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Baumont

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# Prediction of forage rumen protein degradability from an *in situ* degradability database



Marie-Odile Nozières <sup>1</sup>, Jean-Pierre Dulphy <sup>1</sup>, Jean-Louis Peyraud <sup>2</sup>, René Baumont <sup>1</sup>

<sup>1</sup> INRA - Centre de Clermont-Ferrand / Theix, 63122 St-Genès-Champanelle, France

<sup>2</sup> INRA – Centre de Rennes, 35590 St-Gilles, France

## 1- Objectives

Forage protein value evaluation relies on the estimation of forage protein degradability in the rumen (deg).

Deg is affected by botanical family, plant species, growth cycle and level of nitrogen fertilization, and decreases with plant maturity stage.

→ To develop equations for predicting forage deg values in order to improve the estimation of forage protein values expressed in PDI.

## 3 - Results

### Mean values in the data base for fresh forages

		n	deg (% of CP)	CP (g kg <sup>-1</sup> DM)
Grasses	1 <sup>st</sup> growth	60	80.9 ± 6.5	150 ± 52
	Other growths	141	73.9 ± 8.5	197 ± 61
Legumes	1 <sup>st</sup> growth	43	81.4 ± 4.9	185 ± 46
	Other growths	33	81.4 ± 4.8	205 ± 49
Natural grasslands	1 <sup>st</sup> growth	31	73.6 ± 9.0	158 ± 54
	Other growths	67	67.2 ± 8.3	194 ± 42

### • Fresh forages

$$\text{deg} = 51.2 + 0.14 \text{ CP} - 0.00017 \text{ CP}^2$$

$$R^2 = 0.87; \text{RSD} = 3.5$$

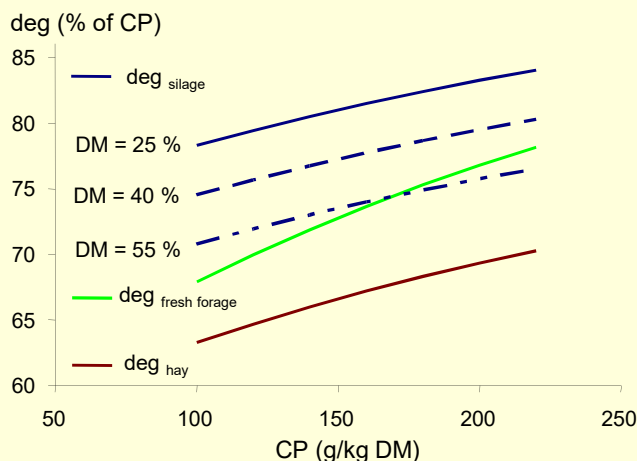
- + 8.8 (grasses - 1<sup>st</sup> growth)
- + 4.6 (grasses - other growths)
- + 6.8 (legume forages - all growths)
- + 4.4 (natural grasslands - 1<sup>st</sup> growth)
- + 0 (natural grasslands - other growths)

### • Conserved forages

$$\text{deg}_{\text{silage}} = 46.5 + 0.56 \text{ deg}_{\text{fresh forage}} - 0.25 \text{ DM}_{\text{silage}} \quad (R^2 = 0.53, \text{RSD} = 4.2)$$

$$\text{deg}_{\text{hay}} = 17.1 + 0.68 \text{ deg}_{\text{fresh forage}} \quad (R^2 = 0.71, \text{RSD} = 3.6)$$

### • Example for natural grasslands – 1<sup>st</sup> growth



## 2 - Methods

**Fresh forages** : meta-analysis of a data-base of 375 *in situ* deg measurements for fresh forages. Data from :

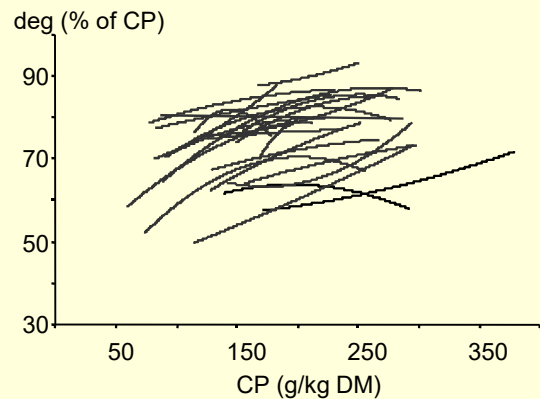
INRA : 11 trials 214 data

European literature and personal communications : 12 trials 161 data

**Conserved forages** : for the same forages comparison between

- Fresh and hay (29 data)
- Fresh and silages (32 data)

### deg – CP relationship for the 23 trials



## 4 - Conclusion

These equations have satisfactory accuracy and will be used to improve estimation for herbage from European temperate climate areas in the INRA PDI system.