

Effect of three legumes containing different condensed tannin concentrations on the *in vitro* formation of the pastoral flavour compound; skatole

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Introduction Feeding legumes, such as white clover (*Trifolium repens*), results in higher intakes and increased animal production compared to grasses (Ulyatt, 1981). Skatole is produced in the rumen from plant protein fermentation and is associated with undesirable pastoral flavours in meat (Young *et al.* 2002). Feeding white clover causes a greater skatole concentration in the rumen compared to perennial ryegrass (*Lolium perenne*) or *Lotus corniculatus*, as the protein in white clover is highly soluble and rapidly degraded (Schreurs *et al.*, 2004). The condensed tannins (CT) in *Lotus* species slow protein degradation in the rumen (Aerts *et al.*, 1999). The aim of this study was to determine the effect of legumes with different concentrations of CT on skatole formation.

Materials and methods Fresh, minced white clover (WC), *Lotus corniculatus* (LC) and *Lotus pedunculatus* (LP) were incubated using the *in vitro* method of Barrell *et al.* (2000). Samples of the *in vitro* media were taken every hour for ten hours. Skatole concentration in the samples was determined by high performance liquid chromatography. Chemical composition and digestibility of the minced forages was measured by near infrared reflectance spectrophotometry.

Results Chemical composition of the three legumes is given in Table 1. Crude protein content (CP) and organic matter digestibility (OMD) was similar for WC and LC and lower with LP. Neutral detergent fibre concentration (NDF) was similar for all forages. The CT concentration was highest for LP, negligible for WC and intermediate for LC. Figure 1 shows that the skatole concentration at the end of the incubation, adjusted for CP added to the incubations, was greatest with WC and lowest with LP while LC was intermediate ($P < 0.001$).

Table 1 Composition of forages in incubations

	WC	LC	LP
CP (g/kgDM)	276	267	194
NDF (g/kgDM)	210	186	221
OMD (%)	>87	86.4	80.9
CT (g/kgDM)	1.4	35.4	98.5

Conclusions This study shows that forages with a high CT concentration are associated with reduced formation of skatole in the rumen. The response is most likely due to the higher CT effectively slowing protein degradation.

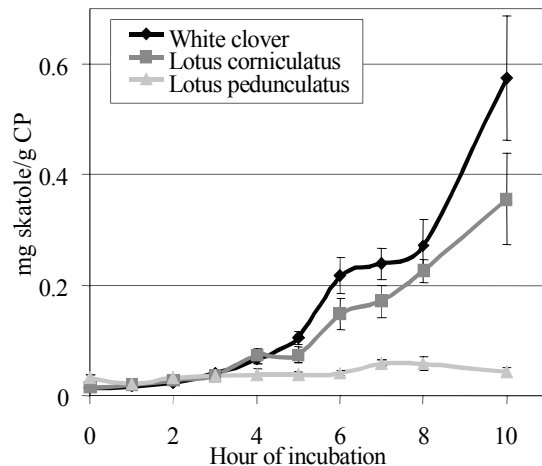


Figure 1 Skatole formation when incubating three legumes (4 replicates; error bars are SEM)

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