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Effects of chemical and physical treatments on antinutritional factors in grass pea (*Lathyrus sativus*)

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Grass pea is one of the leguminous forages cultivated in many countries.This forage contains a neurotoxin amino acid, β-N-oxalyl -L- α, β -diaminopropionic acid (β-ODAP), which can cause a paralysis of lower limbs (lathyrism) and condensed tannin (CT), which can affect on digestibility. So reduction of these Antinutritional factors (ANFs) by some treatments can improve the nutritive value of this forage. The forage was harvested at late flowering stage. The sun dried forage was chopped 3-5 cm length, and then treated with different chemical solutions. The ratio of forage to reagent volume was kept at 1:4 (W/V) for water soaking, 0.03 M solution of $KMnO_4$, 0.05 M solution of NaOH and 0.1 M solution of $NaHCO_3$.The amount of polyethylene glycol (PEG) (50g/1 kg of DM) was based on a kg of DM. The experimental plant contained the high amount of ODAP (1.18%). ODAP is hypothesized to function as a carrier molecule for zinc ions, soils depleted in micronutrients or high iron content may be responsible for the high level of neurotoxin. So, the low level of zinc in soils can cause to high level of ODAP in experimental grass pea in Iran. Results showed that water soaking (80.48%) and NaOH (63.81%) can greatly reduce the ODAP concentration. ODAP is soluble in water and have an acidic structure, so the alkali pH (12.28 for NaOH) can reduce ODAP concentration while acidic treatments like PEG (pH= 5.91) decrease ODAP, alone 19.05%. CT content of grass pea was (0.02%). Forage treated with NaHCO3 (98.8%) and water soaking (70.18%) show highest reduction in CT content. In spite of the alkali pH (12.28) of NaOH, this treatment can not reduce CT concentration (7.32%) in compare to another alkali treatments. In conclusion water soaking treatment can reduce both ANFs and is a practical treatment in farms for improvement the nutritional value of grass pea.

The evaluation of three ruminal degradability models using the plot of residuals against predicted values

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The evaluation of different models as candidates to describe ruminal DM and CP degradation kinetics of raw and roasted whole soybeans from data obtained using the *in situ* polyester bag technique were conducted using the plot of residuals (y-axis) against predicted values (x-axis) approach. The candidate models were included: a segmented model with three spline-lines delimited by two nodes or break points, constraining splines 1 and 3 to be horizontal asymptotes, and follows zero-order degradation kinetics (model I); a simple negative exponential curve with first order kinetics and assuming a constant fractional rate of degradation (model II); and a rational function or inverse polynomial which assumes a variable fractional rate of degradation that declines with time (model III). The models were fitted to the DM and CP ruminal disappearance data by nonlinear regression using the PROC NLIN of the SAS (SAS, 1999) to estimate ruminal degradation parameters. The results showed that the plot of residuals against predicted values was a useful visually and provided an easy to use approach for assessing models goodness-of-fit. Based on this approach, the model III was less suited than models I and II to describing the degradability patterns of the experimental feeds because the residual points generated horizontal bands in plots which is an indicator of model inadequacy and the need for adding extra terms in the fitted equation (e.g., square or cross-product terms). Also, linear and quadratic relationships between residuals and predicted values were assessed and results showed statistically significant linear and quadratic trends ($P<0.001$) for model III, but not for models I and II.