

Effect of condensed tannins on protein solubility in legume forages.

B. Julier⁽¹⁾, M. Lila⁽¹⁾, C. Huyghe⁽¹⁾, P. Morris⁽²⁾, G. Allison⁽²⁾, M. Robbins⁽²⁾
⁽¹⁾ INRA, Unité de Génétique et d'Amélioration des Plantes Fourragères, 86600 Lusignan, France.
⁽²⁾ IGER, Plas Gogerddan, Aberystwyth SY23 3EB, UK.

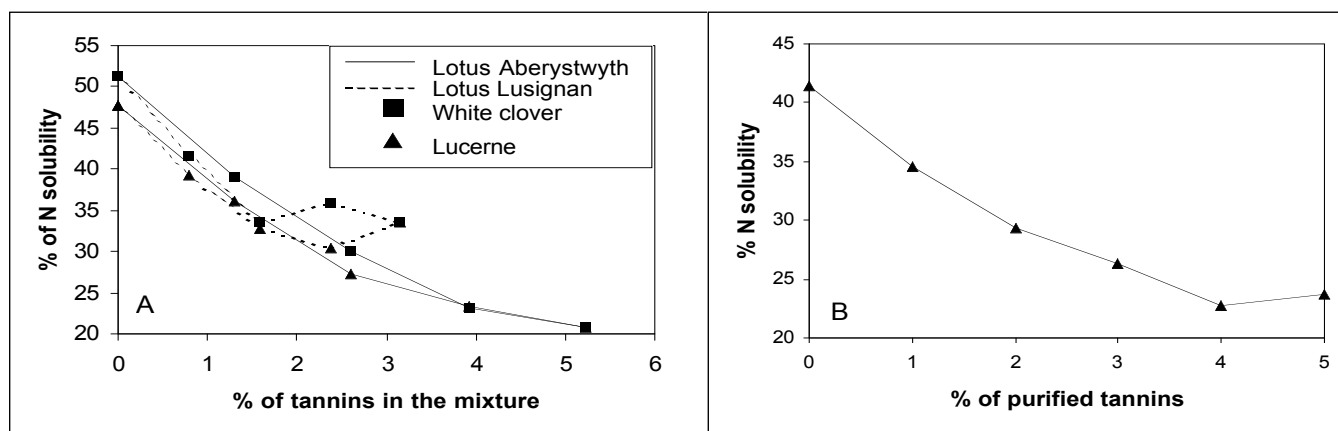
Proteins in fresh forage legumes (alfalfa, white clover) are rapidly degraded in the rumen, inducing a poor dietary protein efficiency, risk of bloat and nitrogen loss in the environment. However, species of the *Lotus* genus have less degradable proteins because they produce condensed tannins, secondary metabolites of the phenolic pathway. The objective was to study the effect of tannin supplementation to alfalfa and white clover forages on their protein degradation.

Samples of alfalfa, white clover and *Lotus pedunculatus* were harvested, dried and ground. Condensed tannin was extracted from leaves of *L. pedunculatus*. Two protocols were applied. (1) Dried and ground *Lotus* samples were mixed with alfalfa or white clover, at rates of 0, 25, 50, 75 and 100% of dry matter. (2) Purified condensed tannins were added to dried and ground alfalfa, to obtain samples with tannin content of 0, 1, 2, 3, 4, and 5% of DM. All samples were analysed for *in vitro* protein solubility in a buffer.

The addition of *Lotus* forage to alfalfa and white clover induced a decrease in protein solubility (Figure 1A). Protein solubility decrease was curvilinear with the condensed tannin content in the mixture. This results could be used to better adjust protein quality to energy value in a diet, both in grazed swards or in conserved forage.

The addition of purified tannins to alfalfa forage induced a reduction in protein solubility from 41.5 to 23.8% (Figure 1B). These results show that exogenous tannins can act on protein degradation as intrinsic tannins do.

Figure 1. Nitrogen solubility of forage mixtures. A. Mixture of alfalfa and white clover with two *Lotus* forage samples, at rates varying from 0 to 100%. The x-axis indicates the proportion of tannins in the mixture (RMSE of N solubility for each mixture varied between 1.5 and 2.7). B. Mixture of alfalfa with purified condensed tannins (RMSE = 1.8).



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