Contents

LIST OF ABBREVIATION

AA	Amino acid
ADF	Acid- detergent fiber
ADL	Acid- detergent lignin
Ad – lib	Ad- libitum
AL	Albumin
ALT	Alanin aminotransferase
AST	Aspartic amino tranfers
BWG	Body weights gain
BM	Blood meal
Cell	Cellulose
CF	Crude fiber
CGM	Corn gluten meal
COC	Crude olive cake
CSM	Cotton seed meal
CP	Crude protein
DA	Dehydrated alfalfa
DCP	Digestible Crude protein
DM	Dry matter
DDG	Distillers dried grains
EE	Ether extract
FM	Fish meal
G	Gram
GL	Globulin
Ha	Hactar
Hemi	Hemicellulose
Kg	Kilogram
LBW	Live body weight
LE	Egyptian pound
LSM	Linseed meal
MBM	Meat bone meal
MC	Mustard cake
NDF	Neutral- detergent fiber
NB	Nitrogen balance
NFE	Nitrogen free extract
NO	Number
OM	Organic matter
OP	Olive pulp
NH3-N	Ammonia Nitrogen
SBM	Soybean meal
SEOC	Solvent extracted olive cake
SESCO	Solvent extracted sieved olive cake
SFM	Sun flower meal
T	Ton
TDN	Total digestible nutrients
TP	Total protein
TVFAs	Total volatile fatty acids

5. Summary and conclusion

This study was carried out at AL – Kanater AL- Khairia sheep station, Kaluabeya Governorate which belong to the Horticulture Services Unit, Agriculture Research Center, Ministry of Agriculture, Egypt. The objective of this study was to nutritionally and economically evaluate the olive cake as one of the most promising agro industrial by products ingredient for feeding sheep. The effect of feeding olive cake at different levels in lambs' rations on lambs performance were investigated.

This work included eight invivo digestibility trials using sheep, to determine digestibility and feeding value of the experimental growing and finishing rations, and a feeding trial to evaluate the productive performance of the lambs that fed the experimental concentrate mixtures that contained 0, 15, 25 and 35% olive cake on DM basis.

Chemical composition of olive cake, digestion coefficient, feeding values, some rumen parameters, some blood metabolites, growth – fattening performance of lambs, feed and economic efficiency were investigated.

The feeding trial had two stages, growing period for 147-d and finishing period for 36-d in which an extra corn grain was added at 0.5% of LBW.

Thirty two Rahmani lambs of average 6-7 months old and 25 kg live body weight were randomly assigned to receive the following treatments during the growing period:

G1 Concentrate mixture (CM) without olive cake
G2 CM with 15% olive cake
G3 CM with 25% olive cake
G4 CM with 35% olive cake, in addition, wheat straw was given at ad libitum for all groups. During finishing period, just the above rations were fortified by 0.5% of LBW of corn grains.

The important results and conclusion could be summarized as following:

1- The chemical composition of olive cake was 87.89, 12.00, 34.02, 1.98, 39.89 and 12.11% for OM, CP, CF, EE, NFE and ash, on DM basis, respectively. The values for NDF,

ADF, ADL, hemicellulose and cellulose were 74.03, 58.60, 25.94, 15.43 and 32.66%, respectively.

2- The DM intake of the experimental growing rations was 97, 88, 88 and 76 g / kg $W^{0.75}$ for G1, G2, G3 and G4, respectively.

3- The digestion coefficients of the most nutrients of the growing rations were tended to decrease with increasing the level of olive cake up to 35%. Up to 15%olive cake inclusion, the digestibility of most nutrients did not significantly influenced relative to control.
The digestibility of NDF, ADF and ADL were significantly reduced after olive cake inclusion extended to 25%. However, cellulose and hemicellulose digestibility showed non significant reduction among all dietary treatments.

4- The DM intake of the finishing rations was 105, 103, 104 and 112 g / kg w 0.75 for G1, G2, G3 and G4 respectively.

