

STUDIES ON DAMSISSA (AMBROSIA MARITIMA) SUPPLEMENTS IN SHEEP RATION

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ABSTRACT: Ten chios growing lambs aging 8-9 months with an average initial weight of 33.0kg were divided into two experimental groups five lambs each to represent two experimental groups. The first group was fed on concentrated commercial sheep ration without damsissa while the second was fed on the same diet with 2% damsissa and the diets were offered at a rate of 3% of the live body weight. Beside the experimental diets bean straw was offered adlibitum as roughage. The experiment terminated 91 days after start. The results could be summarized in the following:

- 1) Supplementing diets of growing lambs with damsissa at a rate of 2% of the concentrates decreased significantly live body weights and daily gain.
- 2) Diet containing 2% damsissa caused insignificant decrease in digestibility coefficients of nutrients except EE and NFE where the decrease was significant.
- 3) Incorporation of damsissa increased the costs of production of one kg. gain in weight, thus the price of damsissa is over 8LE.
- 4) Damsissa decreased significantly pH value of rumen contents as well as the concentration of total short chain fatty acids.
- 5) Incorporation of damsissa in growing lambs ration decreased significantly blood glucose, globuline, Albumin and cholesterol compared to the control group however damsissa, increased significantly plasma AST; ALT; alkaline phosphates and creatinine.

In general, based on the results obtained in this study, damsissa seemed to have negative effect on growth performance of chios lambs and further studies are required to investigate its pharmacological effects.

INTRODUCTION

Damsissa (Asteraceae) an annual herbaceous plant widely distributed throughout the Mediterranean region, is used in the folk medicine for the treatment of renal and calculi. It is well known in Egypt under the name of damsissa. It acts as antispasmodic, diuretic and useful in bronchial asthma, spasms and frequent urination. In the Mediterrean area damsissa. is used as flavor in liquers, and in Uruguay damsissa tenifolia sprengel is used to control fertility (Mabberley, 1989). The plant has reached the stage of large-scale trials for control of Bilharziosis (El-Sawy et al., 1989).The whole plant, its extracts and isolated sesquiterpene lactones were shown to be toxic to the snails representing the intermediate host of Schistosomiasis and Fascioliasis found in canals (Picman, 1986). Fed damsissa leaves to rats at a dose of 5g/kg, as well as a powder or as an alcoholic extract equivalent to 5g of powder, and did not reported any toxicity.

Liver diseases are world - wide problem and conventional drugs used in the treatment of liver diseases are sometimes inadequate and can have serious adverse effects. It is therefore necessary to search for alternative drugs for the treatment of liver disease to replace currently used drugs of doubtful efficacy and safety.

The objectives of this study was to evaluate the effects of damsissa on growth in diets of growing chios sheep on their growth performance and some biochemical blood changes.

MATERIAL AND METHODS

1- Animals and experimental diets:

Ten chios lambs of about 33.00-kg live body weight (LBW) were randomly divided into 2 similar groups of 5 lambs each. The experimental groups were assigned at random to receive tow experimental rations. Animals were weighed biweekly to the nearest 100g (during the growth trial). Animals were weighed in the morning before drinking and feeding and fasting weights were recorded. Bean straw was offered ad libitum for all experimental groups and concentrated commercial feed was given at the rate of

3% of (LBW) for each of the two groups. Group 1 (control) was fed on the concentrate only while group 2 (damsissa fed group) was offered the dry plant material at a rate of 2% from the concentrate. The amount of unified feed offered was adjusted biweekly according to body weight changes. Mineral blocks and water were given freely to the animals. The experimental animals were kept under the routine veterinary supervision of the station throughout the duration of the experiment. The chemical composition of the concentrates; bean straw and ambrosia are illustrated in table (1)

2- Metabolism trials:

Three digestibility and nitrogen balance trials were carried out to study the effect of the different treatments on nutrients digestibility and Nitrogen balance. Three representative lambs from each group were used in the digestibility and N balance trials. The lambs were individually placed into metabolism cages. Each trial expanded for 17 days where the first 10 days were considered as preliminary period and during subsequent seven days feces and urine quantitative collections were carried out.

3- Rumen liquor:

At the end of the experimental period samples of rumen liquor were obtained from the experimental animals using stomach tube after feeding 4 hours for pH and volatile fatty acids determination.

4- Analytical Methods:

Rumen fluid samples (collected using stomach tube) were analyzed for total volatile fatty acids concentration in rumen liquor (TVFAfS) according to Warner, (1964).

