SILAGE MAKING AT THE BATA-ATA FARM, SOUTHERN PROVINCE

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INTRODUCTION

CONSIDERABLE difficulty is experienced at the above farm in providing sufficient succulent feed during the long annual drought periods, to the livestock that are admitted to the Board and Lodging Scheme of the above farm by which village cows, she-buffaloes and she-goats are cared for and sired by several proved breeds.

An attempt was therefore made in silage making, whereby the plentiful green fodder grasses which were available during the rainy months were conserved in a pit silo, thus improvising a method of supplying a succulent feed to the animals by way of silage, during the lean months of drought, when natural pasture is scarce, dry, unpalatable and lacking in nutritive qualities.

SILAGE

Feed like maize, sorghums, fodder grasses and leguminous crops, such as, lucerne and clover, normally fed to farm animals, when preserved in a succulent state in the absence of air is called silage, as opposed to hay or dry fodder which is feed preserved in a dry condition. If the material needed for silage making is raised exclusively in the farm, it provides the most economically produced succulent feed for farm animals to tide over times of scarcity. It has also the further advantage in that, a crop like maize, sorghum, green gram or cowpea doomed to failure through insect attack, disease or drought could be advantageously used for silage making.

When green or semi-green fresh material is heaped or interned, respiration of green tissues assisted by plant enzymes takes place and a process of fermentation with a rise of temperature occurs, provided air is excluded from the mass. The chief change that takes place in this process of curing is the breaking down of the complex substances like sugar and to a lesser extent protein compounds in the ensiled material and converting them into simpler organic compounds as lactic, acetic and amino acids, giving the silage a distinct acid smell.

Over-matured or withered material when ensiled develops moulds and an inferior silage known as " mouldy " or " musty " silage is the result. Immature, very soft succulent material cakes hard, prevents heating on curing and develops an objectionable smell and is known as " sour " silage. " Acid " silage is the best.

CONSTRUCTION OF THE SILO

Taking into consideration the climatic and weather conditions prevalent in the area and the capital expenditure involved, the pit type of underground silo was considered the most suitable.

A rectangular pit, 30 feet long, 6 feet broad and 8 feet deep was excavated on an elevated spot in the farm. A spacious, open cadjan shed, with broad eaves was erected over the pit. The drip was about 6 feet away from the pit and a drain was provided right round the shed to keep off any storm water and lead away the rain water from the roof.

The sides of the pit were shaved clean to plumb, removing all bumps and hollows as a good finish to the walls of the silo is absolutely essential in order to facilitate even packing and to help the material to sink evenly without obstruction, when settling of the charge takes place during the process of curing.

CHARGING THE SILO

Guinea and Napier grass cut at the stage normally used for fodder were utilized for the purpose. The grass cut during the morning session was charged the following morning, while the afternoon's cut was used the following afternoon, as partly withered material was easy to pack, being less springy than freshly cut grass.

The material was laid in the silo in layers 2 to 3 inches deep and well compacted by trampling down, particular care being taken at the sides and corners of the pit to exclude air as much as possible from in between the ensiled material.

In each layer, the butt ends were placed to face one direction, reversing the direction in the next layer. The material was laid down, end to end, but in such a manner that it overlapped for about one-third of its length. With this system of arranging the charge, very close packing was ensured.

After the pit was filled to ground level, a three-foot fence was constructed round the inner dimensions of the silo by driving down stakes in between the material ensiled and the sides of the pit. Care was taken that the stakes were smooth, so that the whole structure could slip down into the silo as the material in the pit started settling.

This improvised cradle, lined on the inner sides with old sacking was also charged with more grass and when the whole structure was full, a cover was provided with old sacking. The excavated earth was now drawn round and over the silo and well rammed down, leaving about one foot of earth above the top of the fence, all the time settling was going on. Once the material had fully settled, the height of the earth layer above ground level was 2 feet. The silo was left to mature for 3 months. In the meantime, cracks that appeared in the earth filling were repaired.

The silo used up 50 cart-loads of cut grass weighing 1,000–1,200 lb. each. An area of about 30 feet by 90 feet of Napier or 45 feet by 90 feet of Guinea grass provided a cart-load. On this basis a silo of the above dimensions would need the harvest of cut grass of 3–3½ acres for each charge.

The silo was charged in 9 days, the cut fodder being carted to the silo. Four women did the filling, 2 working in the pit at either end, laying and trampling, while 2 handed down the material.