5- Regarding the digestibility of finishing rations, similar trends for all nutrients digestibilites to those of the growing rations could be observed, with the highest values were associated with G1 and the lowest ones occurred with G4 ($p<0.05$).

6- Regarding feeding value, the inclusion of olive at 15, 25 and 35% caused a significant reduction in TDN values in growing and finishing rations, being 70.94, 65.75, 63.82 and 55.93% for G1, G2, G3 and G4, respectively for growing rations. The respective values for finishing rations were 73.71, 69.90, 67.61 and 61.64%, on DM basis. The corresponding values for DCP were 8.32, 8.62, 8.55 and 8.31%; 8.75, 8.64, 8.41 and 8.07%

7- Nitrogen balance was positive for all experimental rations either growing or finishing ones, with the lowest value associated with the 25% and 35% olive cake rations.

8- Concerning rumen fluid parameters, the overall mean of the pH values were 6.48, 6.53,6.55 and 6.60 for G1, G2, G3 and G4, respectively with significant differences between G1 and G4 only. The corresponding values for TVFAs were 6.43, 6.20, 6.16 and 5.91 /meq/100 ml, with the lowest value ($p<o.o5$) associated with the 35%-olive cake ration. Ammonia-N values were not significantly affected by dietary treatments.

9- Most blood parameters (Total protein, albumin, globulin, A/G ratio, liver enzymes of AST and ALT) were not affected significantly by dietary treatments.

10- Results concerning the lambs performances during the 147 d growing period, 36-d finishing period and the 183 d as a whole period, including growth rate, feed intake and conversion and economical efficiency are summarized as follows:

10.1. The DM intake / h / d were not significantly different among treatments being 1043, 1003, 972 and 957 for G1, G2, G3 and G4, respectively, during the growing period. The corresponding values for finishing one were 1751, 1593, 1585 and 1633 g, with significant differences between G1 and the others. The values for the whole period were 1182, 1119, 1093 and 1090 g / h / d

10.2. Daily gain was 142.5, 118.4, 114.5 and 106.5 g/h/d for G1, G2, G3 and G4, respectively, with a significant difference between the control (G1) and the tested rations which didn't have significant differences among them. The respectively values for finishing rations were 245.8, 260.3, 213.9 and 202.8 g/h/d; with significant differences between control and the olive cake rations. The daily gain for the whole period was 162.8,146.3,134.0 and 125.5 g/h/d; with the highest ($p<0.05$) value for control and the lowest one for G4.

10.3. The feed conversion for the growing rations was 7.32, 8.47, 8.49, and 8.99 kg DM / kg gain; 5.27, 5.57, 5.42 and 5.03 kg TDN/ kg gain, for G1, G2, G3 and G4, respectively. On the same order, the values for finishing rations were 7.12, 6.12, 7.41 and 8.05; 5.25, 4.28, 5.01 and 4.96 and the values for the whole rations (whole period) were 7.26, 765, 8.15 and 8.69; 5.62, 5.12, 5.29 and 5.01.

10.4. Results concerning the economical efficeincy showed that the feed cost per kg LWG was 5.14, 4.90, 4.89 and 4.93 LE for rations G1, G2, G3 and G4 respectively, during the whole experiment (183-d). Economically , the olive cake rations appeared to be the most economic against control one that costed the highest .

Conclusion:

Based on the results of this study, it could be concluded that olive cake could successfully used in formulating the concentrate mixtures of growing lambs up to 25% on DM basis, especially when the traditional ingredients are not available and expensive. On the other hand further studies are needed to:

1 - Improve the nutritive value of olive cake and the other olive by products throughout the physical, chemical and biological treatments

2 - To study the different additives that can be enhance its nutritive value.

3 - Carry out more researches that required to study the probability of incorporating of olive cake by products in the diets of other classes of livestock.

4 - Also, more specific researches are needed to study the most appropriate methods for storing olive cake pulp and other concentrate mixtures containing it.

5 - More studies concerning the most suitable and cheapest ingredients that create and maximize its positive associative effect and consequently the rations that contained relatively higher levels of olive cake especially under arid and semi arid areas and new reclaimed land.