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PRESERVATION OF FORAGE CROPS: HAY AND SILAGE MAKING

Vimalraj R*, Mohana Priya M and Sruthi S
Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Nedungadu, Karaikal.
**Corresponding Author Mail ID: rvimalraj110701@gmail.com*

Introduction

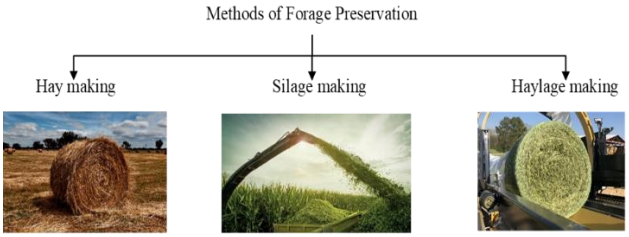
Preservation of forage refers to the practice of storing and maintaining forage plant materials to provide feed for livestock after the primary growth period of these plants. This process involves preparing and storing forage crops in a way that ensures they remain nutritious and suitable for feeding during times when fresh forage is not available. Proper forage preservation is essential for maintaining livestock health and productivity, as it ensures a consistent supply of high-quality feed throughout the year.

Why Preservation is important?

Fodder preservation is important for a number of reasons:

- **Ensuring Availability During Scarcity:** Preserving fodder guarantees that animals have sufficient feed during periods of scarcity, such as droughts or winter months.
- **Reducing Wastage:** During peak seasons, there is often excess fodder production. Preservation helps prevent this surplus from going to waste.
- **Maintaining High Feed Quality:** Proper preservation techniques maintain the nutritional value of the fodder, ensuring it remains a high-quality feed.
- **Resource Management:** Preservation allows for the strategic use of feed by shifting its availability from times of surplus to times of need.
- **Supporting Animal Health:** When preserved correctly, the fodder can be an excellent source of nutrition for animals at all stages of production, supporting their overall health and productivity.

Methods of forage preservation



Hay Making

Hay making refers to the process of harvesting, drying, and storing cereals, grasses, or legumes to be used as animal feed. Numerous factors affect the quality of hay, such as the kind of plant, the maturity stage at harvest, and the drying and storage climate.

Suitable Crops for Hay Making

Thin-stalked crops with lots of leaves dry up faster than thick, sad-looking stems with few leaves, thus it is preferable to create hay from them. Among them are oats, desmodium, lucerne, maize, sorghum, Napier grass, and Rhode's grass. Harvesting legume-based fodder plants (such as lucerne, cowpea, and others) should happen as soon as crown buds form or when the blooming stage commences.

Methods of Hay Making

There are two major approaches to creating hay:

i) Traditional method

Traditional hay-making relies on manual labor and simple tools. The forage is typically cut by hand or with basic equipment, spread out to dry in the sun, and then gathered and stored manually. This method is labor-intensive and dependent on favorable weather conditions.

ii) New mechanized technique

Mechanized hay making uses modern machinery to streamline the process, making it faster and more efficient. This method involves several key steps:

- **Cutting:** The forage is cut using mechanical mowers, which ensures an even and consistent cut, essential for optimal drying.
- **Tedding:** The cut forage is spread out using a tedder to facilitate quicker and more uniform drying by turning and fluffing the hay.
- **Raking:** After drying, the hay is gathered into rows or windrows using a rake, making it easier to collect for baling.
- **Baling:** Finally, the dried hay is compressed into bales using a baler. After that, these bales are kept and fed to cattle. Depending on the type of baler used, this procedure might result in square or round bales.

Pitfall of hay-making

- **Weather Dependency:** For optimal drying and curing, haymaking needs dry weather. Weather that is unpredictably wet or damp might cause hay to deteriorate, postpone harvest, or lose some of its nutritious value.
- **Equipment Costs:** Specialized tools including mowers, tedders, balers, and storage facilities are needed for haymaking. This equipment can be expensive to buy, operate, and maintain, particularly for small-scale farmers.
- **Storage Requirements:** To keep it from spoiling, hay must be kept dry and well-ventilated. Space and resources may be required for appropriate storage facilities, such as covered sheds or barns.
- **Nutrient Loss:** Hay may lose some of its nutrients if it is not dried or kept correctly. Important nutrients including proteins, vitamins, and minerals might deteriorate from prolonged exposure to sunshine, rain, or humidity.
- **Hazard of spoiling:** Hay that is not kept correctly may rot or grow mold, which can cause spoiling and loss. If given to cattle, moldy hay can be dangerous in addition to being useless.
- **Fire Hazard:** Hay that is not entirely dry before storage might spontaneously fire owing to heat accumulation from microbial activity. This is a major fire hazard, especially in enclosed barns or enormous haystacks.

