

LPM (UNIT-2)

[conservation of fodder]

By-

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Silage Preparation

Silage-making is a fermentation process aimed at preserving forage in its wet state in anaerobic condition.

Silage preparation is one of the important methods for storage of green fodder for dairy animals & it is necessary to adopt this method by Indian dairy farmers on large scale in situations like drought or heavy rainfall or scarcity of fodder.

Silage making means preservation of chaffed cereal green fodder in anaerobic condition by way of fermentation method.

- In anaerobic condition (no air inside pit/tank), with the help of micro organisms, sugar contained in green fodder is converted into Lactic acid, which helps to preserve the green fodder for longer duration. Respiratory function of living cells present in green chaffed fodder utilizes oxygen in air tight condition & releases water & carbon dioxide in closed environment in pit/tank.
- Due to Carbon dioxide releases in pit/tank, air inside is expelled outside as well as organism which depends on oxygen (Like bacteria & Fungi) cannot withstand in CO_2 atmosphere in Tank/Pit. These effects result in preservation of chaffed green fodder in silo pit/tank as silage for longer duration (6 months or max. a year if good care is taken).

- **Essential fodder crops for silage making**
- To prepare best quality silage, cereal green fodder like Green fodder maize, Fodder sorghum, Bajara, Hybrid Napier, Sugar cane tops, Oat, Marwel etc are required.
- cereal green fodder (monocotyledons) is preferred due to its more sugar content than protein because sugar is utilized in fermentation process to make lactic acid by microorganisms.
- These cereal fodder crops have hard stem, which takes more time for drying in making hay of these crops, so it is better to use these kinds of crops for making silage than hay.

• Benefits of silage making

- Silage is storage system of green fodder which keeps all parts of fodder in appropriate condition for feeding than any other system of storage of fodder.
- Silage requires less space for storage as it is pressed in pit/tank than hay making.
- For daily cutting, transporting & chaffing of fodder in traditional way requires more labour & time but in case of silage, fodder cutting, transport, chaffing is done at one time only, so it is less labour & time consuming practice.

- Land under fodder cultivation is emptied, and immediately it is used for plantation of other crops. So farmers' can take more crops in same land in a year against traditional way where land is reserved for fodder until all crops is harvested.
- Silage is prepared in closed & air tight condition so there is no danger of fire. (In hay making, dry fodder is stocked & exposed for fire like situation).
- Due to lactic acid in silage, it is easily digestible to animals, so energy required for digestion is used for other purposes like milk production etc.
- Silage is tasty & flavoured, so it increases appetite of dairy animals

□ Important thing behind to adopt silage is in scarcity –

it provide supply of fodder to dairy animals.

Situations like drought, high rainfall & scarcity of fodder, farmers may use silage for feeding dairy animals. (Rain fed area where shortage of green fodder is for March to June & in high rainy area or water logged lands, it is impossible to cultivate or harvest fodder)

□ Due to treatment of additive for silage, farmers can supply energy, mineral & vitamins to dairy animals.

Methods of silage making

- There are two methods for silage making which are vastly used
- (i) Pit method and
- (ii) tank method.

- These two methods are economically viable for dairy farmers.

Pit Method of Silage Making

- For pit method, location for making pit should be at higher level on ground so that rain water may not percolate into pit. In rectangular pit, corner edges should be making round .
- while filling & pressing chaffed fodder, air will not remain inside in the corners of pit or tank.

- Wall of pit/tank should be air proof to avoid air too come inside in pit /tank through cracks or crevices .To avoid this situation, plaster wall of silo pit or tank with cement or moistened soil.
- If ground water level is nearer, then building tank for silage making is preferable than pit method. If plastering cement to the wall of pit/tank is uneconomical, then HDPE plastic paper (200 micron) may be used to cover pit/tank inside out position

- For planning of silage, following aspects needs to pay attention-
- How many dairy animals farmer's have?
- How many days farmer's have to feed animals with silage?
- Is sufficient green fodder is available with farmer to prepare required silage?
- On the above points, decide to plan for silage making

Treatment for Silage

- For making best quality & balanced silage, it needs proper treatment of additives like-
- Per ton of chaffed green fodder requires 1 kg Urea, 2 kg jaggary, 1 kg common salt, 1 kg mineral mixture & 1 litre of Whey.
- Prepare separate solution in 15 to 20 litres of water for Urea, Jaggary, Mineral mixture & common salt in separate pots/buckets & then spread it on layer of pressed chaffed green fodder while filling silo pit/tank.

Procedure for filling silo pit/tank

- When fodder crop is in cob stage or Tussling stage, harvest it for preparation of silage.
- Very mature stage is not good for preparing silage as its sugar content is decreased as well as fibre percentage is increased; this kind of fodder is less suitable for silage making.
- After harvesting fodder crops, let it dry for 5-6 hours in shed so that moisture content of fodder will decrease from 80% to 65-70%.
- Care to be taken to avoid silage making in rainy days or crops containing dew drops in winter season because moisture is more in this situation so there may be chances for development of mould in silo pit during storage period.

