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Introduction Mediterranean-like pastures in Central and South Chile house nearly half of the national sheep population , dominated by Merino and various crossbreds ,with an important contribution of blackface breeds . A large proportion of these sheep are managed by small farmers using native pastures with a very small contribution of sown pastures and forages . The large majority of the native grasslands are severely degraded ,and their yield is small and heavily seasonal . Wool and lamb yields are therefore small . Cultivation of olives trees for the production of high quality oil is rapidly expanding in the region . Using the modern two-phase extraction ,3-4 metric tons of residues (cake") are produced for every ton of oil . These residues are occasionally composted but most frequently left to decompose on the field . This unexhausted cake has a high demand for oxygen ,decomposes slowly and can contaminate soils and water sources ; nevertheless ,it can be used as an animal feed . The objective of the present work was to compare the performance of suckling ,grazing lambs with that of contemporary weaned lambs fed either a control-or a cake-based ration .

Materials and methods The experiment was conducted from October 20 to November 22 ,2006 ,at the Hidango Experiment Station of INIA ,Chile ,located in Central Chile ,following an 8-day adaptation period .

Three treatments were compared in a completely randomized design using 36 Suffolk lambs with an initial age of 80 days and 25±2 .5 kg initial weight . The three treatments were (1) suckling lambs run with their mothers on a native grassland (GRAZING) ; (2) weaned lambs and fed a control ration (RATION) and (3) weaned lambs fed an olive-cake based ration (CAKE) . The two latter rations were calculated ,based on table values ,to be approximately isoproteic (CP) and isoenergetic (ME) and contained ground alfalfa hay ,ground maize ,liquid molasses ,soybean meal ,sodium bicarbonate and a complete mineral and vitamin supplement . The cake replaced the ground alfalfa hay and part of the maize in the corresponding ration . The diet was offered in slight excess of calculated requirements ,together with long chopped ,medium quality alfalfa hay equivalent to 10% of the total ration .

Ewes and suckling lambs in GRAZING were rotated weekly on a native grassland with an *Acacia caven* tree story and a herbaceous layer composed of *Hypochaeris radicata* (range 28-38%) ,*Trifolium spp* . (13-31%) ,*Trifolium subterraneum* (1-4%) *Bromus sp* . (13%) ,*Vulpia sp* . (4-12%) ,*Hordeum sp* . (5-8%) *Lolium sp* . (3-6%) ,and traces of other species . Lambs allocated to RATION and CAKE were housed in individual pens ,and were gradually introduced to the respective diets over an 8 day period . Thereafter ,the amount of feed on offer was adjusted weekly beginning with 1080 g (as fed) and ending with 1300 g in week 4 . All animals were weighed weekly ,prior to the morning feeding . Refusals were collected ,weighed ,dried and sampled daily ,and were pooled weekly for each animal . No health problems were detected . All lambs were slaughtered and the end of the experimental period and a complete carcass dissection was carried out .

Results and discussion Liveweight gains during the experimental period did not differ ($P>0.05$) between the three treatments . The overall average gain ,calculated by regression of the liveweights on days on experiment amounted to 0 .279 kg . day^{-1} $head^{-1}$. Nevertheless ,the dry matter intake of the CAKE ration (0 .99 kg dm ,day^{-1} ,$head^{-1}$) was significantly less ($P<0.05$) than that of RATION (1 .07 kg dm ,day^{-1} ,$head^{-1}$) . These results led to significant differences in the efficiency of the weight gain ,with CAKE being significantly higher than that of RATION ($P<0.05$) . The three treatments did not differ ($P>0.05$) in terms of slaughter weight ,carcass weight or chilled carcass weight . The most important significant difference at slaughter was the weight of the full digestive tract (7 .28 ,6 .52 and 5 .79 kg for GRAZING ,RATION and CAKE respectively ,$P<0.01$) . The commercial yield of the CAKE carcasses was slightly but significantly higher ($P<0.002$) than that of RATION and GRAZING ,and no significant differences were detected in terms of rib eye area .

These results tend to be slightly better in terms of liveweight gains and overall animal performance than those generally reported in Europe (reviewed by López-Gallego ,2003) .

Conclusions It is possible to finish fat lambs with a short period of confined feeding using an otherwise little used ,and potentially contaminating ,residue of the olive oil industry ,while simultaneously relieving grazing pressure on already degraded native grasslands . It remains to be established if the earlier weaning of lambs is reflected on improved reproductive performance of the ewe flock .

Reference

López-Gallego ,F . ,2003 . El alpeorujo en la alimentación de corderos . *Badajoz : Universitat de Lleida . Doctoral thesis* .