

# STUDY ON UTILIZATION OF ROUGHAGES FOR DAIRY AND BEEF CATTLE

## INTRODUCTION

The cattle population in Vietnam is around 5.5 millions heads, in which there are more than 100 thousand dairy cows. The increase of cattle population resulted many difficulties in solving roughages for the animals. Using agro-industrial by-products as roughages is one of important solutions for cattle development in Vietnam. The general objective of the topic was finding out a solution for exploiting and using efficiently the roughages for dairy and beef cattle feeding. The specific objective is determining the ensilage techniques of groundnut vines (GV) and pineapple waste (PW).

## GROUNDNUT VINES ENSILAGE



A sample of groundnut vines ensilage

The groundnut vines has rather high crude protein (15.3%/DM), thus it is good roughage for cattle. The traditional preservation method of this by-product is drying. However, there is a big loss of nutritive quality during drying. The result of experiment showed that ensilage of groundnut vines with 5% molasses + 1%

commercial salt is the most simple and effective technique. The groundnut vines silage has green-yellow colour, good smell and about 30% of dry matter. The level pH of ensilaged product is 4.00 and the total organic acid is 2.29%, in which the lactic acid occupies 85% of the total organic acids.

## PINEAPPLE WASTE ENSILAGE

The experiment result showed that ensilage of pineapple waste with 15% rice straw + 0.1% bio-enzyme is the most simple and effective technique. The pineapple waste silage has yellow colour, good smell and about 20% of dry matter. The level pH of ensilaged product is 4.58 and the total organic acid is 2.5%, in which the lactic acid occupies 61% of the total organic acids. Especially, bromerline enzyme decreased therefore the animals have more appetizing of intake compared to fresh pineapple waste. Some rumen indices such as pH, NH<sub>3</sub>-N and micro organisms are in normal level.

## ENSILAGES FEEDING

The weight gain of heifers and milk yield of milking cows have not been affected when 10 kg of grasses in the ration was replaced by groundnut vines or pineapple waste silages.

The experiment results indicated that treatment of groundnut vines and pineapple waste by ensiling as a roughage sources is an important solution to solve the deficiency of feedstuffs for cattle development in Vietnam.



**Pineapple waste ensilage mixing into ration**

Table 1. Dry matter, crude protein and crude fiber of groundnut vines silage

Indices	INIT	Fresh groundnut vines	Groundnut vines silage after 1 month	Groundnut vines silage after 2 month	Groundnut vines silage after 3 month
1 Dry matter-DM	%	30.90 ± 1.14	30.83 ± 0.58	31.90 ± 0.36	29.83 ± 0.75
2 Crude protein	%/DM	14.91 ± 0.24	14.37 ± 0.47	14.36 ± 0.15	14.85 ± 0.31
3 Crude fiber	%/DM	31.20 ± 3.97	21.00 ± 1.47	23.10 ± 1.01	21.67 ± 2.01

Table 2. pH and organic acids of groundnut vines silage

Indices	Unit	Fresh groundnut vines	Groundnut vines silage after 1 month	Groundnut vines silage after 2 month	Groundnut vines silage after 3 month
01 pH	-	6.08 ± 0.12	4.02 ± 0.07	4.05 ± 0.08	4.00 ± 0.12
02 Acid acetic	%	-	0.16	0.19	0.23
03 Acid lactic	%	-	1.92	2.28	1.95
04 Acid butyric	%	-	0.03	0.05	0.11
05 Total org.acids	%	-	2.11	2.52	2.29
06 % Acid lactic/total org. acids	%	-	91.00	90.00	85.00

Table 3. Dry matter, crude protein and crude fiber of pineapple waste silage

Indeces	Unit	Fresh pineapple waste	Pineapple waste silage after 1 month	Pineapple waste silage after 2 month	Pineapple waste silage after 3 month	
1	Dry matter-DM	%	16.86 ± 0.62	22.20 ± 3.28	21.50 ± 4.11	19.93 ± 2.46
2	Crude protein	%/DM	6.82 ± 0.99	5.35 ± 0.22	6.22 ± 0.58	6.10 ± 0.24
3	Crude fiber	%/DM	18.63 ± 0.87	35.00 ± 0.92	34.43 ± 0.80	34.40 ± 0.92

Table 4. pH, organic acids and enzyme bromerline of pineapple waste silage

Indeces	Unit	Fresh pineapple waste	Pineapple waste silage after 1 month	Pineapple waste silage after 2 month	Pineapple waste silage after 3 month	
01	pH	-	-	4.44 ± 0.52	4.01 ± 0.36	4.58 ± 0.31
02	Acetic acid	%	-	0.45 ± 0.43	0.67 ± 0.43	0.79 ± 0.43
03	Lactic acid	%	-	2.16 ± 0.50	1.94 ± 0.50	1.52 ± 0.50
04	Butyric acid	%	-	0.09 ± 0.40	0.06 ± 0.40	0.19 ± 0.40
05	Total org.acids	%	-	2.70	2.67	2.50
06	% Lactic acid/ total org. acids	%	-	80.00	73.00	61.00
07	Bromeline composition	µg/g	436.32 ± 3.7	-	-	345.1 ± 15.0
08	Active bromeline	UI	0.11 ± 0.09	-	-	Nin

Table 5. pH and NH<sub>3</sub>-N in rumen fluid of cattel fed pineapple waste silage

Time after feeding	Rumen fluid pH			Rumen fluid NH <sub>3</sub> -N (mg/L)		
	Ration without pineapple waste	Ration with fresh pineapple waste	Ration with pineapple waste silage	Ration without pineapple waste	Ration with fresh pineapple waste	Ration with pineapple waste silage
0 hours	6.88	6.80	6.40	99.92	107.29	40.69
5 hours	6.84	6.69	6.51	153.68	137.98	73.36
9 hours	6.91	6.75	6.15	87.64	81.43	54.89
$\bar{X}$	6.88 <sup>a</sup>	6.75 <sup>b</sup>	6.36 <sup>c</sup>	113.45 <sup>a</sup>	108.90 <sup>a</sup>	56.32 <sup>b</sup>

Table 6. Rumen micro-organisms of cattle fed fed pineapple waste silage

Time after feeding	Protozoa ( $\times 10^5/\text{ml}$ )			Bacteria ( $10^9/\text{ml}$ )		
	Ration without pineapple waste	Ration with fresh pineapple waste	Ration with pineapple waste silage	Ration without pineapple waste	Ration with fresh pineapple waste	Ration with pineapple waste silage
0 hours	0.77	1.54	1.54	2.47	3.22	3.53
5 hours	1.01	1.39	1.47	2.31	2.37	2.82
9 hours	0.71	1.97	1.90	2.74	4.47	4.62
$\bar{X}$	0.83 <sup>a</sup>	1.63 <sup>b</sup>	1.64 <sup>b</sup>	2.51 <sup>a</sup>	3.32 <sup>ab</sup>	3.66 <sup>b</sup>