

EVALUATION OF SOME METHODS TO INCREASE
THE VOLUNTARY INTAKE AND DIGESTIBILITY OF
RICE STRAW

By

AHAMED LEBBE BADURDEEN

POSTGRADUATE INSTITUTE OF AGRICULTURE
UNIVERSITY OF PERADENIYA
PERADENIYA
SRI LANKA
1989

C 636.086
B12



402643

AGRICULTURE LIBRARY
UNIVERSITY OF PERADENIYA

402643

ABSTRACT

In this thesis some experimental works on increasing the voluntary feed intake and digestibility of rice straw is presented with a review on past works. Reference was made to definition of nutritive value, factors affecting nutritive value, limitations associated with feeding of rice straw and methods used to improve the nutritive value of rice straw (Chapter 1). Intake, digestibility and efficiency of utilization are found to be the components of nutritive value of a feedstuff. Variety, environment, cultural practices and post harvest conditions are identified as factors affecting nutritive value of rice straw.

(S) Low intake and digestibility are reported to be the main limitations associated with feeding of rice straw. Existing methods to overcome the problems of straw feeding are considered to be not widely applicable to Sri Lankan conditions. Hence, the importance of evaluating of some simple methods suitable to our condition is realized.

Two separate in vivo experiments were carried out on chopping, wetting, and soaking of rice straw with water and salt solution (Chapter 2). In the first experiment, 40 cross bred bull calves were randomly allotted to 4 treatments, namely; untreated rice straw,

rice straw sprayed with water, rice straw sprayed with 2% salt solution and rice straw sprayed with 4% salt solution to form a 4x10 RCBD. In the second experiment, 12 cross bred bull calves were randomly allotted to 4 treatments, namely; rice straw soaked overnight in water, rice straw soaked overnight in 2% salt solution, chopped rice straw and unchopped rice straw to form a 4x3 RCBD. Chopping of straw did not show any significant improvements in intake and digestibility. Similar results were observed in case of wetting of straw by water and salt solution (NaCl) of different concentrations (2 & 4%). Soaking of rice straw in 2% salt solution reduced intake and digestibility, while soaking in water had no effect.

Fourty cross bred bull calves were used in a in vivo experiment on selective consumption of rice straw (Chapter 3). This experiment consisted of untreated and urea ammonia treated rice straw at 5 levels of feeding. The levels were 60%, 80%, 100%, 120% and 140% of ad libitum intake. A linear relationship was formed between the amount of treated straw offered and intake. Even at the highest level (6.5 kg/100 kg BW) of organic matter offered (140% ad libitum), maximum intake was not reached. Digestibility of treated straw was not affected by the amount of feed offered. In case of untreated straw a non-linear relation of $Y(US) = -0.904 + 2.070X - 0.355X^2$ (Y = intake;

X= offered) was established. The maximum intake of 2.08 kg organic matter was obtained when 2.96 kg of organic matter per 100 kg body weight was offered. However, there was a drop in digestibility with increasing intake of both untreated and urea ammonia treated straw. The intake of digestible organic matter was increased with increasing amount of feed offered.

A study of supplementation of urea molasses lick (MO:U-MIN) on intake and digestibility was carried out using 12 cross bred bull calves in a 2x2x3 factorial RCBD (Chapter 4). The diets consisted of untreated straw (US), US plus urea molasses lick, treated straw (TS), TS plus urea molasses lick. This experiment was repeated over another period with rerandomization of animals and treatments. Supplementation of lick increased the intake of untreated straw. There was a considerable reduction in the digestibility. The intake of digestible dry matter was not affected by supplementation of lick block. Though the intake was not affected by urea ammonia treatment the digestibility and intake of digestible dry matter was increased.

A latin square design using 4 cross bred bull calves was used to study the effect of supplementation of urea molasses lick and urea ammonia treatment on intake, digestibility, serum protein level, red blood cell count, haemoglobin concentration, packed cell

volume, rumen ammonia, rumen pH, Na : K ratio in saliva and concentration of some minerals in the blood and rumen fluid in cattle. The minerals studied were Ca, Mg, Fe, Zn and Cu. In addition to these the level of P in the blood was also studied. Supplementation of lick block did not affect the concentration of minerals in blood or the rumen fluid, except P content in blood. Red blood cell count was increased and the serum protein level was decreased. In the case of urea ammonia treatment, only Ca and Fe concentration in the rumen fluid, and Fe as well as Cu levels in the blood were increased. There was no effect on red blood cell count and serum protein level.

The concentration of P in the blood was found to have an inverse relationship with the content of nitrogen in the feed.