

Feed Manufacturing Process (Pelleting, Cooling, crumbling, screening, bagging, storage)

Pelleting

- Pelleting involves forcing a soft feed through the holes in a metal die plate to form compact pellets and then cut into a pre-determined size.
- Specialized pellet mills for aqua-feed manufacture have a conditioning unit mounted above them, where liquids such as water and molasses can be added to improve pelletability.
- The general process involves passing a feed mixture through the conditioning chamber, where 4 to 6% water as steam may be added.

- Moisture provides lubrication for compression and extrusion and the presence of heat causes some gelatinisation of a raw starch in the ingredients
- From the conditioner feed material falls into the centre of the pelleter itself.
- In the pelleter two or more rollers and feed ploughs push the material through the holes of the die plate.
- Stationary knives positioned on its outer side cut the pellets to a pre-set length.
- Pellets, discharged on to a screen belt of a horizontal tunnel drier, are aircooled within ten minutes and dried to moisture below 10%.

- Die hole size usually range from 1.5 mm up to 9.5 mm. The thickness of pellet dies can be up to about 90 mm.
- For small scale operation, a dough of the feed mix can be prepared and extruded through a mincer extruder and the feed strands could be steamed, dried, crumbled and graded for use.

Cooling/Drying

- The temperature and the moisture from the dry pelleting processes should be reduced within few minutes after extrusion for proper storage and handling.
- This can be done by collecting the pellets and spreading them in thin layer on a concrete or tiled floor and blowing air over them or by solar drying.
- Alternatively, they could also be dried in an oven with temperature regulation and air-circulation.
- But in commercial feed production vertical or horizontal type cooler-dryer with air circulation are used.
- The temperature is reduced to ambient levels, and the moisture preferable is below 10%, but not exceeding 13%.

Crumbling

- Crumbling of the pellets is necessary to produce granules or crumbles for feeding small fish and prawns.

Fat spraying

- High lipid levels as required in the diet of carnivorous fish may affect the pelleting.
- So lipid is sprayed onto the feed in mixtures placed in the production flow after the pelleting in commercial operations.

Bagging

- The finished dry pellets or granules should be bagged for storage and the bags must be suitably marked to show the product specification and date of manufacture, if sold.

Storage

- Storage of feed ingredients and finished feeds (pellets, granules or flakes) is an important step in maintaining the quality of the feeds.
- Moist and semi-moist feeds and feed ingredients as far as possible should be used immediately after preparation.
- Freezing is necessary if it has to be stored or transported. A cold storage may be required for the purpose.
- Proper storage of feeds and ingredients is necessary to prevent theft, physical and chemical damage, infestation by insects or microorganisms and rodents (rats) .

- The accumulated economic loss can be enormous due to the quality changes.
- Fungal growth is very rapid when temperature exceeds 25°C and humidity exceeds 85 per cent, and produce toxins besides staleness.
- It is important to protect feeds and feed ingredients by adding cost effective preservative.
- To prevent the entry of insects and rodents proper screens should be provided in the warehouse ventilators.

- Vitamins and vitamin premixes should be kept in the coolest place possible either in the manufacturers containers or in airtight- light -proof containers and used within six months.
- Lipids should be stabilised with antioxidants and kept in sealed dark plastic containers in a cool place.
- Dry ingredients and feeds should be used within 2-3 months.