

## EFFECT OF FEEDING SUPPLEMENT FREQUENCY ON RUMEN FUNCTION AND DRY MATTER DIGESTIBILITY

Bintara Her Sasangka<sup>1</sup>

### ABSTRACT

An experiment was conducted to evaluate the effects of feeding supplement frequency on rumen function and dry matter digestibility of ruminant. Three male fistulated buffaloes were used in this experiment. Roadside grass was fed to the animal as basal diet, and drinking water was available whole day. The experiment was design in a 3 X 3 randomized Latin Square. Feeding trial during the period of experiment was as follow: (A) grass *ad libitum* as control; (B) grass *ad libitum* + single fed of 400 grams supplement/head/day; (C) grass *ad libitum* + 200 grams supplement/head before feeding + 200 grams supplement/head/ day on mid day. pH, N-NH<sub>3</sub>, TVFA, microbial synthesis and dry matter digestibility were recorded in each period and analyzed in a Latin square 3 X 3 design. The result indicated that microbial synthesis and dry matter digestibility are higher in twice a day supplementation as compare once a day supplementation (B). However, animal that had once a day supplementation significantly (P<.01) has microbial synthesis and dry matter digestibility higher to that control animal.

### INTRODUCTION

In density populated areas, the available land for forage production decreased, so that livestock feeding will depend especially on the agriculture waste products. Waste products of agriculture and agroindustry can be used for livestock feeding although the types of their waste and their nutrient contents or nutritional values are very various. The availability of feedstuffs differs from one area to another. It depends on the climate of each area. Studies have been conducted to evaluate the use of some feedstuffs derived from waste products of agriculture / agroindustry as feed supplement for ruminant.

Ruminants have some advantages compared to monogastric animals, such as the ability to digest high fibre feedstuffs for their benefits with the help of microorganisms in the rumen. Some previous study showed that supplements increased the ability of animals to digest feed.

Supplement was usually given in the morning once a day (Sasangka *et al.*, 1994; Hendratno *et al.*, 1991) and was eaten up by

the animals less than one hour. Supplement being given to the animals contained some nutrients needed by ruminal microbes for their normal development. Ruminal microbes will grow well if the nutrients are always available continuously in the ruminal fluid. Based on those reasons, the study was conducted to know the effect of frequency of feeding supplement on the ruminal microbe and digestibility of dry matter of feed.

### MATERIALS AND METHODS

Three fistulated buffaloes were used in the experiment. They were fed with basal diet of road side grass cut manually. The trials were consisted of three periods of observation, each period needed  $\pm$  3 months. During the trials the animals were treated differently among them upon the period. Treatments of the trials were as follows: the first buffalo fed with grass only (as control / Treatment C), the second buffalo fed with grass as well as 400 gram supplement per head per day and given all at once time (Treatment A), the third buffalo fed with

<sup>1</sup> Pusat Aplikasi Isotop dan Radiasi-BATAN

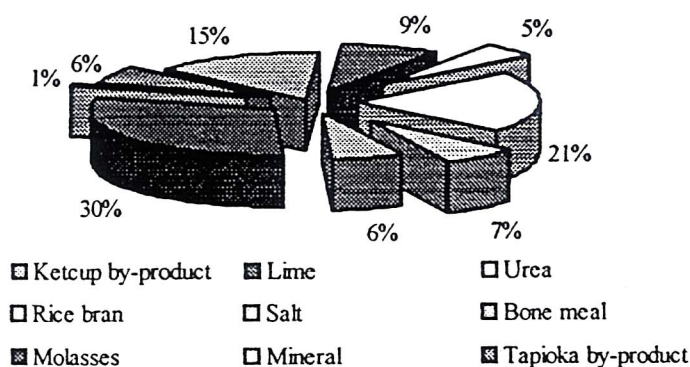


Figure 1. Ingredients of supplement

grass as well as 400 gram supplement per head per day and given twice a day each 200 gram in the morning and 200 gram in the afternoon (Treatment B). Grass and drinking water were provided *ad libitum*. Supplement given contained soya ketchup by-product formulated by Sasangka *et al* (1991). Supplement contents consisted of various ingredients as showed in Figure 1.

