

## Effect of drying on the nutritive value of the olive leaf

Gómez-Cabrera A., Garrido A., Guerrero J.E.

*in*

Tisserand J.-L. (ed.), Alibés X. (ed.).  
Fourrages et sous-produits méditerranéens

Zaragoza : CIHEAM

Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 16

1991

pages 157-159

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=91605063>

To cite this article / Pour citer cet article

Gómez-Cabrera A., Garrido A., Guerrero J.E. **Effect of drying on the nutritive value of the olive leaf.** In : Tisserand J.-L. (ed.), Alibés X. (ed.). *Fourrages et sous-produits méditerranéens* . Zaragoza : CIHEAM, 1991. p. 157-159 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 16)



<http://www.ciheam.org/>  
<http://om.ciheam.org/>

# Effect of drying on the nutritive value of the olive leaf

GOMEZ-CABRERA, A.\*; GARRIDO, ANA.\*;  
GUERRERO, J.E.\* AND ORTIZ, V.\*\*

\* DPTO. PRODUCCION ANIMAL. UNIVERSIDAD CORDOBA.  
APDO. 3048. CORDOBA (SPAIN)

\*\* DPTO. PRODUCCION ANIMAL D.G.I.E.A.  
APDO.240. CORDOBA (SPAIN)

**SUMMARY** - Olive leaves isolated or attached to the branch were dried by different methods: quickly in an oven at 60-65°C or slowly air dried. The air dried leaves were either protected or directly exposed to the sunlight and rain. Oven drying leaves increased the level of N-ADF in relation to those air dried, mainly if the leaves remain on the branches. The IVDMD were decreased drying the leaves isolated at air. The OMD of the fresh leaves (58%) was reduced by 12% by either oven drying or inside air drying and an additional 14% by the effect of the sun and the rain. The CPD of the fresh leaves was slow (30.9%) and was reduced by dessication a 27% (air inside), 51% (air outside) and 68% (oven).

**RESUME** - "Effet du séchage sur la valeur nutritive des feuilles d'olivier". Des feuilles d'olivier isolées ou rattachées aux branches ont été séchées par différentes méthodes: de façon rapide dans une étuve à 60-65°C, ou lentement de façon naturelle. Les feuilles séchées naturellement ont été protégées ou bien exposées directement au soleil et à la pluie. Les feuilles passées à l'étuve ont montré un niveau de N-ADF plus haut que pour celles séchées naturellement, et surtout lorsque les feuilles étaient rattachées aux branches. La DMS *in vitro* était des feuilles fraîches (58%) était réduite de 12% par passage à l'étuve ou séchage dans un bâtiment, et de 14% de plus par effet du soleil et de la pluie. La DPB des feuilles fraîches était faible (30,9%) et était réduite de 27% par dessèchement (de façon naturelle en intérieur), de 51% (à l'air libre) et de 68% (étuve).

## Introduction

The olive leaf is the most commonly used foliage in the mediterranean basin. It has been utilized traditionally by the ruminants that eat the branches directly on the land of cultivation during the pruning season (winter). Nevertheless, with the intensification of the production system the ruminants have been moved from these lands and the branches resulting from the prune must be eliminated, normally burned, to avoid some cultivation problems or tree diseases, or transported some distance to the animals.

The information available on their nutritive value is limited and quite varied (SANSOUCY, 1985) because the new factors involved in their actual system of manipulation have not been studied.

The objective of the present study is to determine the effect of different drying methods on the nutritive value of the olive leaf.

## Material and methods

### A) Laboratory assays

Triplicated samples of fifteen olive trees (n= 45) pertaining to different cultivars were each dried by three methods:

a.1) Isolated leaves, dried in an oven at 65°C, for 16 hours.

a.2) Isolated leaves, air dried (25°C) for 30 days; then dried as in a.1.

a.3) Leaves left to air dry on the branches for 30 days; then, picked and dried as in a.1.

"In vitro" dry matter digestibility -IVDMD-(Tilley and Terry, 1961), total nitrogen -TN- and nitrogen in acid detergent fiber -N.ADF-(ROBERTSON and VAN SOEST, 1981) were done.

## B) Field assays

Olive branches coming from the same land were conserved by four different methods:

b.1) Fresh leaves picked, and stored in plastic bags in a cold room at 20-40C (5-10 days of storage maximum).

b.2) Leaves left on the branches, and dried in an oven at 60-60C for 16 hours.

b.3) Leaves left to dry on the branches in a room (100-200C), for 3 months, then separated from the branches by crushing.

b.4) Leaves left to dry on the branches outside, exposed to the rain and the sun, for 3 months, then separated from the branches by crushing.

