Brief communication

BEEF PRODUCTION FROM UNTREATED SILAGE AND SILAGE TREATED WITH A MIXTURE OF FORMALIN AND FORMIC ACID

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Ryegrass-clover herbage with an organic matter digestibility of 72% was made into direct-cut silage in two 45-tonne polythene-covered stacks, using a flail-type forage harvester. One stack was untreated, but herbage cut for the other was treated with 6.0 l of commercial formalin (40% w/v formaldehyde) and 1.5 l of 85% (w/w) formic acid per tonne of fresh grass, from a gravity-fed applicator mounted on the harvester. After 6 months' storage the stacks were opened and self-fed by cattle.

Yearling Angus weaner cattle, of mean initial weight 152 kg, were divided into four groups and put on sawdust-based pads for 68 days during the winter of 1973. The total feeding time was divided into four periods ranging from 13 to 22 days. Two of the groups were self-fed untreated or treated silage *ad lib.* The remaining two groups, both fed in wooden troughs, were given, respectively, lucerne hay *ad lib.* (organic matter digestibility 60%) and a maintenance ration consisting of non-experimental silage and meadow hay.

TABLE 1: CHEMICAL COMPOSITION OF THE FEEDS

	Pasture used for Silage	*Untreated Silage*	*Treated Silage*	*Lucerne Hay*
Dry matter (%)	20.35	19.59	21.63	84.80
Total N (% DM)	2.02	2.11	2.22	2.75
True protein (% total N)	90.27	57.12	82.00	83.20
pH	6.02	4.24	4.82	—
Total organic acids (% DM)	—	13.85	5.70	—
2, 3-butanediol	—	—	2.32	—

There was considerable protein breakdown in untreated silage, but only a small degree of protein degradation occurred in the treated silage (Table 1). Treatment with formalin-formic acid also markedly increased silage pH, lowered the content of total organic acids, and caused the production of a small quantity of 2, 3-butanediol.

TABLE 2: EFFECT OF TYPE OF WINTER FEEDING SYSTEM ON LIVEWEIGHT GAIN

Period	*Length of Period (days)*	*Condition of Self-feeding Pads*	*Liveweight Gain (kg/day)*				
			Maintenance	*Untreated Silage*	*Treated Silage*	*Lucerne Hay*	*Error CV (%)*
		Number of cattle	15	15	12	16	
1	19	Clean	0.01 b	0.14 b	0.51 a	0.54 a	73.8
2	22	Dirty	0.05 c	—0.04 c	0.17 b	0.63 a	67.8
3	14	Clean	—0.21 d	0.21 c	0.52 a	0.36 b	70.7
4	13	Dirty	—0.16 d	0.14 c	0.35 b	0.78 a	76.0
Overall	68		—0.06 d	0.10 c	0.37 b	0.58 a	40.7

Within each row, treatment means bearing the same letter do not differ at $P < 0.05$.

Silage stack temperatures, measured 51 days after opening, were not significantly different in the surface 10 cm layer, and in the layers from approximately 35 cm below the surface to the base of the stack. In the layers 20-25 and 30-35 cm below the surface, untreated silage was, respectively, 9 and 5° C warmer than treated silage.

In all experimental periods untreated silage gave very low weight gains, indicating that it was a maintenance-type ration (Table 2). Treated silage increased weight gains in all periods. In periods 1 and 3, when the self-feeding pads were clean, growth rates on treated silage were either comparable to or better than on lucerne hay, showing that under these conditions it was a production-type ration. However, when the self-feeding pads were dirty (periods 2 and 4), growth rates declined on treated silage and under these conditions it was inferior to lucerne hay.

At the end of winter feeding, the 4 groups of cattle were joined and grazed on pasture. After 106 days of grazing the maintenance group compensated, respectively, 54 and 65% of the winter weight advantage built up by the treated silage and lucerne hay groups. The corresponding compensation for the untreated silage group was, respectively, 25 and 45%.