Responses of sheep to a water-based urea supplement

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Background - Urea is used as a source of ruminally available N for ruminants grazing mature, low-protein pasture. Intakes of conventional supplements range from nil to amounts which are wasteful and potentially toxic. Urea in the drinking water is consumed by all animals and tends to even out consumption but there are questions about the effectiveness of this method.

Objective - To compare water-based and conventional urea supplements.

Methods -Ten Merino wethers (50 kg ± 3.4 SD) were given four treatments in an incomplete randomised block design with three periods (10 d adaptation, 8 d collection). Treatments were fortified molasses (FM) with 80g urea/kg molasses, a dry loose mixture (LM) of 100 g urea, 100 g salt, 100 g dicalcium phosphate and 10 g ammonium sulphate, a water-based supplement (WS) of 2 g urea and 0.64 g ammonium sulphate/L, and a control (CO) which received no supplement. The FM, LM, and WS treatments had similar N: S (5.9:1) ratios. Chaffed Callide Rhodes grass hay (4% protein, DM basis) and drinking water were given *ad libitum*.

Results - Sheep given FM ate more urea (10.8 g/d) than those given WS or LM (5.7 and 4.2 g/d; pooled sed = 1.25, $P<0.05$), but did not eat more dry matter (DM intakes were 812, 811, 1040 and 788 g/d for CO, FM, LM and WS; pooled sed = 136.9) or digest food organic matter differently to the CO group (49.3, 47.4, 47.6 and 50.7% for CO, FM, LM and WS; pooled sed = 3.75). Supplemented sheep drank similar amounts of water, and more ($P<0.06$) than the CO group (1.9, 2.6, 2.5 and 2.6 L/d for CO, FM, LM and WS; pooled sed = 0.34).

Conclusions - Water with 2% urea is acceptable to sheep, water-based supplements may avoid excessive urea consumption and reduce the time spent in supplement preparation.

Effect of dietary α-linolenic acid on incorporation of phytosterols into tissues in rats

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Background - Both polyunsaturated fatty acids (PUFA) and phytosterols in vegetables and vegetable oils may contribute to the hypocholesterolemic effect of vegetable oils. However, there has been no data on the interaction between phytosterols and fatty acids, and their effects on tissue levels of cholesterol and phytosterols.

Objective - To investigate the interaction between dietary phytosterols and α-linolenic acid (ALA) on tissue levels of phytosterol and cholesterol.

Design - Ten weaning male 4 wks old Sprague-Dawley rats were on a commercial rat chow diet for four days, and then they were randomized into one of two diet groups. Both diets contained 2000 mg phytosterols/kg. In the diet A, commercial sunflower oil was used as the only added oil (70 g/kg diet), whereas, the diet B contained a mixture of 60 g sunflower oil and 10 g pure ALA/kg diet. Linoleic acid (LA)/ALA was 117:1 for diet A and 3.6:1 for diet B. On day 29, their tissues and blood were collected after injection with lethal pentobarbital sodium. The fatty acids, phytosterols and cholesterol levels in the tissues were analysed by standard methods.

Outcomes – Compared with diet A, in the diet B group, all tissues showed a significant increase in total n-3 PUFA, particularly 22:5n-3 and 22:6n-3 and decreased total n-6 PUFA levels ($P<0.05$). Not all tissues accumulated ALA or 20:5n-3 levels. Diet B group also showed increased phytosterol levels in liver, heart and lung ($P<0.05$), and increased cholesterol levels in lung ($P<0.05$) relative to diet A.

Conclusions – The present study indicated that dietary ALA modulates the incorporation of phytosterols into tissues, and also affects tissue cholesterol levels in rats.