119. The effects of urea treatment, urea supplementation and coarse milling on the nutrient intake of sheep fed barley straw

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In the Middle East chopped cereal straw is fed traditionally to reduce food selection and waste. In a 2 × 3 factorial experiment with 24 mature Awassi wethers, we compared coarsely milled barley straw with long straw, using urea treatment (T), urea supplementation (S) or no treatment (C). Rations were offered at 1·2 of previous intake for 21 days, with collection of faeces and refusals in the last 10 days. Straw was treated with 40 g urea in 0·4 l water per kg and stored for 3 months in closed bags. It was air-dried before feeding. Coarse milling reduced the ability of the sheep to select straw with higher crude protein and ash or lower neutral-detergent fibre and acid-detergent fibre contents. Urea treatment increased *in sacco* dry matter (DM) loss from 636 to 678 (s.e. 7·1) mg/g at 96 h ($P < 0·001$). Crude protein contents of diets eaten were 82, 84 and 29 g/kg DM for T, S and C. Voluntary intakes of DM were 1030, 1026 and 717 (s.e. 54) g/day ($P < 0·01$). Rumen ammonia levels (at 4 h or 24 h after feeding) ranked similarly, 177 or 85, 130 or 56, and 19 or 7 mg N per l (s.e. 23 or 9·0, $P < 0·001$). Urea treatment increased organic matter digestibility, so that digestible organic matter (DOM) intakes were 560, 450 and 290 (s.e. 34) g/day ($P < 0·001$). The increase of DOM intake due to urea treatment was 1·65 of the increase due to supplementation, but required 2·5 times as much urea. If urea is scarce, supplementation is more efficient than treatment.

120. Cut-and-carry feeding of indigenous grasses in Indonesian smallholder sheep production: effect of amount offered on intake and growth, and on output of compost made from refusals and excreta

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Sheep in Indonesia are raised by smallholders using labour-intensive cut-and-carry feeding of indigenous grasses, with *ca.* five sheep per household. Animals are housed on slatted-floors, beneath which the excreta and food refusals (*ca.* 400 g/kg offered) are composted. Compost is an important fertilizer for smallholder crops. Indigenous grasses (*ca.* 30-day regrowths; 185 (s.e. 26) g dry matter (DM) per kg; 155 (s.e. 8·5) g ash per kg DM; 20·4 (s.e. 1·4) g nitrogen (N) per kg DM, dominated by *Axonopus compressus*, were hand-cut each morning and offered at 25, 50 or 75 g DM per kg live weight (M) daily to 18-month old, Javanese Thin-Tailed rams of 29·1 (s.e. 0·3) kg M. Water and salt licks were provided. Thirty rams were individually fed for 70 days and DM intake and growth were recorded. From day 5 to 25, total faeces was collected from three rams per treatment to measure digestibility. Refusals, faeces and urine from three rams per treatment were collected over 50 days and composted over a further 50 days. DM intake and growth rate respectively, increased with offer rates (22·1, 31·7, 34·9 (s.e. 1·16) g/kg M per day; −16·5, 25·8, 28·5 (s.e. 4·73) g/day, but the incremental improvements from 50 to 75 were non-significant ($P > 0·05$) and less than from 25 to 50. Quantities of refusals increased with higher offer-rates (109, 359, 526 g DM per kg DM offered). Dietary digestible organic matter (DOM) contents improved with increasing offer-rates (535, 599, 624 (s.e. 15·3) g DOM per kg DM. For offer-rates 25, 50 and 75 respectively, compost yield, DM content, and N content were 81, 243, 348 kg; 334, 294, 431 g/kg; 20, 17, 20 g/kg DM. The study shows that increasing offer-rates improved DM intake, growth and compost yield. Such benefits need to be set against the higher labour required to cut additional grass.

121. Evaluation of malt distillers' wet grains for pregnant ewes

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Two hundred and twenty thousand tonnes of malt distillers' grains (MDG) are produced annually in Scotland. Effects of feeding MDG in replacement of *ad libitum* grass silage and barley/fish meal supplements in diets of pregnant ewes were studied in order to evaluate the potential for food cost savings and maximization of by-product use. One hundred and forty Bluefaced Leicester × Blackface multiparous ewes were used, they were housed in four groups in strawed pens. Diets of *ad libitum* silage were fed to 35 control ewes from day 77 to 117 of gestation then supplemented daily with 0·45 kg barley + 0·05 kg fish meal from day 117 to 147. The hypothesis tested was that the barley/fish meal component of a ewe pregnancy diet could be replaced by MDG without detriment to ewe performance. The hypothesis was extended to study of replacement of the silage and fish meal components and further extended to total diet replacement. Replacing the barley/fish meal supplement of the control diet with 1·6 kg MDG had no effect on birth weight, ewe weight, condition score, beta-hydroxybutyrate level in blood pre-lambing or frequency of assisted lambing. Feeding 4·5 kg MDG to replace the silage and fish meal components of the control diet significantly increased birth weight by 0·3 kg ewe condition score by 0·6 units, blood urea level by 1·9 g/l and increased the incidence of assisted births from 0·17 to 0·43. Pre-lambing ewe weight increased from 84 to 92 (s.e.d. 1·57) kg ($P < 0·01$). Replacing both silage and barley/fish meal in the diet of controls by feeding 4.5 kg MDG to day 117 then *ad libitum* MDG resulted in overfatness leading to vaginal and intestinal prolapse in 0·2 of ewes by day 132. Results thus indicate MDG can economically replace concentrates in silage-based diets but cannot replace both silage and concentrates. Results suggests daily allocation of MDG should be restricted to not more than 1 kg per 25 kg body weight during the last 4 weeks of pregnancy and should be supplemented with cereal.

122. Prediction of digestibility and intake of sheep fed different quality hays from the kinetics of gas production or dry matter degradation

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Gas production (*in vitro*) and dry matter (DM) degradation (*in sacco*) of 10 hays previously fed *ad libitum* to sheep (intake, g DM per day per kg $M^{0·7}$); *in vivo* DM digestibility (DMD) (g/kg DM) were studied. For gas production, 200 mg sample per 30 ml rumen liquor: buffer (1 : 2) were incubated in glass syringes at 39°C. DM degradation was determined by incubating 3 g samples in nylon bags in rumen-canulated sheep. Gas production (ml/200 mg DM) or DM degradation (g/100 g DM) were calculated at 6, 12, 24, 48, 72 or 96 h. Kinetics of gas production or DM degradation were described using the equation $p = A + B\ (1 - e^{-ct})$. Generally, the ranking of samples according to their DM degradation or gas