



SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
Coimbatore.

UNIT IV – TOPIC 5

Grinding of split pulses-pulse flour products - their applications and equipment's used

Grinding of Split Pulses and Pulse Flour Products is a crucial step in the pulse milling process, where the dehusked and split pulses are ground into fine flour. This flour can be used in a variety of food products, and pulse flour is becoming increasingly popular due to its nutritional benefits, especially for gluten-free and high-protein diets.

Grinding of Split Pulses

The grinding process involves converting split pulses (such as split chickpeas, lentils, peas, etc.) into a fine powder or flour. This flour can be used for baking, thickening, or in other culinary applications. The grinding process typically occurs after pulses have been dehusked and split.

Grinding Process

1. Preparation:

- Before grinding, pulses may be cleaned to remove any remaining debris or small impurities.
- Depending on the type of pulse, it might be pre-soaked or roasted before grinding. Roasting can enhance the flavor and reduce moisture content, which helps in easier grinding and improves shelf life.

2. Grinding Mechanism:

- The pulse is fed into a grinding machine, where it is subjected to mechanical action. The most common types of grinders used are:
 - **Hammer Mills:** A hammer mill uses hammers to crush and grind pulses into a fine powder. It is widely used for grinding dry pulses.
 - **Stone Mills (Atta Chakki):** Stone mills use the friction between two stone surfaces to grind the pulses into flour. This traditional method is often preferred for finer, more uniform flour.
 - **Impact Mills:** These mills grind pulses by rapidly moving blades or rotors that cause impact force on the material. They are efficient for producing fine flour.
 - **Roller Mills:** Roller mills use two rotating rollers to crush and grind pulses into a fine powder, with the process being controlled by adjusting the spacing between the rollers.
 - **Pin Mills:** A pin mill uses rotating pins to finely grind pulses. It is suitable for producing fine, even-sized flour.



3. Sieving and Separation:

- After grinding, the pulse flour is sieved to separate the fine flour from coarser particles. This helps in ensuring a smooth texture for the final product.
- Air classifiers or vibrating sieves can be used to achieve the desired particle size and ensure a uniform product.

4. Storage:

- Pulse flour, especially if not processed immediately, must be stored in moisture-controlled environments to prevent spoilage or loss of quality.

Types of Pulse Flour Products

Pulse flours are made from various pulses such as lentils, chickpeas, peas, beans, and mung beans. The type of pulse used determines the properties and uses of the resulting flour.

Common Types of Pulse Flours:

- **Chickpea Flour (Besan):** Made from ground chickpeas, besan is commonly used in Indian, Middle Eastern, and Mediterranean cuisines for making fritters (bhajis), savory pancakes (chilla), and batters for deep-frying.
- **Lentil Flour:** Made from ground lentils (often split red lentils), this flour is used for soups, stews, and as a binding agent in various dishes.
- **Pea Flour:** Ground from yellow or green peas, this flour is commonly used in gluten-free baking and as a protein supplement.
- **Mung Bean Flour:** Used in Asian cuisines for making noodles, desserts, or fermented products.
- **Bean Flour:** Made from various types of beans (such as kidney beans, black beans, or navy beans), used in gluten-free and protein-rich recipes.

Applications of Pulse Flour Products

Pulse flour products are versatile and have various culinary and industrial applications due to their high protein content, fiber, and nutritional value.



**SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
Coimbatore.**

1. Gluten-Free Baking and Cooking:

- Pulse flours are commonly used in gluten-free recipes for making bread, cakes, cookies, crackers, and pancakes. They provide an excellent alternative to wheat flour, offering high protein and fiber content, which is beneficial for people with gluten sensitivities or celiac disease.

2. Soups and Stews:

- Pulse flour can be used as a thickening agent in soups and stews. It can add body to liquid-based dishes and contribute a rich, creamy texture.

3. Nutritional Supplements:

- Due to their high protein and fiber content, pulse flours are often incorporated into health foods, protein bars, shakes, and nutrition supplements. They are a good source of plant-based protein for vegetarians and vegans.