Three months after the final charging, the pit was opened. The ensiled material had roughly settled to two-thirds the original height. The silage was sliced out with a sharp catty. It was found more economical to cut a broad slice of less depth, than a narrow slice going down the pit.

After removing the silage for 22 days, a halt was made for 6 days to ascertain how far the silage would be effected. It was found that during this interval of 6 days, moulds had penetrated the silage from the exposed cut surface up to a depth of about 12–14 inches. About 4 inches of this penetration were matted with fungus mycelia followed up further by thin strands. A 2-day interval between cuttings showed 2–3 inches penetration of every light fungal growth. It took another 8 days to empty the silo.

The silage had cured well, the general appearance was that of a pale, greenish-yellow to brown colour. The Guinea grass cut just at flowering stage had cured best and had an acid-sweet alcoholic smell. The tender butt-ends of Napier had cured soft, very compact and looked dark-brown, with an offensive sour odour, but cattle relished it all the same. The quantity of the cured silage was 30 feet by 6 feet by 6 feet= 1,080 cubic feet. A cubic foot of silage weighed 30–40 lb. thus giving on the average an out-turn of 1,080 × 35 lb. = 37,800 lb.

SILAGE FEEDING

The farm animals both cattle and goats ate the silage lustily, preferring this to green fodder, when given in a mixture. As it was thought unwise to feed large quantities, particularly as these animals have had no previous experience on silage feeding, an average of 10 lb. per head per day for cattle were allowed at the start, gradually increasing the quantity to 20 lb. Goats were given roughly 1/5 this quantity. Animals fed on silage showed a marked improvement over the rest, looking healthier, active and showing good colour and suppleness of coat.

COST OF PRODUCTION

	Rs.	c.
A.—Capital expenditure :—		
1 Construction of pit, measuring 30 ft. × 6 ft. × 8 ft.—60 men at 2·50 per day	150	0
2 Erection of shed, 40 ft. × 12 ft. including all materials	200	0
Total ..	350	0

	Rs.	c.
B.—Recurrent expenditure :—		
1 Cutting grass—58 women at 1·50 p. d.	87	0
2 Loading and transporting by carts—38 men at 2·50	95	0
3 Charging the pit—36 women at 1·50 p. d.	54	0
4 Making stick fence, covering with earth, &c.—24 women at 1·50 p. d. ..	36	0
5 Filling up cracks, &c.—4 women at 1·50	6	0
6 Removing earth layer for reaching the silage—18 women at 1·50 ..	27	0
7 Cutting and lifting silage out of the silo—56 women at 1·50 ..	84	0
Total ..	389	0

	Rs.	c.
Cost of production of 37,800 lb. of silage	389	0
Cost of production of 1 lb. of silage	1	04

If the fodder was cut and fed direct, the cost would have been items (1) plus (2) of B, *i.e.*, Rs. 182. Thus the extra cost of converting the fodder into silage has been Rs. 389–Rs. 182.

i.e.—Rs. 207 for 37,800 lb. which is about $\frac{6}{10}$ cts. per lb.

If the material is chopped into lengths of 8–12 inches by means of a power driven chopper, a much larger quantity could be charged into a silo of known size. Such material could be better packed, less earth would be required for weighing down, while the removal of the prepared silage would be considerably easier. With these improvements it would be possible to convert the fodder into silage at a low cost as $\frac{1}{5}$ cts. per lb.

Incorporation with the fodder grass, to the extent of about one-tenth its bulk, spread thinly between layers, of a leguminous fodder crop such as "Stylo", *Stylosanthes gracilis*, a late introduction to Ceylon from Australia and found to luxuriate in the dry zone, would greatly enchance the feeding value of the silage.

SUMMARY

At the Bata-ata Board and Lodging Station for farm animals, where the need for pasture and fodder grass feeding during the annual drought periods is keenly felt, a system of conserving the green fodder so plentifully found during the monsoon periods, has been successfully evolved.

This has been made possible by preparing silage in a pit silo, which type has been found most suitable, taking into consideration the meteorological aspects of the area. The procedure adopted in silage making and the results obtained are given.

While the animals fed on the prepared silage had shown definite improvement, the drought insurance value of silage as a cattle feed has been amply demonstrated.

The economics of silage making is given, with observations on possible methods of further reducing the cost of silage making, and improving the feeding value of grass silage by the incorporation of a lately introduced leguminous fodder crop.