

Effect of soaking and urea treatments on *in sacco* degradability of wheat straw in sheep

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Introduction Several efforts have been made in the past to improve the nutritive value of straw by chemical and biological means (Sundstøl and Owen, 1984). Also numerous work was performed to evaluate the effect of these treatments on the degradability of cereal straws by using the nylon bag technique (Mehrez and Ørskov, 1977). Therefore, the objective of this study was to investigate the effect of using water for soaking of wheat straw alongside different amounts of urea on the *in sacco* organic matter degradability (OMD) of treated wheat straws following their rumen incubations in fistulated sheep at various times.

Materials and methods Nine bales of approximately 300 kg of wheat straw were chopped (10-15cm), and distributed manually into 18 polyester silo bags which were individually placed inside the galvanized mesh rings. A replicated 2x3 factorial design by involving 2 water: straw soaking ratios (0.15:1 and 0.50:1) and 3 urea amounts (0, 2.5 and 5%) were used to prepare 3 treated straw bags per treatment. The relevant amounts of water and urea representing these soaking ratios and urea treatments were sprayed onto these straws in bags which were compressed to exclude air, sealed and left outdoors for ten weeks. At opening the silos, sensory tests and chemical composition were determined for all treated and untreated straws. Representative samples of these straws were dried and ground through 2mm sieve for their use in *in sacco* studies using fistulated sheep consuming fixed amounts of grass hay and concentrate at 67:33 ratio. A split-plot *in sacco* study using two fistulated sheep (blocks), eight incubation times (0, 6, 18, 24, 48, 72, 96 and 120h), six straw treatments was completed to determine degradability of these straws in duplicate. At the end of each incubation time the bags were removed from the rumen and washed with cold water until the water was colourless. The bags were dried in an oven at 60°C for 24h and the un-degraded residues weighed to estimate dry matter degradability (DMD) of each straw. The un-degraded residues were weighed to estimate dry matter degradability of each straw. The un-degraded residues were ashed at 600°C to estimate organic matter degradability (OMD). Only the OMD data were statistically analysed for this paper to compare the effects of soaking, urea and soaking x urea interaction at $P < 0.05$.

Results Only the main effects of the urea and soaking treatments on the mean OMD for each incubation time are shown in figure 1 and 2 respectively. Urea treatment at either 2.5 or 5% improved the *in sacco* OMD when compared with the control (0% urea) at all incubation hours ($P < 0.001$). The higher soaking ratio showed lower OMD than the low soaking ratio at most incubation hours ($P < 0.01$). Sensory test did not show any visible mould growth for urea and soaked straws during the 70 days of conservation.

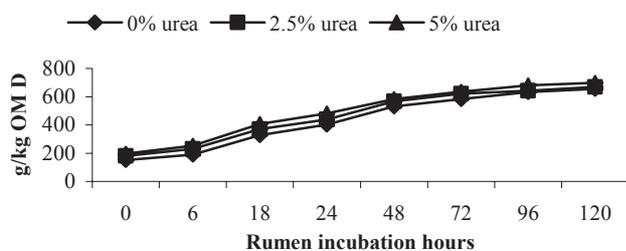


Figure 1 Effect of urea levels on OMD

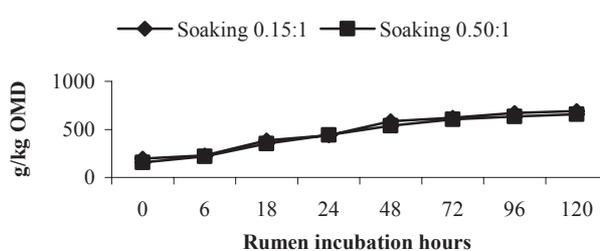


Figure 2 Effect of soaking OMD

Conclusion: The use of different levels of urea increased OMD at various incubation times, whereas, soaking at 0.50:1 ratio gave lower OMD than the low soaking ratio at most incubation hours. It appears that low levels of soaking may be more beneficial in improving the effect of urea to enhance the nutritive value of cereal straws for ruminant. Therefore, it would help if the correct amount of water as a readily available 'resource' was used when applying urea to treat cereal straws to enhance their nutritional quality for ruminant animals.

References

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