Parameters observed were:

- Dry matter digestibility using nylon bag method of Ørskov *et al.* (1980).
- pH of rumen fluid.
- Concentration of N-NH<sub>3</sub> measured six hours later after supplement feeding.
- Concentration of total VFA.

- Rate of microbe development using tracer of <sup>32</sup>P (KH<sub>2</sub><sup>32</sup>PO<sub>4</sub>) as described by Hendratno *et al.* (1991).

The data collected were analyzed by Latin Square 3 x 3 (Steel *et al.*, 1961).

### RESULTS AND DISCUSSIONS

Consumption of supplement during the first week of pre trial was quite little, however, it increased after the animals got used to consume the supplement.

Results of the experiment were showed in Table 1. Feeding supplement significantly increased the digestibility of dry

Table 1. Parameters of experiment being observed

No.	Parameters	Treatments		
		C	A	B
1.	Digestibility of DM during 24 hours (%)	52.24 <sup>c</sup>	57.63 <sup>b</sup>	59.31 <sup>a</sup>
2.	pH	6.08 <sup>a</sup>	6.78 <sup>a</sup>	6.73 <sup>a</sup>
3.	N-NH <sub>3</sub> (mg/100 ml)	23.08 <sup>a</sup>	22.66 <sup>a</sup>	23.83 <sup>a</sup>
4.	VFA (nmol/100 ml)	9.39 <sup>a</sup>	12.24 <sup>a</sup>	10.84 <sup>a</sup>
5.	Synthesis of microbes (mg/100 ml/hour)	17.35 <sup>c</sup>	24.10 <sup>b</sup>	26.45 <sup>a</sup>

<sup>a,b,c</sup> Different superscript in the same row showed the significant at P<.05.

C = control.

A = treatment A, 400 g supplement, once time feeding.

B = treatment B, 200 g supplement, twice feeding



matter of feed during 24 hours of observation. This was probably due to the increased of the microbial activity in the rumen of buffaloes given supplement.

The addition of supplement in the basal diet played the main role in enhancing or improving condition of rumen environment because the ingredients in supplement such as molasses, urea, carbohydrate and mineral supported the development of microorganism (Preston and Leng, 1987).

Measurement of digestibility using nylon bag at incubation time of 3, 6, 9, 12, 48 and 72 hours (Figure 2) showed similar results. The animals provided supplement twice a day were able to digest feedstuff more efficient than the other animals. By more frequent feeding supplement, it was expected to provide continuously essential elements in rumen fluid for the microbes to develop well and then to digest the fibre. Another studies showed that animals offered ration contained urea more frequently would be more effective in digesting the feed compared to animals which just offered once time a day (Preston and Leng, 1987).

pH of rumen fluid from the animals given supplement was quite lower than the control. This was related to the production of total VFA and the amounts of VFA for the control, treatment A, treatment B were 9.39, 12.24 and 10.84 nmol/100 ml respectively. High VFA might decrease pH of rumen fluid,

however, resalivation of rumen fluid might increase pH of rumen fluid, because saliva was base.

Concentration of N-NH<sub>3</sub> in rumen fluid six hours after feeding supplement was not significantly different compared to control animals. This was due to the present of carbohydrate sources in the feed such as molasses, tapioka by-product, rice bran that could bind N-NH<sub>3</sub>. Soewardi (1975) stated that feeding the animals with easily digestible carbohydrate could decrease concentration of N-ammonia in rumen fluid. Concentration of N-NH<sub>3</sub> in rumen fluid 0 – 6 hours after feeding supplement was probably high because the supplement contained urea as a source of non protein nitrogen and soya ketchup by-product as a source of protein. The present of carbohydrate in the supplement could decrease concentration of N-NH<sub>3</sub> in rumen fluid.

Feeding supplement (Table 1) significantly influenced synthesis of microbial rumen ( $P < 0.01$ ). Control animals had the lowest synthesis of microbial rumen i.e. 17.35 mg/100 ml/hour, compared to 24.10 and 26.45 mg/100 ml/hour of treatment A and treatment B animals respectively. Similar results were reported by Hendratno *et al.* (1989) that rumen fluid of buffaloes and sheep provided with supplement had higher synthesis microbial rumen as well.