The "In vivo" organic matter -OMD- and crude protein -CPD-digestibilities, were obtained by utilizing four wether of Segureña breed, complementing the olive leaf with 150 g. of sunflower meal and minero-vitamin corrector.

## Results and discussion

The results for the laboratory assays are shown in Table 1. From these, it can be seen that the percentage of N-ADF is higher when the oven drying is done directly on a fresh leaf than on a previously air dried one, as has been observed by VAN SOEST (1982). No information is available on the fact that by previously drying the leaves on the branches the effect is even less.

The IVDMD of the isolated slowly air dried leaves showed a significative decrease in relation to that of the quickly oven dried. Nevertheless, when the leaves were air dried on the branches, a decrease was not noticed. This effect must be partially related to the level of N-ADF and other nutritive and antinutritive factors which

**Table 1: Effect of the drying method on the nitrogen in acid detergent fiber and "in vitro" digestibility of dry matter**

| COMPONENT   | DRYING METHOD     |                   |                    |
|-------------|-------------------|-------------------|--------------------|
|             | OVEN              | AIR AND OVEN      |                    |
|             | isolated leaf     | isolated leaf     | leaf on the branch |
| N-ADF/TN(%) | 52,1 <sup>a</sup> | 42,9 <sup>b</sup> | 37,2 <sup>c</sup>  |
| IVDMD (%)   | 55,8 <sup>a</sup> | 49,4 <sup>b</sup> | 55,5 <sup>a</sup>  |

a,b,c, Significant difference (P<0.05)

could have been transferred between the leaf and the wood during the drying period.

The maintenance of the values of digestibility observed in the field assays (Table 2) between the oven dried branches and those air dried inside agree with the effect observed in the laboratory. The decrease in relation to the fresh leaf was about 12%. When the leaves were exposed to the sun and the rain an additional 14% decrease was observed.

The digestibility of the protein was very low (30,9%) and the dessication provoked a decrease of 27% (air inside), 51% (air outside) and 68% (oven).

Maymone et all. (1950) obtained similar results in OMD and slightly higher ones in CPD in fresh (61,2%; 44,3%) and dessicate leaf (44,7%; 23,8%), but the desiccation conditions were not explained.

**Table 2: Effect of the drying method on the "in vivo" digestibility**

| COMPONENT | Fresh leaf        | DRYING METHOD     |                    |                    |
|-----------|-------------------|-------------------|--------------------|--------------------|
|           |                   | OVEN              | AIR                |                    |
|           |                   |                   | Inside             | Outside            |
| OMD (%)   | 58.0 <sup>a</sup> | 50.8 <sup>b</sup> | 52.0 <sup>b</sup>  | 45.2 <sup>c</sup>  |
| CPD (%)   | 30.9 <sup>a</sup> | 9.8 <sup>c</sup>  | 23.9 <sup>ab</sup> | 15.1 <sup>bc</sup> |

a,b,c, Significant difference (P<0.05)

## Conclusion

The nutritive value of the olive leaf is quite high, however it must be taken into account that different drying methods reduce this value in different ways.

More information is needed on the transference of nutritive and antinutritive factors between leaf and wood during desiccation when the leaves are attached to the branches.

## References

MAYMONE, B., SBLENDORIO, A. and CECI GINESTRELLI, D. 1950. Ricerche sulla composizione chimica, sulla digestibilita e sul valore nutritivo delle foglio di olivo (Olea Europea L.) verdi, essiccate, insilate. Ann. Ist. Sper. Zootec., 4: 1-19.

ROBERTSON, J.B. and VAN SOEST, P.J. 1981. *The Analysis of Dietary Fiber*. James, W.P.T., Theander, O. (ed.), Marcell Dekker, New York, pp. 123-158.

SANSOUCY, R. 1985. Utilization of olive by-products as animal feed in the Mediterranean basin. *FAO Study: Animal Production and Health n° 43*. 46pp.

TILLEY, J.M.A. and TERRY, R.A. 1963. A two-stage technique for the in vitro digestion of forage crops. *J. Br. Grassl. Soc.*, 18: 104-111.

VAN SOEST, P.J. 1982. *Nutritional ecology of the ruminants*. O&B Books, Inc., Corvallis, USA, 374pp.