Representative samples (3 of feed feces and urine) were analyzed according to A. O. A. C. methods (1980). Heparinised blood samples were withdrawn from the jugular vein and centrifuged for 15 minutes at 3000 rpm to separate the plasma for analysis.

Total plasma proteins were determined using special kits according to the methods of Doumas (1975). Albumin was measured using the method of Doumas et al (1971). Plasma globulin content was calculated mathematically by subtracting the total albumin concentration from total proteins content.

Plasma total lipids were determined according to the method of Kinght et al (1972). Total cholesterol was assessed by using the method of Sidle et al (1983). Glutamate oxaloacetat Transaminases (AST) and glutamate pyruvat transaminase (ALT) were determined according to the method of Reitman and Frankel (1975). And plasma glucose was measured using the method Trinder (1969). Ceratinine was measured using the method of Schrimmeister (1964) and phosphorus was measured using the method of Fiske and Subbarow (1952).

5- Statistical Analysis:

The data were analyzed statistically according to Snedecor and Cochran, (1980) and the signifecancy among experimental groups were tested by Duncanís Multiple range test (1955).

RESULTS AND DISCUSSION

Chemical composition and nutritive value of the tested feed are presented in table (1) Results show that DM contents of the tested experimental feed materials were 92.50; 93.53 and 93.15% for the concentrate, straw and damsissa respectively, which indicate the similarity of the three used nutrients in DM contents. The organic matter (OM) contents % of straw seemed to be higher than that the concentrate followed by the damsissa. As presented in the same table crude protein (CP) contents was found to be the lowest in straw followed in an increasing order by the concentrate and the highest CP contents were recorded by the damsissa. The crude fibers (CF) recorded the highest value in straw, followed in a decreasing order by damsissa and concentrate respectively. Ether extract (EE) concentration had ranged between 1.20% in the straw and 4.10% in the concentrates. As presented in the same table damsissa showed the highest ash contents (18.76%) followed by the concentrate and straw, respectively. The higher ash contents in damsissa may due to the bad processing procedure which allowed contamination with dust and sand. The nitrogen free extract (NFE) contents was the lowest in the damsissa followed in a decreasing order by straw and concentrate respectively. The lower NFE contents of damsissa hay may due to its contamination with dust, thus its ash contents was very high.

Table (1): The chemical composition of feed stuffs (on DM basis)

Item	DM%	OM%	CP%	CF%	EE%	ASH%	NFE%
Concentrate	92.50	83.60	13.60	13.40	4.10	16.40	52.50
Bean straw	93.53	90.10	4.02	40.17	1.20	9.90	44.71
Damsissa	93.15	81.24	15.79	20.64	2.70	18.76	42.11

Digestibility of nutrients:

Results of table (2) illustrate the digestibility coefficients of dry matter (DM); organic matter (OM); crude protein (CP); crude fibers (CF); ether extract (EE) and nitrogen free extract (NFE). Results revealed that incorporation of damsissa in growing lamb rations had no significant effect on DM; OM; CP and CF digestibility coefficients, however the damsissa at 2% inclusion rate tended to decrease the digestibility coefficients of the traits cited above on the other hand results of table (2) revealed that damsissa at 2% inclusion rate resulted in a significant ($P < 0.05$) decrease in the digestibility coefficients of EE and NFE. Results of digestibility of nutrients (Table 2) may indicate that damsissa in general depressed the digestibility of nutrients which may due to its in direct effect on rumen microflora. The decreases in digestibility coefficients of the nutrients due to incorporation of damsissa had due to the direct effect of Damsissa on reducing the intestinal movements and waves as described by Wafaa (1990).

Table (2): Digestibility coefficient of experimental diet feed to chios lambs

Diet	DM	OM	CP	CF	EE	NFE
Control	64.09 ^a ±	64.94 ^a ±	78.32 ^a ±	62.00 ^a ±	63.92 ^a ±	68.23 ^a ±
SE	10.898	2.707	1.347	9.426	2.656	7.771
Experimental	61.69 ^a ±	63.49 ^a ±	73.74 ^a ±	58.74 ^a ±	52.76 ^b ±	63.17 ^b ±
SE	2.685	10.604	7.619	3.978	13.92	4.723

a,b, means with the same superscript in the same row, are not significantly difference ($P < 0.05$)

Feeding value:

Results of table (3) revealed that TDN% of the control and the diet containing 2% damsissa were 60.87 and 58.94 percent, respectively with insignificant differences among the treatment groups, however the control diet seemed to have higher TDN% compared to the other group. As presented in the same table DCP% decreased significantly ($P < 0.05$) from 9.20% (control group) to 8.47% for the treatment group. On the other hand results of table (3) show that incorporation of damsissa in growing lamb diet seemed to have insignificant effect on nitrogen balance.

