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## Use of olive by-products in the nutrition of lambs in southern Tunisia

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**SUMMARY** - Three diets based on olive by-products (air-dried leaves, crude cake, crushed branches) and one diet based on oat hay were distributed to 4 groups of 12 lambs after weaning. Additional 200 g of concentrate were given to each animal during the two months of experimentation (May and June) which was carried out at the Arid Land Institute at Medenine (South-east of Tunisia). The mean daily feed intake of leaves, hay and crushed branches was 53.0; 53.7 and 57.3 g dry matter (DM) per kg metabolic weight ( $P^{0.75}$ ), respectively. However, it was only 8.2 g DM/kg  $P^{0.75}$  with olive cake distributed at will with a limited quantity of hay. This could be attributed to the age of lambs (young) and/or the high oil content which becomes rapidly rancid and makes the food less appetizing. The lambs growth was poor or nil in all groups because of the low concentrate and nitrogen levels in the 4 diets. The olive by-products as well as hay covered the animals maintenance requirements. Better growth could be obtained with higher concentrate ratios. Then, in olive growing regions it is useless to look for supplies with hay (expensive with poor nutritive value) because the olive by-products could be an effective substitute.

**Key words:** Olive by-products, oat hay, lamb nutrition.

**RESUME** - "Utilisation de sous-produits de l'olivier en nutrition des agneaux dans le Sud de la Tunisie". Trois régimes basés sur des sous-produits de l'olivier (feuilles séchées à l'air, tourteau brut, rameaux broyés) et un régime basé sur du foin d'avoine, ont été distribués à 4 groupes de 12 agneaux après le sevrage. 200 g additionnels de concentré ont été offerts à chaque animal pendant les deux mois de l'expérience (mai et juin) menée à l'Institut des Terres Arides de Médenine (Sud-Est de la Tunisie). L'ingestion moyenne journalière de feuilles, foin et rameaux broyés était de 53,0 ; 53,7 et 57,3 g de matière sèche par kg de poids métabolique ( $P^{0.75}$ ), respectivement. Cependant, elle n'était que de 8,2 g MS / kg  $P^{0.75}$  avec le tourteau d'olive distribué à volonté avec une quantité limitée de foin. Ceci pouvait être attribué à l'âge des agneaux (jeunes) et/ou à la teneur élevée en huile qui rancit rapidement et rend l'aliment moins appétissant. La croissance des agneaux était faible ou nulle chez tous les groupes à cause des faibles niveaux de concentré et d'azote dans les 4 régimes. Les sous-produits de l'olivier ainsi que le foin ont couvert les besoins des animaux pour l'entretien. Une meilleure croissance aurait pu être obtenue avec des ratios plus élevés en concentrés. Il est cependant inutile d'envisager un approvisionnement en foin (onéreux et ayant une faible valeur nutritionnelle) dans des régions d'oliviculture, car les sous-produits de l'olivier peuvent constituer un produit efficace de remplacement.

**Mots-clés :** Sous-produits de l'olivier, foin d'avoine, nutrition des agneaux.

### Introduction

In the south of Tunisia, the hay is supplied by the northern parts of the country. It is expensive with low nutritional value. However, in this region large areas are cultivated with olive trees, especially the coastal zones. The present work had for aim to study the effect of the substitution of hay by olive by-products on the growth of lambs.

### Materials and methods

Air-dried leaves, crude cake and crushed branches from olive have formed the basis of 3 diets. The control was constituted by the oats hay. Each diet included, in addition, 200 g of concentrate and the diet based on crude cake includes also a limited quantity of hay. These diets were distributed to 4 groups of 12 lambs after weaning. The experiment lasted 2 months (May and June).

## Results

The mean daily intake of diets based on crushed branches, dried leaves and hay were comparable (Table 1). Nevertheless, the intake of diet with olive crude cake was lower (Fig. 1). This is probably due to the young age of animals and/or the quality of this rich oil product which becomes rapidly rancid and makes the food less appetizing.

Table 1. Effect of diets (hay and olive by-products) on live weight and forage intake

	Crushed branches	Dried leaves	Crude cake and hay	Oat hay
Number of lambs	12	12	12	12
Initial weight (kg)	23.86 <sup>a</sup>	23.02 <sup>a</sup>	22.68 <sup>a</sup>	22.85 <sup>a</sup>
Final weight (kg)	24.17 <sup>a</sup>	22.96 <sup>a</sup>	23.21 <sup>a</sup>	24.25 <sup>a</sup>
Intake (g/kg P <sup>0.75</sup> )	53.7	53.0	44.2	57.3

a: Means with the same letter in the same row were not significantly different (P>0.05)

