FODDER ALTERNATIVES DURING SHORTAGE PERIOD

WHAT IS CONSERVATION OF FODDER

Conservation of fodder means *preservation and careful maintenance* of certain quantities of fodder unchanged during chemical or physical transformation of fodder when it is excessively available for future needs

NEEDS OF FODDER CONSERVATION

- To preserve feed when it is available in excess
- To maintain optimum nutritional value of fodder
- To shift available feed from the present to the future
- To move feed from one location to another location
- To assist pasture management

METHODS OF CONSERVATION

- Hay and silage are the methods of conserving forage
- Hay is preserved by drying and will generally keep while it is kept dry.
- Silage involves natural fermentation , which produces lactic and other acids, which ‘pickle’ or preserve the

SILAGE MAKING

WHAT IS SILAGE?

Silage is the final product when green forage of sufficient moisture (> ~50%) is conserved and stored anaerobically (oxygen-free), under conditions that encourage fermentation of sugars to organic acids

Types of Silage?

High Moisture Silage	≤ 30% dry matter
Medium Moisture Silage	30% to 40% dry matter
Low Moisture Silage (Haylage, Baleage, or Wilted silage)	~ 40% to 60% dry matter

SILO AND ITS TYPES

The specialized device or container used for preparation of silage is called silo.

1. Pile :

In this type of silo there is no need of construction.

Only a pile of chopped fodder is made on a ground and it is pressed with the help of tractor.

2. Long Silage Bag

This type of silo consists of long stretchable bag. After proper filling and compaction, the end of bag is closed.



3. Silo tower:

These are long vertical silo of steel or concrete

4. Silage Bunker:

Silage Bunker is most commonly used type of silo. This is rectangular structure which is open from one side or both sides. On both sides of walls of wood, steel, concrete are constructed.

5. Temporary Bunker :

Temporary bunker consists of two frames of steel or iron which are covered by sheets of steel, iron or wood. The function of these frame is same as that of the wall of bunker but difference is that these are portable and can be easily transferred from one place to other place.



6. Silage Pit

In this type of silo, a pit is constructed in ground. It may be rectangular or cylindrical

7. Trench Silo

This is compromised form of silage pit and bunker in which some fodder is preserved inside of pit and some outside of pit

8. Baled Silage

This is the most modern way of silage making in which fodder is preserved in the form of bale. Fodder is converted into bale via machine called silage baler and this bale is then tightly wrapped with polyethylene sheet with the help of wrapper.



STEPS FOR SILAGE MAKING

- Selection of fodder
- Check Moisture
- Harvesting and chopping of fodder
- Filling of silo
- Mixing of Additives
- Sealing of Silo
- Storage
- Feeding

SELECTION OF FODDER

- There should be adequate amount of fermentable carbohydrates
- More than 65% moisture in fodder selected for silage making
- Silage can be made from all winter and summer fodders
- Commonly used fodder for silage making are maize, sorghum, millet, oat, and sorghum sudan grass.

SELECTION OF FODDER

- Should have 35% DM at the time of ensiling
- Normally Fodders with (Broad leaves, thick stem)
- Leguminous contain fewer amounts of carbohydrates hence molasses or mineral have to be sprinkled over them at the time of silage making.
- They are usually mixed with non leguminous fodders

Maize

Pearl Millet

Oat

Sorghum

HARVESTING & CHOPPING THE MATERIAL FODDER AT THE PROPER TIME

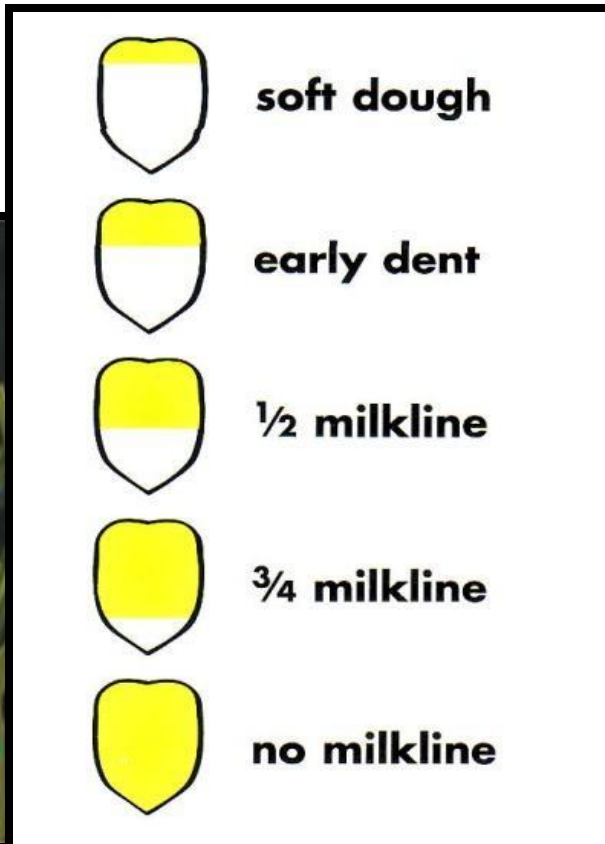
THE RIGHT TIME TO HARVEST FODDER

- The nutritional value of fodder decreases when it is harvested before or after it is mature
- Due to this the fodder does not remain easily digestible
- The best time to harvest maize is when its grains are 50 percent milky
- The best time to harvest the leguminous fodders is when 50 percent flowers are in blossom
- Moreover, the best time to harvest green fodder for silage is when its moisture content is 65-70 percent

Harvested at the stage when maximum nutrients present in crop and 65-70% moisture content.