Table (3): Feeding values and Nitrogen balance

Item	TDN%	DCP%	N.B
Control	60.87 ^a ± 3.622	9.20 ^a ± 0.950	5.85 ^a ± 0.525
Experimental	58.94 ^a ± 6.125	8.47 ^b ± 1.783	5.21 ^a ± 0.369

a,b, means with the same superscript in the same row are not significantly difference ($P < 0.05$)

TDN: Total digestible Nutrients.

DCP: Digestible crude protein.

NB: Nitrogen balance.

Growth performance:

Results of growth performance parameters (initial weight (IW); final weight FW; total gain (TG); daily gain (DG) and growth rate (GR%)) are presented in table (4). Result revealed that incorporation of damsissa into growing lamb rations resulted in an insignificant decrease in average final weight at the end of the experimental period (91 days after start). The same trend was observed in TG thus the group of lambs fed on diets containing 2% damsissa showed insignificant lower total gain (11.00 kg) compared to their controls (13.75kg). Results of DG showed that this trait was reduced significantly ($P < 0.05$) with the diet containing the damsissa at 2% incorporation level compared to the control group. Results of the same table

indicate that growth rate % decreased from 41.67% (control diet) on 33.08% in the damsissa supplemented diet. These results are in accordance with those reported by Wafaa (1990), who reported that the administration of aqueous and alcoholic extracts of damsissa significantly decreased body weight of rate during the period of four weeks as compared with that of the control group.

Table (4): Growth performance of Chios lambs fed ration contained 2% damsissa as feed additive

Item	Control group	Experimental group
Initial body weight, Kg	33.00 ^a	33.25 ^a
Final body weight, Kg	46.75 ^a	44.25 ^a
Total body gain, Kg	13.75 ^a	11.00 ^a
Daily body gain, g	151.09 ^a	120.88 ^b
Growth rate %	41.67	33.08

a,b, means with the same superscript in the same row are not significantly difference ($P < 0.05$).

Feed intake; feed conversion and economic efficiency:

Averages of DM intake from concentrated feeds and roughages of the control and damsissa groups are illustrated in table (5). Results revealed that DM intake of the control group was slightly higher than that of the damsissa group and the same trend was observed with DM intake from roughages. As presented in table (5) total DM intake was found to be 1365.43 and 1317.0g for the control and damsissa groups, respectively. The same trend was observed in TDN and DCP intake where the control group showed also slightly higher intake of both TDN and DCP compared to the damsissa group. Averages of DM, TDN and DCP conversion ration (Table 5) were slightly better for the control group compared with the damsissa group. Results of the same table indicate that feed costs for each kg gain in weight was higher in the damsissa group due to the higher price of the damsissa and this was reflected on the economical efficiency where the control group showed better figures (2.43%) compared to the damsissa group (1.73%).

Table (5): Feed Intake, feed conversion and cost of feeding of chios lambs as affected with "damsissa" as a feed additive

Items	Control group	Ambrosia group 2% of concentrate
Concentrate	1101.68	1069.20
Roughage	263.75	248.79
TDMI	1365.43	1317.99
TDNI	831.14	776.82
DCPI	125.62	111.63
<u>Feed conversion, Kg / Kg gain</u>		
DM	9.04	10.90
TDN	5.50	6.43
DCP	0.831	0.923
<u>Feed cost</u>		
Total feed cost/Kg body weight gain L.E	3.71	5.19
Economical efficiency	2.43	1.73

Rumen liquors pH value and total volatile fatty acids:

Results of table (6) revealed that pH values in rumen liquor for the control damsissa groups were 5.41 and 6.13, respectively and analysis of variance for this trait showed that incorporation of damsissa in growing lamb diet significantly increased ($P < 0.05$) rumen pH value.

Results of the same table show that incorporation of damsissa in diets of growing lambs caused a significant ($P < 0.05$) decrease in rumen TVFAs compared with the control groups.

