

Fodder Management

Storage



Introduction

- Three important criteria for storage
 - Should make optimum usage of space
 - Should not cause loss of nutrients
 - Should not result in excess spoilage
- Good alternative during fodder shortages
 - During monsoons, shortage because of difficulty to go out and cut fresh fodder
 - During summer months shortage because of water shortage
- Two popular methods of storage
 - Silage
 - Hay

Silage

- Not as good as freshly cut fodder but better than Hay in terms of nutrients & other properties
- Any green fodder suitable for silage making
- A fermentation process in the absence of air is involved in silage making
 - Bacteria responsible for production of Lactic acid & Acetic acid should dominate
 - The pH keeps dropping till it inhibits growth of all bacteria & this results in long shelf life
 - If conditions are too wet, clostridia bacteria that produce Butyric acid will dominate & cause souring & spoilage. Also pH will go up & other bacteria will start growing & result in short shelf life
- Salt is sprinkled for taste
- Tight packing is required
 - Otherwise aerobic deterioration of silage will occur
 - Yeasts & Molds form causing further spoilage
- Because the process involves cutting into small pieces and extremely tight packing, it uses the storage space most optimally
- Maize is ideal for making silage because of good lactic acid content
 - Lucerne, Jowar, Bajra have less lactic acid. Hence not the best for silage
- xxx quantity of silage is required per cow
- Silage is 20% less nutritious than green fodder but better than dry fodder
- Grass can also be used & this is called Haylage
- Silage is good during dry cycle ???XXX
- When silage is consumed, the lactic acid will be used by the animals as an energy source

The Silage Pit

- Takes 2 months & can be stored up to 2 years
- Should be done in periods of plenty e.g. just after monsoon
 - Plan maize just for silage for use during lean periods in the following year
- 25 kgs. Of Silage per Cubic Feet (a)
- Calculate yearly requirement as follows (b) –
 - # of Days in a Year With Fresh Fodder Shortage x # of Cows x Qty. required per Cow
- Calculate Silage capacity (b)/(a) cubic feet
- For large capacities, design such that a tractor can be used to press it –
 - at least 8 feet wide
 - Gently sloping towards the center
- At the bottom 2'lengthx2'widthx3'deep pits (at least 2) filled with brick pieces to drain out excess water
- Wooden planks to cover the front as the pile builds up

The Silage Pit

- XXX Add drawing

Silage – The Process

- Use maize when corn is in dough stage
 - If you do it in milk stage, it will have (70-89%) too much moisture & causes putrefaction
 - In dough stage, 65-70% moisture which releases lactic acid & fermentation is best
 - If too wet, add some dry paddy straw
 - Press test for checking the moisture
- Cut to 1 inch pieces using chaff cutter & spread evenly in the pit
- Every 6 inches, sprinkle salt
 - 1% like you add to your salad
- Keep packing it really tight
 - Tractor should go over it
 - Or have all the people dance on it
 - Also make sure the edges are pressed
- Process should be completed ideally in a day but max. in 2-3 days to avoid excessive spoilage
 - Divert all required labor for this activity
- After required height is reached, cover tightly with plastic sheet
- Put 2 inch layer of soil on sheet
- Slide in the wooden boards in the front
- Plug any gaps in the boards with a mixture of cow dung & soil

Silage – Under The Hood

- Phase I – Aerobic Process
 - Aerobic process till all trapped Oxygen is used up
 - Aerobic bacteria use up soluble carbohydrates that might otherwise have been available for the Lactic Acid bacteria or the animal consuming the silage
 - Proteins are broken down to Amino Acids & Amines resulting in loss of Protein
 - Produces heat & water which is not desirable
 - Excess heat reduces digestibility of nutrients
 - Should not last more than 2 days ideally
- Phase II – Acetic Acid Producing Stage
 - Anaerobic fermentation where Acetic acid producing bacteria dominate
 - The bacteria ferment soluble carbohydrates & produce acetic acid
 - Acetic acid reduces the pH which is desirable
 - Acetic acid can be utilized by the ruminant
 - pH falls from 6.0 to 5.0

Silage – Under The Hood

- Phase III – Lactic Acid Producing Stage
 - Lactic acid producing bacteria dominate
 - Lactic acid is the most desirable of the fermentation acids produced
 - For efficient preservation, it should comprise of more than 60% of the organic acids produced
 - Lactic acid is used by the ruminant as an energy source
 - pH falls from 5.0 to 4.0
 - If excess moisture present, clostridia bacteria which produce Butyric acid will develop & cause putrefaction
- Phase IV – Preserved State
 - pH reaches 4 & stays there
 - The acidic conditions inhibit all bacterial activity
 - All the silage will now be preserved efficiently
 - Can be stored for up to 2 years in this state
- Phase V – Aerobic Decomposition
 - Occurs at the time of removing silage or where any surfaces are exposed to Oxygen
 - Yeasts & Molds form, causing spoilage
 - Aerobic deterioration of silage occurs resulting in significant losses
 - Good management is required to reduce these losses

Silage – How To Use

- Can start using it in 2 months
- Any time there is a shortage of fodder, open the plastic cover, remove required amount & seal again
- Can be kept for two years if sealed properly

Hay

- Should be cut at right stage
 - So that max. nutrients are present
 - Lucerne at 10% flowering
 - SSG at XXX
 - Maize at XXX
 - Bajra at XXX
- Should be dried in the right way
 - So that max. nutrients are preserved

Making Lucerne Hay

- Should be cut between 8:00 to 10:00 a.m.
 - Too early & XXX
 - Too late & XXX
- Lay in neat strips next to each other on the side of the bed
- Next day at 9:00 a.m. turn the strips
 - If you don't turn fast, it will turn dark brown & protein content drops to 10%
- Third day, between 8:30 – 10:30, make bundles XXX diameter & tie with same lucerne
- Stack criss-cross to make stacks 3 ft. high
 - Make stacks like this every 2 feet
- Cover with paddy straw & leave for 7 days
- Take it to the storage area & again stack it criss-cross
- End product should be light green XXX
- Best fodder to start the weaning of calves when they are 15 days old
- Best fodder for pregnant cows
- All the indicated timings ensure that the leaves do not fall off
 - They are required for drying the stem correctly

Making SSG Hay

- Don't water land 5-6 days before making hay
- 1st day, cut and lay in strips on the side of bed for 2 days
- Turn 3rd day
- 4th day make bundles of 6 diameter & tie with same SSG
- Take 100 of these bundles & stack vertically
- Leave the heap for 7 days in the field
- Take to storage area & stack them vertically