Effects of natural and synthetic plant oestrogens on rumen fluid degradation of some feedstuffs. V Pace, D Settineri, C Marzoli *(Istituto Sperimentale per la Zootecnia, Via Salaria, 31, 00016 Monterotondo Scalo, Rome, Italy)*

Subterranean clover (SC) has been found to contain oestrogenic compounds, such as genistein (G), biochanin (B), and coumestrol (C), which are extensively metabolized in the rumen by the microbial population. To verify if these substances or their metabolites can interfere with the rumen degradation of feeds, an extract from SC was prepared, purified, freeze-dried and utilized for *in vitro* trials of rumen degradability on several feeds: wheat straw (WS), cocksfoot hay (DH), lucerne hay (LH), barley grains (BG) and soybean meal (SB). The feeds were incubated for 48 h in rumen fluid + McDougall buffer with and without the addition of 10 μg/ml SC extract ($N = 6$ both for the treated and untreated samples); the degradation percentages of organic matter (OM), NDF and crude protein (CP) were calculated from the chemical analysis of the residues. The trials were repeated using synthetic oestrogens, G ($N = 4$), B ($N = 4$) and C ($N = 4$).

Subterranean clover extract always enhanced OM degradability, but the effect was influenced by the chemical composition of the feeds, and was larger for the high-protein feeds (SB = +4.6% with a significant difference, $P \leq 0.001$ and LH = +2.5%, $P \leq 0.01$) and smaller for the fibrous feeds (BG = +0.5%, DH = 1.2%, $P \leq 0.01$ and WS = +1.3, $P \leq 0.01$). G showed a similar effect as the SC extract (7.2%, $P \leq 0.001$ and 4.7%, $P \leq 0.001$ for SB and LH respectively), while B and C did not significantly affect OM degradability. SC extract and G also increased the degradability of NDF of SB (5.9%, $P \leq 0.001$ and 10.0%, $P \leq 0.001$), LH (3.4%, $P \leq 0.001$ and 4.8%, $P \leq 0.01$) and DH (1.2%, $P \leq 0.05$ and 4.1%, $P \leq 0.001$); their effect on WS and BG was not significant. C and B slightly decreased the NDF degradability of WS and DH and were ineffective on the other feeds. Concerning CP degradability, the positive trend of SC extract and G was confirmed in all the feeds, particularly SB (4.3%, $P \leq 0.001$ and 4.9%, $P \leq 0.001$) and LH (4.0%, $P \leq 0.05$ and 3.9%, $P \leq 0.01$), whereas C and B did not cause noticeable effects. SC extract seems to enhance the *in vitro* degradation of feedstuffs. Further studies are needed to clarify its metabolism and interaction with microorganisms.

Research supported by NRC (Italy), Spec, Proj, RAISA – Subproj 3, Paper 1 604.

Ruminal degradation kinetics of carob pulp*. JC Pereira, J González, MR Alvir, C Rodríguez *(Dpto Producción Animal, ETSIA, Universidad Politécnica, 28040, Madrid, Spain)*

The ruminal degradation of DM and CP was carried out for 3 samples of carob pulp (C1, C2, C3) with increasing NDF and ADF values (31.1, 32.3, 37.7% and 20.5, 30.3, 32.0%, respectively) and ADL values of 17.9, 24.9 and 22.4%. A high percentage of the nitrogen (mean CP content 5.1%) was represented by insoluble nitrogen in the NDF (NDIN) and ADF (ADIN) solutions (40.1, 40.1, 47.3% and 39.1, 39.4, 45.1%, respectively). Three rumen-fistulated lambs were used to incubate nylon bags (46 μm) with 3 g of sample milled to 2 mm for 2, 4, 8, 16, 24, 48 and 72 h by duplicate. Lambs were fed with a ration of good quality grass–alfalfa hay and concentrate (ratio 2:1), at 40 g DM/kg$^{0.75}$, distributed at 8 and 16 h. Effective degradability (ED) was calculated using a measured outflow rate of particles of 2.47%/h. The carob pulps showed a small potentially degradable fraction of insoluble DM (7.33, 5.66 and 10.4%), although affected by a high fractional degradation rate (12.1, 8.80 and 10.1%/h) and a very high soluble fraction (59.1, 56.0 and 51.4%), both of which decrease ($P < 0.05$) with increasing fiber content in samples. This effect could be attributed to a decrease in sugar content, because this concentration could be inversely related to NDF, due to the lack of starch content in this feed. Moreover, the carob pulps showed a high undegradable DM content, slightly higher than its NDF value, showing a low value ($p < 0.05$) for the sample C1 (33.6 *vs* 38.4 and 38.2%). This difference remains ($p < 0.05$) for the ED values of DM (65.2 *vs* 60.4 and 60.4%). These results indicate that the cell walls are practically undegradable, and the ruminal use of this feed depends basically on its sugar content. For the CP, the increase in fiber content was associated with a decrease ($P < 0.05$) and an increase ($p < 0.05$) in its soluble and undegradable fractions (36.1, 29.1, 17.9%, and 53.8, 61.8, 65.0%), the latter values being higher to that of NDIN. On the other hand, the potentially degradable fraction of insoluble CP is very low (10.1, 9.09, 17.1%) and affected by a high degradation fractional rate (12.9, 14.5 and 6.41%/h). Although C1 shows a higher ED value ($p < 0.05$, the ED of CP is always low (43.9, 33.8 and 30.1%), and post-ruminal use must also be low.

* Work supported by the CICYT. Project GAN 89-126.