Factors affecting Pulse Milling

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Pre-treatment factors affecting dhal recovery

Water

- Soaking helps loosen the binding action of the gum between seed coat and cotyledon
- Soaking time – 2 to 14 h

Oil

- This treatment allows oil to penetrate the seed through the husk into the cotyledon layer

Chemicals

- Sodium bicarbonate, calcium hydroxide, sodium carbonate, sodium chloride are used
- Pre-treatment with 10% sodium bicarbonate is most effective resulting 78% dhal recovery

Heating

- In India, roasting on sand at 100- 125 C for 5-10 min is done.
- Seed is exposed to 70-95C is appropriate

Theoretically, the endosperm of the pulses accounts for maximum 87-89% of the wholegrain legumes

Important factors affecting recovery of dhal mill:

(a) Grain parameters

1. Type of grain
2. Species/ strain of grain legumes
3. Chemical constituents
4. Moisture content of grain endosperm
5. Shape of the grain
6. Size
7. Seed coat surface texture
8. Thickness of the gum layer

(b) Machine Parameters:

1. Size of the roller
2. Peripheral speed of the roller
3. Texture of the abrasive material
4. Hardness of the abrasive material
5. Clearance between roller and cage
6. Inclination of the roller
7. Outlet position

Nutrient losses in dehulling

- During dehulling, outer layers of cotyledonsare scarified resulting in 12% yield loss as powder fraction.
- The outer portion of the cotyledons is a rich source of protein, sugar, fibre and ash but poor in starch
- Considerable amount of Ca (20%) and iron (30%) are removed without affecting protein quality and amino acids

Processed/value added products

- Dhal/sambar
- Roasted/fried snacks
- Fermented products
- Extruded products
- Chillas/pakodas/badies
- Dahi badas

- During sprouting, starch is broken down to dextrin and maltose, and proteins are broken down to polypeptides, peptides and amino acids.
- The ascorbic acid/ vitamin C content rises from negligible levels in the seed to 12mg/100g, 18h after germination.
- Riboflavin and niacin contents increase significantly by enzymes which active during germination.

Handling of pulses

Soft handling

- Pneumatic grain conveyor should be avoided because Impact speed of grain on grain is higher than the critical speed of 12m/s.
- Augurs should be run full and preferably slowly to reduce damage.
- Augurs smaller than 125 mm in diameter should be avoided.

Loading and unloading

- Silos are designed to withstand uniform downward and significant uniform outward forces.
- Pulses must only be loaded from the central top hatch

Storage of pulses

- Only dry and clean grain which contains no more foreign seeds or other material than allowed by the bulk storage operators should be stored.
- The moisture content of the grain needs to be measured using moisture meter only.
- Fumigation is applied as soon as the silo is filled.
- The packaging material chosen has to be of food grade, moisture proof, insect resistant and high on strength.
- Packing should be carried out using automatic form fill and seal (FFS) machines followed by attractive consumer packaging.