

Comparison of grass species influence on dry matter degradability and its prediction using chemical composition



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CONCLUSIONS

- » the best ED_{DM} was determined for *Lolium perenne*
- » the best ED_{DM} predictor was NDF
- » using of two predictors increased equations accuracy level (R^2)
- » calculated equations are useful tool for practical use
- » ensiling process had not significant influence on dry matter rumen degradability

OBJECTIVES

- compare the most widely used grass species conserved by ensiling process according to dry matter rumen degradability parameters
- evaluate the regression equations for prediction of effective dry matter rumen degradability (ED_{DM}) of grass silages based on chemical composition of estimated samples
- estimate the effect of ensiling process on dry matter degradability parameters

MATERIAL AND METHODS

Tested grasses:

- » *Dactylis glomerata* L.
- » *Phleum pratense* L.
- » *Lolium perenne* L.
- » *Festuca arundinacea* S.
- » grass hybrid Felina

Ensiling process:

- » grass forages were wilted, cut to 1 – 1.5 cm long pieces and ensiled without any additives into hermetic glass vessels (3 litre capacity)
- » vessels were stored in dark and cool room for 10 and 20 weeks

Ruminal DM degradability:

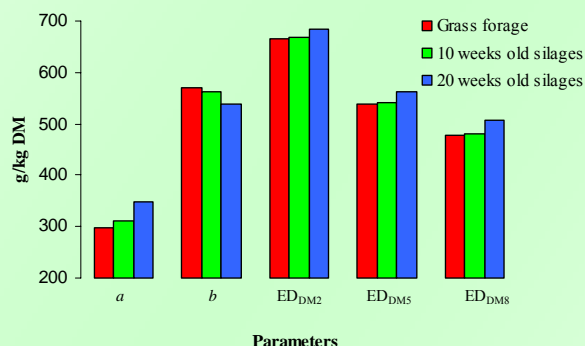
- » estimated by *in sacco* technique
- » used two Holstein steers
- » pore size of nylon bags was 42 μ m
- » incubation times were 0, 6, 12, 24, 48, 72, 96 hours

Determined degradability parameters:

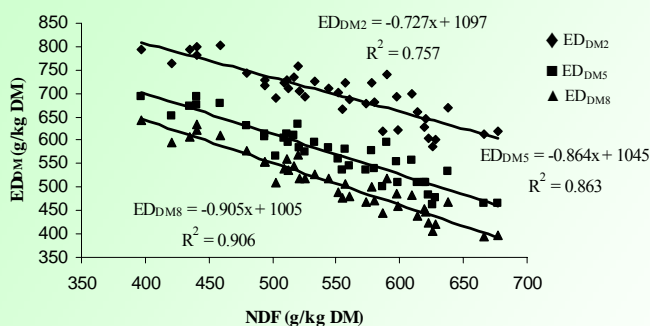
- a = portion of DM solubilized at initiation of incubation (time 0)
- b = fraction of DM potentially degradable in the rumen
- c = rate constant of disappearance of fraction b
- ED_{DM2} , ED_{DM5} and ED_{DM8} = effective degradability of DM calculated for each ingredient assuming rumen solid outflow rates of 0.02, 0.05 and 0.08 h^{-1} , respectively.

RESULTS

The influence of ensiling on degradability parameters



Prediction of ED_{DM} by NDF



Comparison of species by parameters of rumen DM degradability of grass silages

Grass species	a^1	b^1	c^2	ED_{DM2}^1	ED_{DM5}^1	ED_{DM8}^1
<i>Dactylis glomerata</i>	316.2 ^{ab}	553.6 ^a	0.0416 ^a	687.4 ^a	565.8 ^{ab}	504.4 ^{ab}
<i>Phleum pratense</i>	245.9 ^{ac}	652.4 ^{abc}	0.0375 ^b	669.0 ^b	523.9 ^{ac}	453.1 ^{ac}
<i>Lolium perenne</i>	365.4 ^{ad}	561.5 ^b	0.0451 ^{bc}	753.2 ^{ab}	631.1 ^{acd}	567.7 ^{ad}
<i>Festuca arundinacea</i>	369.3 ^{bc}	524.7 ^c	0.0390 ^c	711.9 ^{bc}	596.0 ^{cd}	538.9 ^{bc}
Hybrid Felina	290.0 ^{cd}	579.5 ^c	0.0344 ^{ac}	655.3 ^{ac}	525.5 ^{bd}	463.9 ^{bd}

¹ g/kg DM; ² h^{-1} ; ^{a,b,c,d} Within a column means with same superscript letters are different ($P < 0.05$).

Prediction of ED_{DM} using multiple regression

	RMSE	R^2	P
Equation ED_{DM2}			
$y = 1083 + 0.464 CF - 0.962 NDF$	19.66	0.892	<0.0001
Equation ED_{DM5}			
$y = 1035 + 0.337 CF - 1.035 NDF$	18.75	0.920	<0.0001
Equation ED_{DM8}			
$y = 998.3 + 0.220 CF - 1.017 NDF$	18.13	0.929	0.0012

RMSE = Root mean square error; R^2 = determination coefficient; P = probability.