In case of maize moisture reaches this level when:

- Color of Lower leaves of plant starts changing to light green
- Husk's color is from green to light green
- There is 40-50% moisture in grain
- Milk line is 50%



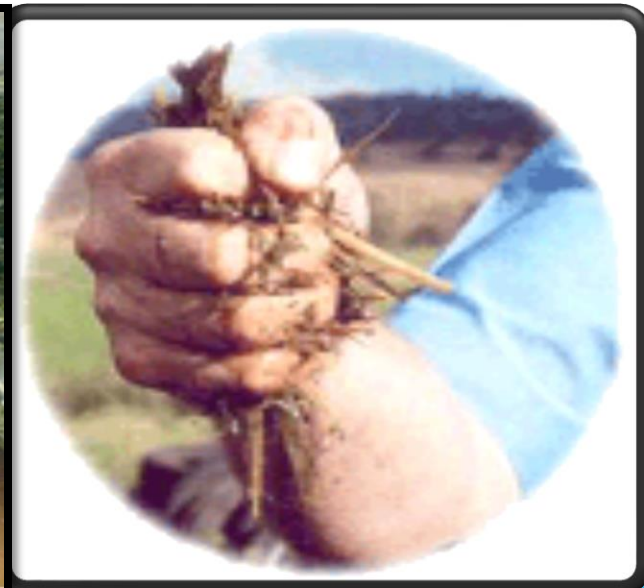
1. **Full-season:** Produce larger plants and higher tonnage of silage
2. **Early Season:** May Produce as much grain , but on smaller plants

   As a result , therefore, total silage yield is usually lower, but percentage grain in the silage is higher in early season

3. **For Corn Hybrids:** Full season (120 plus days), mid season (115 days) and early season (110 days)

METHODS OF CHECKING MOISTURE

1. Grab test is used to measure the moisture concentration in fodder. Take a hand full of fodder and press it in hand for few seconds. On opening of hand, there will be a ball of fodder:



- If this ball suddenly opens, it means moisture connect is too low
- If this ball remains it shape, it means moisture content is too high
- If this ball opens slowly, it means moisture content in fodder is suitable to be ensiled



2. Moisture content in fodder can also be checked by electronic moisture tester
3. Another test to check the moisture content in fodder is oven test

ADJUSTING THE MOISTURE CONTENT

- Optimum moisture level for Pit silage is 60 to 65%
- Optimum moisture level for wrapped bale silage is 50 to 55%
- To get the maximum yield of nutrients/ Acre
- To minimize field and storage losses
- To ensure high palatability and maximum intake by animals

CHOPPING OF FODDER

- Fodder can be chopped with a common fodder chopper, but an electric chopper or the tractor's shaft can hasten the chopping process
- Nevertheless chopping can be done with the common scythe too.
- Modern harvesters are also available for the chopping process

THE SIZE OF CHOPPED FODDER

¼th to ¾th inch size of the chopped fodder is considered quite suitable for silage, but a one inch size of 15-20 percent pieces of chopped fodder keeps its fiber ratio to a suitable level.

CRITICAL FACTORS FOR SILAGE MAKING

- Rapid removal of air
- Rapid production of lactic acid that results in a quick lowering of the pH

  (This is the result of adequate fermentation processes)
- Rapid feed out

  (once the silo is opened and exposed to air to avoid heating and spoilage)

QUALITY OF SILAGE

- Good silage should have a milk, pleasant aroma, an acid taste and a slightly greenish color.
- It should be free from sliminess and mold
- Have sufficient acid to prevent further action of microorganisms.

FILLING OF SILO

- ✓ After chopping and adding additives silo is filled.
- ✓ Inside silo chopped fodder should be compressed with tractor or some other means so that it is packed tightly and there is no air left.
- ✓ If air left anaerobic condition will not be created.
- ✓ In case of baled silage, silage baler makes bale in well compacted form.

MIXING OF ADDITIVES

Different feed additives may be mixed to stimulate or inhibit the microbial activities in silage.

Inorganic chemical

Calcium carbonate, magnesium carbonate, ammonium sulphate, sodium sulphate, zinc sulphate, copper sulphate, ferrous sulphate, sodium chloride

Organic Chemicals

Acetic acid, citric acid, benzoic acid, formic acid, lactic acid, propionic acid, ethyl butyrate, and urea etc.

