

## RICE AS A POTENTIAL SOURCE OF BYPASS ENERGY IN RUMINANT DIETS

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Between 20-30% of the energy in carbohydrates is lost as heat and methane in rumen fermentation. There is interest in conserving this energy loss by bypassing the rumen and allowing carbohydrates to be digested in the small intestine. On molasses (Rowe et al. 1979) and sugar cane (Elliot et al. 1978) based diets, it was observed that a large proportion of rice grain reached the duodenum when cattle were fed supplements of rice polishings. In the studies now reported, rice is evaluated for its potential as a bypass energy source for ruminants.

Dairy goats in late lactation were fed 1200 g/day of a diet consisting of (g/100 g) 40 cracked polished rice, 41 oat chaff (screened to remove all oats), 8 molasses, 6 formaldehyde treated (HCHO) casein, 217 casein, 1.8 urea and 1 salt/minerals/vitamins. The final diet contained (g/100 g) 34 starch, 19 acid detergent fiber and 16 crude protein. Three measurements of starch digestibility were made: (1) rumen degradability of rice suspended in nylon bags, (2) flow of starch to the abomasum in cannulated animals and (3) digestibility measured by complete fecal collection.

The dry matter disappearance of cracked polished rice from nylon bags suspended in the rumen was 14%, 39% and 73% after 6, 12 and 24 hr incubation. These results indicate that the rice was being degraded at a fairly constant rate of 3% dry matter per hour. From the enzymatic analysis of starch (McCrae and Armstrong 1968) in abomasal samples, it was calculated that 13.6% of the total dry matter flow was starch. With a mean dry matter flow of 670 g/day to the abomasum, approximately 91 g of starch bypassed the rumen.

From the results of total fecal collection, 99.3% of the rice starch was digested. Since 1 g of starch yields 1.1 g of glucose upon hydrolysis, 100 g of glucose were potentially available for intestinal absorption when goats were fed 480 g of rice. Although 91 g of abomasal starch is a small percentage of that fed, it is a significant amount of glucose since Annison and Linzell (1964) suggested that the mammary uptake of 76 g of glucose in goats would yield 1 kg of milk.

The question still remains as to whether a source of intestinally absorbed glucose would be of benefit to lactating or rapidly growing animals with a high energy demand.

## REFERENCES

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