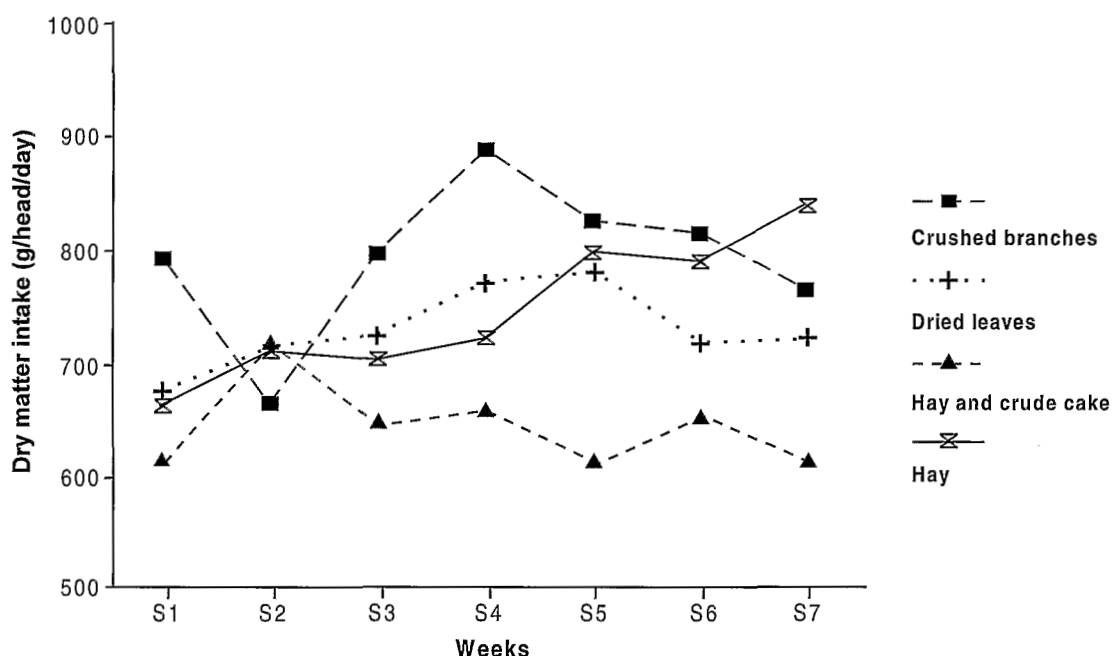


Fig. 1. Evolution of the dry matter intake.

During the experimental period, growth of 4 groups of lambs has been very low or nil (Fig. 2). This result could be attributed to the low quantity of concentrate and probably to a nitrogen deficiency of 4 diets which fluctuated between 6.1 to 7.9%. The crude protein content was 4.79, 6.8, 5.14 and 4.37 for crushed branches, leaves, crude cake and oat hay, respectively.

## Discussion

The crude protein content of olive crude cake was found to be in agreement with the results reported by Nefzaoui (1985), but was slightly lower than those quoted by Boza *et al.* (1970); Ben Dhia *et al.* (1981) and Boza and Guerrero (1981). The crude protein content of crushed branches was also

lower than that obtained by Boza and Guerrero (1981) (7.8%) for dehydrated leaves with 24% wood. This difference was due to the high proportion of wood chips (32%) in our samples. The stabilization of the weight of animals could be attributed to the nitrogen deficiency of the diets and the limited quantity of distributed concentrate. Muñoz *et al.* (quoted in Nefzaoui and Zidani, 1987) have obtained a mean daily gain of 77 g for sheep fed with olive leaves and a supplementation based on barley and a protein complement (230 g/d). At the same level of concentrate, a weaker growth has been obtained by Ben Rouina (1986) with lambs receiving leaves and branches. Higher barbarine lamb growth were reported by Nefzaoui and Zidani (1987) with a concentrate level of 450 g/d. They have been 140, 107 and 94 g/d for diets based on vetch-oat hay, fresh and air-dried leaves, respectively.

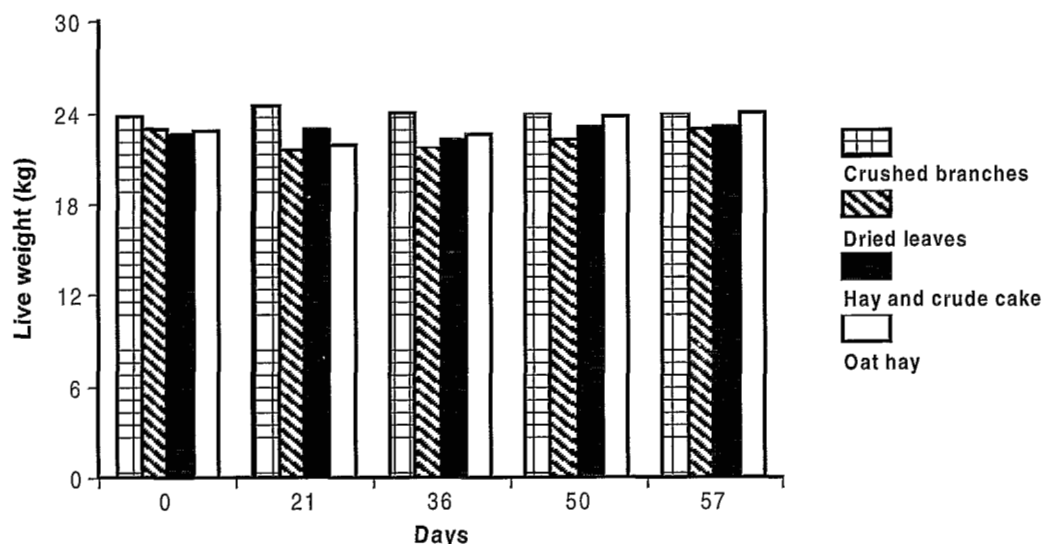


Fig. 2. Effect of diets on the evolution of lambs live weight.

## Conclusion

Olive by-products as well as hay can in consideration of a limited quantity of concentrate assure the maintenance requirements of the young lambs. In olive growing regions it is useless to look for supplies with hay (often expensive with poor nutritive value). The olive by-products could be an efficient substitute. To obtain a better animal growth, it is necessary to increase the rate of concentrates in the ration.

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