Feed Stuffs

wheat bran, crushed maize, starch, dextrose, molasses, whey and yeast etc.

Fermentation products & microorganism

A few enzymes, extract of fungi and several species of microorganism like Lactobacillus acidophilus, Turolopsis species, Bacillus subtilis etc.

Some commercial inoculants to enhance the process of ensiling are also available in market.

STORAGE OF THE SILAGE

Following things should be kept in mind When choosing a storage place:

- The storage place should be near the animals shed.
- It should be on a higher ground to protect it from water.
- There should be no salinity there.

- The filling and pressing process should be finished in a single day to initiate the process of useful fermentation.
- Spread the chopped fodder in 6 to 9 inches thick layers.
- Steady packing is needed between each layer, which is done with the help of a tractor, which moves on it to pack it tightly.
- This packing or pressure keeps the temperature at a suitable level.

- The weight squeezes out air and fermentation begins
- The fodder should be protected from air and rainwater.
- This can be done by covering it with a strong water proof plastic and placing it on discarded vehicle tires or sandbags on it.
- Silage is ready for consumption as fodder for the animals in 4-6 weeks.

25 to 30 kilogram silage can be stored in one cubic foot

PRECAUTIONS STORING SILAGE

1. Chop the fodder in small size.

2. Protect it from dust and do not let dirt stick to the tyres of the tractor during the pressing process.

3. Fill the bunker or the pit quickly.

4. Pack the silage carefully to protect it from air and water.

5. Press the fodder with tractor in 6-9 inch layers.

The whole process of silage making should be completed within 16 to 20 hours.

SEALING OF SILO

- The air tight sealing is necessary to avoid the entrance of air in the silo.
- So after filling of silo, cover it with polythene sheet and put tires or sand filled bags over it or cover it with mud (Lepai).
- It is better to cut tires in small circular pieces for maximum usage.
- In case of baled silage baler automatically wrap the bale with wrapper.

REMOVAL OF SILAGE

After a period of 40-45 days the silage is ready for feeding to the livestock. After the removal of silage the open end of the silo should be covered in such a manner that contact with the air is minimum

ADVANTAGES OF SILAGE MAKING

1. Silage can be prepared from green fodder when the weather does not permit for haymaking
2. Silage can be prepared from plants having thick stem and are generally not very suitable for haymaking like sorghum, maize
3. Weeds can also be utilized along with main fodder crops for silage making

4. It is highly palatable
5. The organic acids produced in the silage are similar to those normally produced in the digestive tract of the ruminants and there fore are used in the same manner
6. A cheap substitute for fodder at the time of fodder shortage.

6. Silage makes the fodder more digestible
7. Land is available for the next crop without delay because all of the fodder is harvested and stored at once.
8. Animals get nutritious feed the whole year
9. Expenditure on labour force is decreased considerably

1. Color

- In general pale yellow indicates good quality.
- If the color is from dark brown to dark green, the silage underwent bad fermentation and is of bad quality.

2. Smell

- Acidic or a sweet-sour pleasant smell indicates good quality.
- On the other hand if there is a manure smell or putrid smell and it is so repugnant that one cannot put the silage near one's nose the quality is poor

3. Taste

- If the silage tastes sour and there is no problem in putting it is one's mouth the quality is good.
- On the other hand if the silage tastes bitter and one cannot put it in one's mouth, the quality is poor.

4. Touch

- When squeezing the silage tightly in a hand and the opening the hand, if the silage breaks slowly into two, that silage is of good quality.

- If the silage breaks into small pieces separately, the silage is deficient in moisture contents.
- If water is dripping, the moisture content of the silage is too high

CAUSES OF POOR SILAGE

Acid Production

- If during silage making acid is not produced in sufficient quantity, it will stop the fermentation, and there will be putrefaction due to undesirable bacteria.
- Such bacteria will produce enzymes that will cause the breakdown of protein causing an off flavor and slimy silage.

- On the other hand if there is production of acid in high quantity due to high proportion of sugar content, it will result in sour unpalatable silage.
- Such silage is not only unpalatable, but when fed in large quantity causes cattle to scour.

Moisture Content

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- When there is high moisture content in fodder, the silage will not be packed well and more air will be left in it. This will result in moldy silage.
- High moisture content causes undesirable fermentation to take place.
- In case of less moisture content there will be no proper fermentation.

FEEDING OF SILAGE

- The animals like eating silage, but the buffalo may be hesitant in the beginning.
- In this case, feed it with green fodder or concentrate mixed in the silage, so that it develops a taste for the silage. Then increase its quantity gradually.
- Provide 3 percent dry matter according to the weight of

- Give 15 to 20 kilogram silage along with concentrates daily to the lactating animals.
- Be careful when removing silage from the bunker.
- Cover it with polythene so that mud or moisture does not spoil the silage

2-3 year old cattle	11-13 kg
3-8 year old cattle	13-22 kg
Sheep	1-1.5 kg per 45 kg of live wt.
Goats	1-1.5 kg per 45 kg of live wt.