Following steps to be taken while filling silo pit-

- Prior to filling silo pit / tank, clean& dry it.
- Cover with plastic film inside pit/tank in such way that it will cover all sides of pit/tank.
- For making silage, chaffing of fodder is essential component. With the help of chaff cutter machine, make pieces of 1.5c.m. to 2 c.m. length of green maize, sorghum, sugarcane tops, marwel, Fodder bajara etc for filling silo pit.

- Prepare separate solution in 15 to 20 litres of water for Urea, Jaggary, Mineral mixture & common salt in separate pots/buckets & then spread it on layer of pressed chaffed green fodder while filling silo pit/tank.
- Start to fill chaffed green fodder in pit or tank.
- After making 4” thick layer of chaffed green fodder, press it with wooden plank in such a way that air will not entangled in chaffed fodder.
- Then sprinkle it with prepared solution of Jaggary, Mineral mixture, Urea, Common salt & whey.

Follow the same procedure until filling of pit/tank 1 to 1.5 feet above the ground level(In pit).Then covet it from plastic film from all side carefully.

- Covet it with Trash, Wheat straw, Soil & dry hay to protect it from entering rain water in to it. If possible to temporary arrangement of shed above the silo pit/tank.

- It will require 45 to 60 days to make good quality of silage. Use of silage After 8-10 weeks, silage is ready as feed for animals. Open pit/tank initially from one side of for use.

- If it is not in use, then cover it carefully with plastic film so that air will not go inside in silage.
- Initially fed animals with 5-6 kg silage by adding it with chaffed green fodder to develop taste to animals.
- Once animal likes sweet-sour taste of silage; it will eat it with good liking.

Quality of Silage

Good silage is light brown in colour, has a sharp taste and little smell as its lactic acid content is right. It is very stable and can be kept for years if required.

- Good quality silage has sweet & sour taste.

Good quality silage has faint green or brownish colour.

- Good quality silage has pH of 3.5 to 4.2.
- Rotten silage has black colour. pH : high and If silage while filling pit/tank, not well pressed; there will be growth of mould

To obtain good silage, following is necessary

- : Use airtight silos (total anaerobiosis); several types of silo are used around the world: tunnel silo, trench silo, corridor silo, tower silo, etc., collect forage which is not earth-soiled, chopped and then piled up,
- If necessary apply additional techniques such as pre-tedding for forage with high water content, or use of preservatives (sugar products, formic acid, anti-moulds, etc.) to improve preservation.
- It is essential to harvest forage at the best time, from the point of view of nutritional quality, quantity available and climatic conditions, and then to store it properly to reduce losses.

- Additives are available to help maximise the quality of silage produced.

There are **three main types of additives**:

- **Sugars/carbohydrates** – by adding extra sugar or molasses the crop is more able to produce lactic acid. Some additives contain materials to stimulate the lactobacilli bacteria.
- **Acids** – formic and sulphuric acid are applied at a rate of between 3–5 litres per tonne as the grass is picked up in the field. This reduces the quantity of lactic acid needed to reach a stable pH.
- **Preservatives** – these suppress chemical reactions and allow the fermentation process more easily. These are usually within acid additives..

Round-Bale-Silage

- Round bale silage is a relatively new method of preserving forage. It is a very flexible system because of its low capital costs.
- It is a combination of hay and silage making and has certain advantages and disadvantages over other forage preservation systems.
- Round bale silage is simply forage of a relatively high moisture content that is baled with a round baler and then stored in a sealed container, usually a plastic bag. Both grasses and legumes can be preserved as round bale silage if proper techniques are followed. It is much easier to make good hay crop silage in silos than in large round bales.

Round bale silage has three distinct advantages over haymaking or conventional silage making:

- Harvesting forage as round bale silage has the potential of minimizing harvest losses.
- Round bale silage requires a relatively low initial investment of capital.
- Round bale silage also is an extremely flexible system

Problems with hay making

- If hay is dried in a moist environment, for example during heavy rains season, mould may grow on the hay. These moulds can be extremely toxic to animals as well as the people handling it.
- In such cases it is advisable to wait till the end of the rainy season before cutting the forage. This may lead to lower nutritional content in the hay, but this is better than toxic hay. The resultant may be supplemented with other feeds.
- On the other hand, drying the hay too fast may lead to shattering of the delicate parts of the plant, causing a subsequent loss of nutrients.
- To avoid this, drying can be done in barns by passing hot air through the forage. Although artificial drying produces hay of good quality, it is expensive, but can be followed.

- THANKS