Silage Making

Silage refers to the preserved green material produced through controlled fermentation of green fodder crops while retaining a high moisture content. The fermentation process helps to preserve the forage, making it a valuable feed resource for livestock, especially during periods when fresh forage is not available.

Basic Objectives of Silage Making

i) Excluding Oxygen: One of the primary goals in silage making is to exclude oxygen from the silage mass. This anaerobic environment is crucial for the fermentation process, which is necessary to prevent spoilage and to ensure that the silage remains nutritious.

ii) Reducing pH: The second objective is to rapidly lower the pH of the forage to a range of 3.8-5.0. This acidification is achieved through the production of lactic acid by naturally occurring bacteria during fermentation. The specific target pH depends on the dry matter (DM) content and the type of crop being ensiled. Lowering the pH helps to stabilize the silage, preserving its quality and preventing the growth of undesirable microorganisms.

Suitable Crops for Silage Making

Numerous crops, including as corn, alfalfa, clover, sorghum, oats, bajra, Napier grass, etc., can be utilized to make silage. Picking crops that are at the ideal maturity level is crucial when choosing them for silage production.

Site for construction of silo

- The location of the silo, as planned, needs to be higher than other locations.
- There must be no clogged water in the area. The silo pit's wall needs to be impermeable.
- It needs to be a minimum of six feet distant from the animal shed.
- If it is feasible, build the silo on the animal shed's southern side.

Procedure of Silage Making

i) Harvesting of Fodder

- Cut fodder at the right stage of growth for optimal nutrient content.

ii) Moisture Testing

- Ideal moisture level for silage is 65-75%.
- If the moisture content is too high, wilting of the fodder is necessary to reduce moisture.

iii) Chopping of Fodder

- Chop fodder into 1-3 cm pieces.
- This ensures better packing density and promotes effective lactic acid fermentation.

iv) Compacting the Forage

- Compact the chopped fodder as tightly as possible using a tractor, hand roller, or heavy objects.
- Proper compaction reduces oxygen levels, allowing anaerobic fermentation.

v) Molasses Addition

- Sprinkle molasses solution (2-3% of fodder weight) over the compacted fodder.
- Molasses serves as an additional source of sugar to boost fermentation.
- If fodder has high moisture content, molasses may not significantly impact the fermentation.

vi) Addition of Bran and Silage Additives

- Bran or other silage additives can be mixed into the fodder to enhance fermentation and nutritional value.

vii) Sprinkling Silage SAVOR Solution

- Uniformly sprinkle silage SAVOR solution over the fodder to promote better preservation.

Viii) Spreading and Layering Fodder

- Spread the chopped and treated fodder to create a bed 2 feet in height within the silo pit.

ix) Sealing the Silo-Pit

- Seal the silo-pit airtight using a plastic cover.
- Press the cover down with heavy objects like bricks or tires to ensure no air enters.

x) Sealing Duration

- Maintain airtight conditions for 45 days to allow fermentation to complete.

xi) Utilizing Silage

- Once the silo-pit is opened, the silage should be used within 45-60 days to prevent fungal contamination and spoilage.

Advantages of Silage Making

- **Weather Flexibility:** Silage can be made even when conditions are unfavorable for haymaking, such as during rainy weather.
- **Suitable for Thick-Stemmed Plants:** Plants with thick stems, like sorghum and maize, which are not ideal for haymaking, can be effectively used for silage.
- **Weed Control:** Weeds can be included in silage making, and the process helps kill most weed seeds, reducing their spread.
- **Palatability:** Silage is highly palatable for livestock, making it an appealing feed option.

Conclusion

Forage preservation through hay and silage making ensures a reliable and nutritious feed supply for livestock, particularly during periods of scarcity. While haymaking is suitable for dry climates and thin-stemmed plants, silage making offers greater flexibility, especially for thick-stemmed crops and during wet conditions. Both methods help prevent wastage, improve feed management, and support animal health, making them essential practices in sustainable livestock farming.