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Maryline Boval
INRA, France

A. Fanchone
INRA, France

E. Ortega-Jimenez

G. Alexandre
INRA, France

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Measurement at pasture of intake , digestibility and chemical composition of the diet of nursing ewes , using Faecal NIRS

M . Boval¹ , A . Fanchone¹ , E . Ortega-Jimenez² , G . Alexandre¹ .

¹ INRA , UR143 , Unité de Recherches Zootechniques , 97170 Petit-Bourg Guadeloupe (F . W . I .)

Key words : pasture , diet quality , intake , digestibility , faecal NIRS , suckling ewes , Tropics

Introduction To improve efficiency of animal production at pasture , the evaluation of the diet *in situ* , is a prerequisite . Faecal NIRS can be a good alternative to estimate the diet quality of grazing animals , by providing a rapid , low cost and highly reproducible diagnostic (Review of Shepherd and Walsh , 2007) . The objective of this study was to use the faecal NIRS method calibration previously realised for rams in stalls , to evaluate at pasture the diet quality of suckling ewes . The consistency of the estimates using faecal NIRS was evaluated by comparing the estimated diet quality , to milk production of to pasture characteristics , since no existence of any reference method to measure the diet at pasture .

Materials and methods A trial with 12 grazing suckling ewes was carried out for 5 lambing periods (LP) , on a *Digitaria decumbens* pasture rotationally-managed for 28 days re-growth period . Faecal samples were collected per ewe three times per LP , using faecal bags and analysed using a Foss NIRSystem 6500 monochromator . From faecal spectra several parameters were determined using previously published faecal NIRS calibrations : organic matter digestibility (OMD) , organic matter intake (OMI) , digestible OMI (DOMI) , the crude protein content of the herbage ingested (CPi) . Simultaneously , the individual milk production (MP) of the ewes , and the pasture characteristics were measured : the biomass , the CP content of the herbage (CPh) and the leaf mass . The relationships between the diet quality , the milk production and the characteristics of the pasture were analyzed .

Results OMI and DOMI (g/kg LW^{0.75}) were higher at the 1st and the 4th LP (P<0.01 , Table 1) . OMD and CPi varied in an opposite way , being higher at the 2nd and the 5th LP (P<0.01) , as the CPh and the leaf mass . Compared to the milk production , the estimates of OMI and DOMI varied in the same way (Figure 1) , whereas OMD was negatively correlated to MP (r=-0.56 , P<0.001) . Compared to characteristics of the pasture , OMD and CPi were positively correlated with CPh (r=0.28 , P<0.03 ; r=0.50 P<0.001) , whereas the ADFi decreased with the CP content of the herbage offered (r=-0.54 , P<0.01) .

Table 1 Characteristics of the diet of grazing nursing ewes estimated using faecal NIRS : organic matter (OM) intake , OM digestibility , digestible OM intake (DOMI) , and chemical composition of the herbage ingested , the crude protein (CPi) . In a row , means with a common superscript letter are not different , P < 0.05 . R . S . D : residual standard deviation of the model .

| | LP1 | LP2 | LP3 | LP4 | LP5 | R . S . D |
|--------|--------------------|-------------------|--------------------|--------------------|-------------------|-----------|
| Intake | 83.3 ^a | 68.5 ^b | 63.3 ^b | 85.3 ^a | 47.9 ^c | 0.99 |
| OMD | 64.9 ^c | 67.4 ^b | 66.3 ^{bc} | 65.6 ^{bc} | 70.5 ^a | 0.94 |
| DOMI | 58.5 ^{ab} | 53.3 ^b | 42.7 ^c | 61.9 ^a | 36.8 ^d | 0.98 |
| CPi | 15.9 ^c | 16.8 ^b | 16.5 ^{bc} | 16.4 ^{bc} | 18.2 ^a | 0.79 |
| ADFi | 33.1 ^b | 34.2 ^a | 32.7 ^b | 32.9 ^b | 32.7 ^b | 0.43 |
| ADLi | 3.1 ^{bc} | 3.5 ^a | 2.8 ^c | 2.9 ^c | 3.2 ^{bc} | 0.32 |

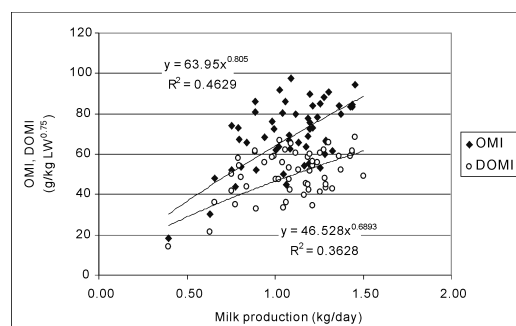


Figure 1 Daily milk production (MP, kg/day) , according to the organic matter intake (OMI, g/kg/day) , measured per grazing nursing ewes over 5 lambing periods .

Conclusions The positive relationships between OMI , DOMI and MP , suggest that the estimates using faecal NIRS calibration , provide consistent estimates of the diet at pasture . The different evolution of OMI and DOMI compared to that of OMD and CPi illustrate how it is important to measure several parameters to characterise the diet . This shows also the need of a useful tool to measure nutrition in real grazing conditions .

Reference

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