



# ROHINI

**COLLEGE OF ENGINEERING AND TECHNOLOGY**

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## DEPARTMENT OF AGRICULTURAL ENGINEERING

### AI3601 POST- HARVEST TECHNOLOGY

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## UNIT V: CROP PROCESSING

**CO5:** To use different post-harvest operations and processing methods of harvested crops.

### Paddy Processing

#### **Introduction to Paddy Processing:**

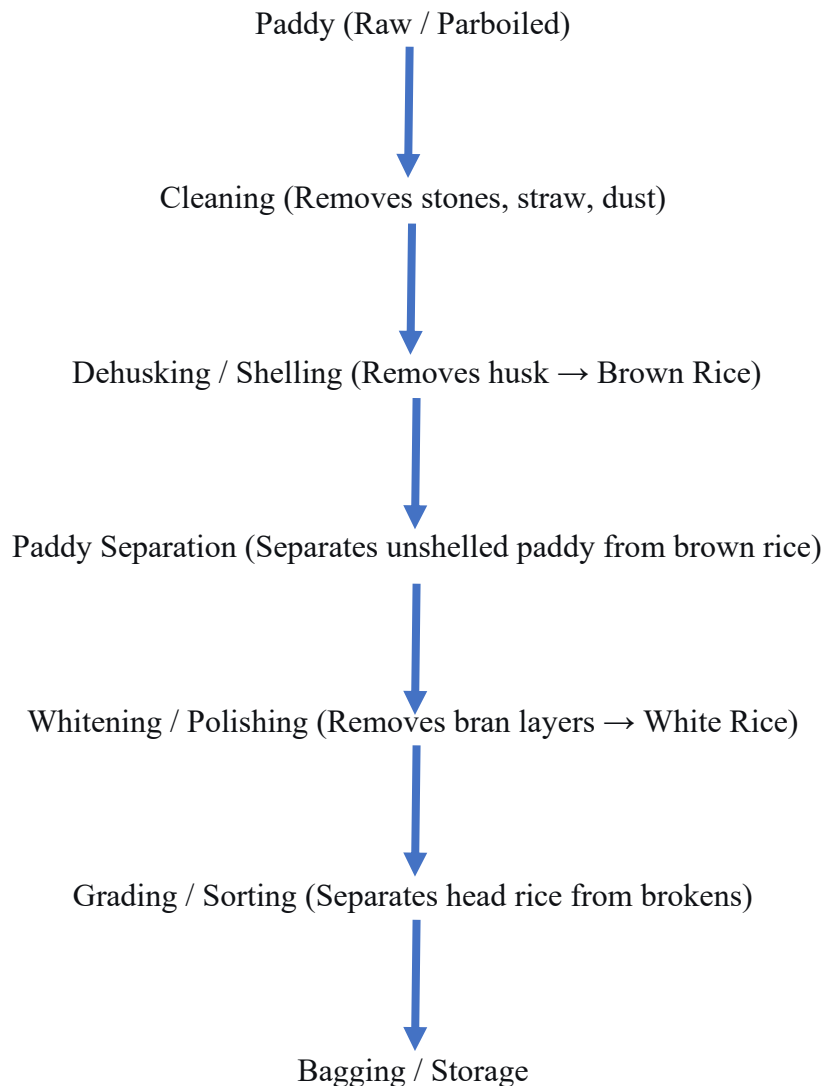
- Paddy is the rice grain with the husk (hull) still intact.
- It is also known as rough rice.
- Paddy processing (or rice milling) is the series of operations performed to remove the husk and bran layers from the paddy and produce edible white rice suitable for consumption.
- The primary goal is to maximize the yield of whole (head) rice while minimizing breakage and preserving nutritional quality.

#### **Why is Paddy Processing Important?**

- The husk is inedible and must be removed.
- The bran layer (which contains oil and enzymes) can cause rancidity if not removed for long-term storage.
- Processing transforms paddy into a form suitable for cooking and consumption.



### Flow chart of paddy processing (Modern rice mill):



#### Detailed unit operations:

i) **Cleaning:**

**Objective:** To remove foreign materials (stones, straw, dust, metal pieces, other seeds) from paddy before processing.

**Equipment used:** Pre-cleaner, air-screen cleaner, magnetic separator, destoner.

**Importance:** Prevents damage to milling machinery and ensures food safety.

ii) **Dehusking / shelling:**

**Objective:** To remove the outer husk (hull) from the paddy grain without damaging the brown rice inside.

**Equipment used:**

- a) **Rubber roll sheller:** Most common; uses two counter-rotating rubber rolls running at different speeds to shear off the husk. Gentle on grain, good for producing head rice.
- b) **Centrifugal sheller / Impeller sheller:** Uses high-speed impeller to throw paddy against a rubber ring; less common now.

**By-product:** Husk is collected and used as fuel, bedding material, or in building materials.

iii) **Paddy separation:**

**Objective:** To separate the loose husk from the brown rice.

**Importance:** No sheller is 100% efficient. The unshelled paddy must be separated and returned to the sheller for another pass.

**Equipment used:** Paddy Separator – Utilizes differences in specific gravity, size, and surface roughness between paddy (rough, lighter) and brown rice (smooth, heavier).

iv) **Whitening / Polishing:**

**Objective:** To remove the bran layer from the brown rice to produce white rice.

**Process:** This is an abrasive or friction process.

**Equipment used:**

- a) **Vertical or horizontal whitening machines:** Use abrasive stones or emery rolls to scour off the bran.
- b) **Friction whitener (or polisher):** Uses pressure and friction between grains to polish the surface after whitening, improving appearance.

v) **Grading / Sorting:**

**Objective:** To separate whole (head) rice from broken kernels and remove any remaining foreign material or discoloured grains.

**Equipment used:**

- a) **Sieve separators / Plansifters:** Separate based on size (head rice vs. brokens of different sizes).
- b) **Length graders:** Use indented cylinders or discs to separate based on length (e.g., separating small brokens from head rice).
- c) **Colour sorter:** Uses optical sensors and air jets to remove discoloured grains.

vi) **Bagging & Storage:**

The final product (Head Rice, Brokens) is weighed and packed into bags (jute, polypropylene) for marketing and distribution.