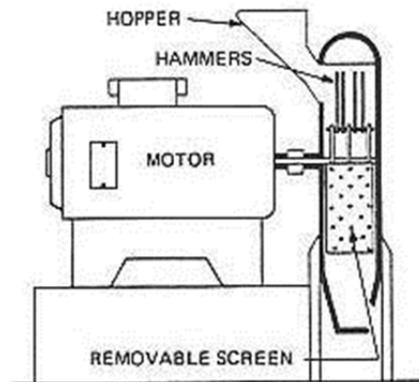


Canadian Feed Research Centre (CFRC)

Essentials of Grinding

Whether by roller or hammermill, reduction of grain is important so that digestive enzymes have a greater surface area to do their work. Effective enzyme activity leads to better nutrient absorption in the intestine, resulting in better animal performance.

Hammer mills work by impacting grain with a hammer head. When the hammer head collides with grain, the size of the particles is dependent on the speed of the hammer head. A wide range of particles are produced from the collision. Hammermills can be either horizontal or vertical in configuration.



Advantages:

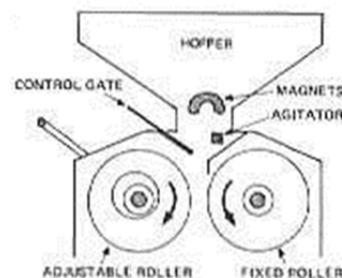
- Produce particles that are very round, wide range in sizes
- Work with any material
- Less expensive than roller mills to maintain
- Work with any kind of material

Disadvantages:

- Can generate heat and noise
- Less uniform particle size
- Less efficient energy use than roller mills

http://www.agriculture.gov.sk.ca/beef_cattle_feeding_systems

Roller mills work by forcing grain through two rolls. If both rollers are moving at the same speed – compression is the primary force on the grain. If the rollers are moving at different speeds, shearing force and compression are both at work on the seed. Rollers can be smooth or grooved; if grooved the grain is torn, as well as sheared and compressed. The particle size of grains run through roller mills are more easily controlled (less variation) than that through hammermills.



Advantages:

- Produce a uniform distribution of particle sizes
- More energy efficient than hammer mills
- Quieter and less dust production than hammer mills

Disadvantages:

- Are not very effective on fibre
- Particles can be very irregular in shape
- More expensive, capital and maintenance costs

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Screen design is important for both hammer and roller mills. Screens separate particles by size and are critical for milling efficiency. Too small of screen size or placement too close to the site of grinding can hinder optimal milling and are less energy efficient.

For more information visit <http://agbio.usask.ca/CFRC>. The Canadian Feed Research Centre is a National Facility funded by the Canadian Foundation for Innovation, the Saskatchewan Ministry of Agriculture, the University of Saskatchewan, Cargill Animal Nutrition and the Western Economic Diversification Fund. For more information on industrial research opportunities contact Dr. Colleen Christensen, Feeds Innovation Institute, University of Saskatchewan.