4. Snack Foods:

- Pulse flour is used in the production of various snack items like chips, crisps, and puffed snacks. The high protein content helps in creating snacks that are not only delicious but also provide nutritional benefits.

5. Batters for Fried Foods:

- Pulse flour, particularly chickpea flour (besan), is widely used in batters for frying vegetables, meats, and seafood. It creates a crisp texture when fried and is commonly used in Indian and Middle Eastern cuisines for dishes like pakoras, bhajis, and falafel.

6. Baby Food:

- Because pulse flours are rich in protein and nutrients, they are often used in baby foods like porridge, cereal mixes, and health drinks.

7. Animal Feed:

- Pulse flour is sometimes used as an ingredient in animal feed, providing a source of protein for livestock and poultry.



8. Industrial Uses:

- Pulse flour is also used in non-food applications, including in the production of biodegradable packaging, adhesives, and as a binder in various industrial processes.
-

Equipment Used for Grinding Pulse Flours

Different types of grinding equipment are used to produce pulse flour, depending on the desired quality, texture, and throughput. Here are the most commonly used machines:

1. Hammer Mill:

- A versatile grinder that uses rotating hammers to crush and grind pulses. It is widely used for large-scale pulse flour production.

2. Stone Mill:

- A traditional method using a stone mill (atta chakki), which grinds pulses into flour with less heat generation, helping to preserve the nutritional quality of the pulse.

3. Roller Mill:

- The roller mill uses smooth or corrugated rollers to grind pulses. It is ideal for producing fine flour from dry pulses and works well for large-scale operations.

4. Pin Mill:

- A pin mill is a fine-grinding machine that uses rotating pins to grind pulses into a fine, powdery consistency. It is used for producing fine flour and is particularly effective for pulses with harder hulls.

5. Impact Mill:

- This mill uses impact force to break down pulses into flour. The fast movement of blades or hammers creates friction that helps reduce the size of the particles.

6. Vibrating Sieves:

- Used for sieving the pulse flour after grinding, sieves ensure that the flour particles are uniformly sized and free from coarser grains.

7. Air Classifiers:

- Used to separate finer particles from coarser ones by using air flow to classify the size of the flour particles. This ensures uniformity and consistency in the flour.

8. Flour Mills (Automatic Mills):



SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
Coimbatore.

- In some automated systems, the entire grinding process, including cleaning, grinding, sieving, and packaging, can be integrated into a single automated system, improving productivity and efficiency.
-

Advantages and Disadvantages of Pulse Flour

Advantages:

- **High Nutritional Value:** Pulse flours are rich in protein, fiber, and essential minerals, making them an excellent choice for health-conscious consumers.
- **Gluten-Free:** Pulse flours are naturally gluten-free, making them an essential ingredient for gluten-free diets.
- **Versatility:** Pulse flour can be used in a wide range of products, including baking, snacks, soups, and baby food.
- **Sustainability:** Pulses are environmentally friendly crops, requiring less water and fertilizer compared to other grains, making pulse flour a more sustainable choice.

Disadvantages:

- **Storage:** Pulse flour can be prone to spoilage if not stored in cool, dry conditions, as it can absorb moisture and develop off-flavors or mold.
 - **Taste and Texture:** The flavor and texture of pulse flour may not always appeal to all consumers, especially in baked goods where wheat flour is traditionally used.
 - **Processing Costs:** Some pulse flours, especially those from smaller mills, can have higher processing costs compared to other types of flours, which might affect their competitiveness in the market.
-

Conclusion

Grinding split pulses into flour offers a variety of applications in food processing and beyond. The right equipment, such as hammer mills, stone mills, or roller mills, can help produce high-quality pulse flour that is used in everything from gluten-free baking to soups and snacks. The increasing demand for plant-based proteins and gluten-free products continues to drive the popularity of pulse flours, making them an important ingredient in both food and non-food industries.



SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
Coimbatore.

