Acta Scientific Veterinary Sciences (ISSN: 2582-3183)

Volume 2 Issue 12 December 2020

Short Communication

Advances in Anaerobic Fermentation Technique for Conservation of Forage for Small Holders

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Received: October 20, 2020

Published: November 12, 2020

Introduction

Supply of green forages throughout the year for the livestock is becoming difficult due to reduction of cultivable land, short supply of seeds and sapling of fodder crops and preference of cash crops over fodder crops by the farmers. To ensure the supply of uniform quality of fodder and their nutrients throughout the year it is highly essential to harvest the available crop completely at one time and ensiling for the further use. Present practice of cutting the required quantity of fodder daily does not ensure the supply of quality nutrient throughout the year. After the flowering stage the crop matures rapidly and the content of fiber increases and stem get hardened.

Figure 1: Air drying of vegetable waste meant for ensiling.

Objectives of the Study

1. To develop the technology of preservation of green fodder, vegetable, fruit and agro based industrial waste by anaerobic acidification by using inoculum of lactic acid bacterial culture.
2. To develop and scale up technology for enrichment of agro-industrial waste (Maize bran, vegetable waste, fruit waste etc. available in Konkan region.
3. To develop mechanized method for compacting and ensiling in easy to use unconventional containers.

Figure 2: Maize bran (Distillary waste).

Technology developed

The technology for Composite silage making in Plastic drums, plastic bags and in bamboo made containers (Figure 1-5) is developed at the Instructional Livestock Farm Complex in the Department of Livestock Production and Management, Bombay Veterinary college Mumbai. Silage making as a tool for Conservation of fodder is not a new concept. But was not very popular with Indian farmers because of hardship and labour intensive. Normally silage making in silo pits or in trench or tower silo has got their own limitations.

Figure 3: Fermented silage in plastic drum.

Figure 4: Silge in synthetic bags.

Figure 5: Silage in Bamboo make containers.

The silage in small containers like bamboo make containers or plastic bags was developed for the farmers with small herd size and having limited land for cultivation of fodder crops. The different types of composite silage with vegetable, by product of distillery such as maize brans and also with fruit waste, mixed either cereal fodder crops or perineal grasses such as Gajraj, DNH6 are developed. By adopting this cost effective technology the small and marginal farmers can be benefitted in ensuing the quality fodder for their livestock within the affordable cost.

The capacity of different type of silage is as under:

1. Bamboo containers - 1000 kg
2. Plastic drum - 80 - 100 kg
3. Specially made bags with inner lining - 500 kg
4. Plastic pouches - 10 - 15 kg.

Use of silage inoculants: The use of silage inoculants in form of lactic acid bacterial culture has had the added advantage as it provided the stimulus for rapid acid (lactic acid) formation and lowering the PH. The maturation period (Complete fermentation period) of the silage with added inoculums was 35 days as against 45 to 48 days in batches without inoculums. The pH of the improved silage was 3.6 as against 4.7 in silage without inoculants.

Technical details

1. Cereal fodder crops like maize, sorghum and perennial grasses ex. hybrid napier, gajraj, yashwant, DHN 6 are harvested at bloom stage. The crops with high soluble carbohydrate are most suitable. At this stage the fodder crops are most palatable and ensure the maximum protein and other nutrients. At this stage moisture content is 80 - 85%.
2. Vegetable waste like cabbage leaves. And other leafy vegetable waste collected early morning from vegetable markets and air dried fir three to four hours and mixed with coven.
3. After harvesting the crops is sundried for maximum 12 - 14 hours to reduce to 70%.
4. The next step is chaffing to ½ inch size. Size of chaffed material has the bearing on final quality of the resultant silage.
5. The chopped materials are packed for anaerobic fermentations in different of containers like Bamboo silo, Drum silo, Plastic bags etc. (Photographs are attached).
6. Intermittently the bacterial inoculums of *Lactobacillus plantarum* or other lactic acid bacteria are sprinkled in during pressing.

7. Proper pressing and compaction is to be ensured to drive out the inside air completely and to create anaerobic condition for growth and multiplication of lactic acid bacteria.