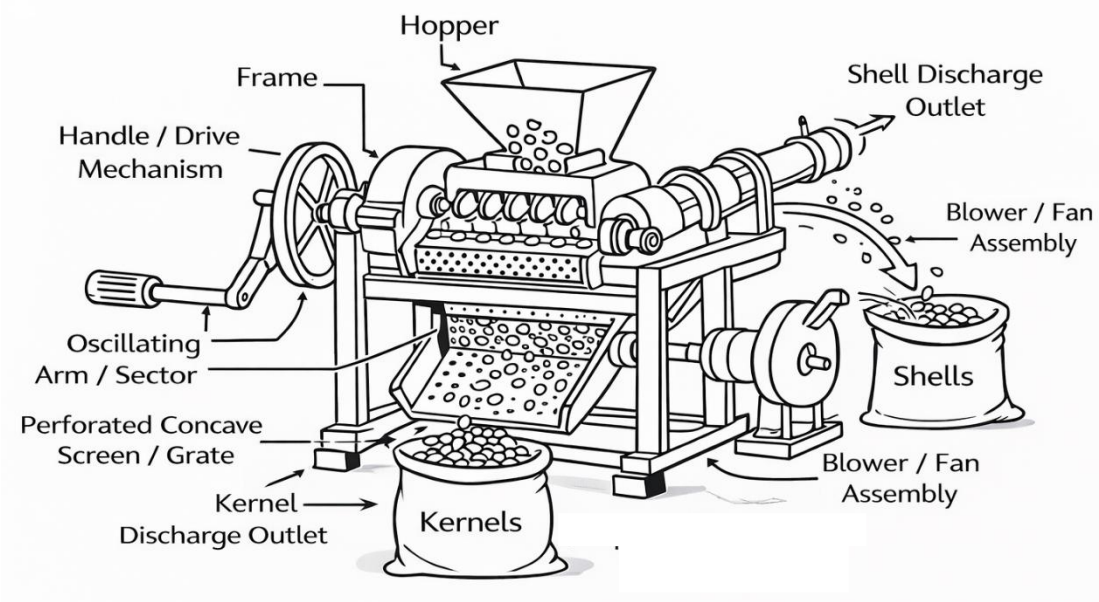
UNIT IV: SHELLING AND HANDLING

CO4: To understand the operation of post-harvest equipment like shellers and conveyors.

Groundnut Decorticator

A groundnut decorticator is a machine used to separate groundnut kernels from their shells efficiently. It operates using impact and rubbing action to break the shells and obtain clean kernels with minimal manual effort.

Major components and their functions:



- **Frame:** The sturdy metal structure that supports and holds all other components of the machine together.
- **Hopper**: The top opening where groundnut pods are fed into the machine for processing.
- **Crushing shoes / peg assemblies**: Projections attached to a moving part that strike and break the groundnut shells against a surface.
- **Oscillating arm / sector**: A moving arm that holds the crushing shoes and creates the rubbing action against a fixed screen.
- **Handle / drive mechanism**: The manual lever or crank that the operator uses to power the oscillating movement of the decorticator.
- **Perforated concave screen / Grate**: A fixed, curved, and perforated surface against which the pods are crushed, allowing kernels and small shell pieces to fall through.

- **Blower / fan assembly**: A fan that creates an airflow to separate the lighter shell pieces (husk) from the heavier kernels.
- **Kernel discharge outlet**: The channel through which the cleaned, shelled kernels are collected after separation.

Working principle:

- **Start the machine**: The operator begins turning the handle (for manual models) or starts the engine/motor (for powered models).
- **Feed the pods**: Dried groundnut pods are poured into the top hopper.
- **Crack the shells**: The pods pass between a moving beater or crushing shoes and a fixed concave screen, where the shells are cracked open by impact and rubbing action.
- **Separate the mixture**: The shelled kernels, along with broken shells, fall through the perforated screen onto a vibrating tray or into an air stream.
- **Winnow the chaff**: A blower or fan blows the lighter shell pieces (husk) away, while the heavier kernels drop down.
- **Collect the kernels**: The clean, shelled groundnut kernels are discharged through a separate outlet for collection.

Advantages of groundnut decorticator:

- Increases shelling speed: It processes groundnuts much faster than manual hand shelling, saving significant time and labour.
- Reduces drudgery: It eliminates the tedious and finger-aching work of handpicking and breaking each pod individually.
- Minimizes kernel damage: When adjusted correctly, it causes less breakage to the kernels compared to hand shelling with sticks or stones, preserving quality for seed or market.
- Cleaner output: The integrated blower or fan separates the lightweight shell pieces from the heavier kernels, providing a cleaner final product.

Limitations of groundnut decorticator:

- Requires drying: The groundnut pods must be properly dried to an optimal moisture level; if too wet, they will not crack properly, and if too dry, the kernels may break.

- Initial investment: Purchasing a decorticator, especially a power-operated model, requires a financial investment that may be a barrier for some small-scale farmers.
- Maintenance needs: The machine has moving parts (bearings, beaters, screens) that require regular cleaning, tightening, and occasional replacement.
- Adjustments required: Different groundnut varieties or pod sizes may require adjusting the clearance between the beaters and the screen for efficient shelling without damage.