Frequency of feeding supplement was significantly influenced synthesis of

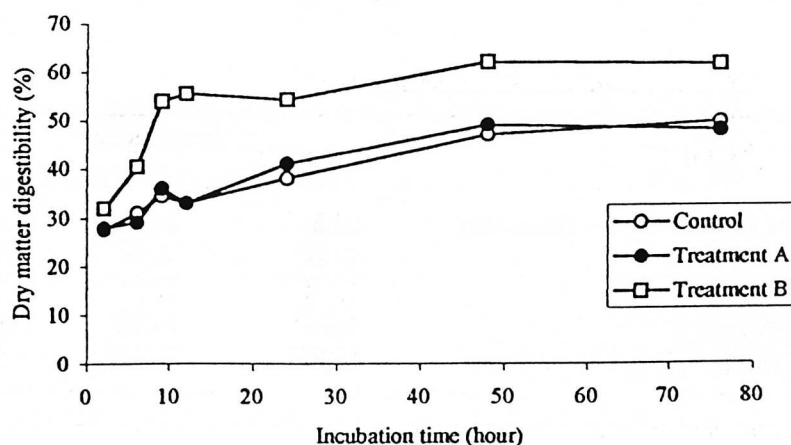


Figure 2. Effect of supplement feeding on digestibility of dry matter

microbial rumen ( $P < 0.05$ ). Animals given supplement amounting to 200 g twice a day had higher synthesis of microbe than offering 400 g for once time. This was caused by the continuity of available nutrients in rumen fluid for microbes to develop. When the number of microbes increased the ability of animals to digest feed would be higher as well as showed in Table 1 and Figure 1.

### CONCLUSIONS

Frequency of feeding supplement influenced synthesis of rumen microbes and feed digestibility. Animals that provided supplement twice a day had higher synthesis of rumen microbe and feed digestibility than one time offering of supplement.

### ACKNOWLEDGEMENT

The author wish to thank Mrs.Hj.Titin Maryati, Nuniek Lelananingtias, Ibrahim Gobel, Edi Irawan Kosasih and Adul bin Eboh for their assistance during the trial in laboratorium. We also appreciated very much to Dedi Ansori and Nasan who had taken care of all the animals for the trials.

### REFERENCES

- Hendratno, C., Suharyono, Z. Abjadin, R. Bahaudin and L.A. Sofyan. 1989. Laju pertumbuhan mikroba rumen dalam kaitannya dengan kemanfaatan biologis pakan. *APISORA*. BATAN. Jakarta.
- Hendratno, C., J.V. Nolan and R.A. Leng. 1991. The importance of urea molasses multnutrient blocks for ruminant production in Indonesia. Isotopes and related techniques in animal production and health. *IAEA*. Vienna. Pp.:157.
- Ørskov, E.R., Deb Hovell and F. Mould. 1980. The use of the nylon bag technique for the evaluation of feedstuffs. *Tropical Animal Production*: 5.
- Preston, T.R. and R.A. Leng. 1987. *Matching Ruminant Production System with Available Resources in the Tropics and Sub-tropics*. Penambul Books. Armidale.
- Sasangka, B.H., Suharyono and C. Hendratno. 1994. Perbaikan kondisi metabolisme rumen dan bobot badan sebagai akibat pemberian ummbampas kecap. *Seminar Nasional Sains dan Teknologi Peternakan, Pengolahan dan Komunikasi Hasil-Hasil Penelitian*. Ciawi, Bogor.
- Soewardi, B. 1975. *Gizi Ruminansia*. Fakultas Peternakan IPB. Bogor.
- Steel, R.G.D. and J.H. Torrie. 1970. *Principle and Procedure of Statistics*. Mc Graw Hill. New
- Soewardi, B. 1975. *Gizi Ruminansia*. Fakultas Peternakan IPB. Bogor.
- Steel, R.G.D. and J.H. Torrie. 1970. *Principle and Procedure of Statistics*. Mc Graw Hill. New York.