Table (6): Rumen liquor parameters

Item	After feeding 3 hours	
	Rumen pH value	Rumen TVFA'S meq/looml
Control	5.41 ^a ± 0.179	11.77 ^a ± 0.433
Experimental	6.13 ^b ± 0.131	10.25 ^b ± 0.144

a,b, means with the same superscript in the same row are not significantly difference (P<0.05)

pH: Hydrogen radicas

TVFA'S: Total volatile fatty Acids.

Blood plasma parameters:

Results illustrated in table (7) show the effect of incorporating damsissa on blood plasma constitutions of growing lambs. Results revealed that damsissa inclusion at a rate of 2% in lamb diets caused a significant (P< 0.05) decrease in plasma glucose. This result are in accordance with the findings of Wafaa (1990), who showed that administration of alcoholic damsissa extract at a dose of 1000mg/Kg body weight of rats significantly increased blood glucose level in normal rats but decreased it in diabetic ones. The same author added that damsissa extract at doses of 500mg/kg body weight released no significant effects on blood glucose in normal and alloxan diabetic rats. Results of the same table indicate that damsissa at the tested dose (2% of the diet) had no significant effects on plasma total proteins (g/dl) and plasma albumin, however plasma globulin (g/dl), decreased (P< 0.05) compared to the control group. Results presented in table (7), revealed that damsissa as a dietary supplement decrease (P< 0.05) plasma total lipids and cholesterol in growing lambs. This agrees with the results of (Adam. (1996)) who stated that damsissa supplements decreased serum total lipids and cholesterol when incorporated at 2% rate in chicks diets. Concerning plasma inorganic phosphorus (mg/dl), incorporation of damsissa in growing lambs

diets seemed to have insignificant effects on this parameter. As presented in table (7), damsissa in diets of growing lambs resulted in significant ($P < 0.05$) increase in plasma ALT; AST; total alkaline phosphate and creatinin. There results are in accordance with those reported by Wafaa (1990), who showed that administration of damsissa alcoholic extracts at doses 500 or 1000 mg/kg of body weigh of rats increased significantly the levels of ALT; AST alkaline phosphatase and creatinin in plasma of rats due to degeneration of liver tissues.

Table (7): Effect of "damsissa" on blood plasma parameters in Chios lambs

Parameters	Control	Experimental
Glucose mg/dl	85.0 ^a ± 2.15	79.8 ^b ± 1.98
Total proteins g/dl	8.50 ^a ± 0.45	8.10 ^a ± 0.50
Albumin g/dl	5.10 ^a ± 0.20	5.60 ^a ± 0.25
Globulin g/dl	3.40 ^a ± 0.18	2.50 ^b ± 0.15
Total lipids mg/dl	425.10 ^a ± 9.15	400.10 ^b ± 6.75
Cholesterol mg/dl	129.5 ^a ± 2.50	100.10 ^b ± 1.25
Inorganic phosphoras mg/dl	6.50 ^a ± 0.12	6.90 ^a ± 0.26
ASTIU/L	31.00 ^b ± 2.10	36.10 ^a ± 1.26
ALTIU/L	12.50 ^b ± 1.56	32.52 ^a ± 1.65
Total Alk. Phosphatase IU/L	60.65 ^b ± 6.30	100.5 ^a ± 3.33
Creatinin mg/dl	0.94 ^b ± 0.054	1.50 ^a ± 0.041

a,b, means with the same superscript in the same row, are not significantly difference ($P < 0.05$)

GENERAL DISCUSSION

Although damsissa shoots is used in Egypt and other parts of the world for the treatment of various ailments, any toxicological information on animals or other species of livestock are unavailable. In our studies, dry damsissa shoots were not lethal to Bovanstype lambs when fed at 2% percent

level of diet for 91 day, however, had a profound effect on growth of the lambs. The pathological and biochemical data were indicative of the plant constituent affecting the intestine, liver and kidneys and damage to these organs could explain the loss of body weight (Ahmed and Khater, 2001). The mechanism whereby the plant constituents injured body tissues can not be stated from the present study, but the damage to these organs probably contributed to the raised serum TL, ALP, LDH, GOT and GPT and to the decreased serum total Lipid and cholesterol concentrations. The concentration of many serum constituents returned to normal by the end of a 3 week recovery period (chicks) Adam 1996, but some of them were still abnormal, indicating incomplete repair of tissue damage by this time such as cholesterol. In general, based on the results obtained in this study, damsisa seemed to have negative effect on growth performance of chios lambs and further studies are required to investigate its pharmacological effects.

ACKNOWLEDGMENT

The authors would like to express their deep thanks to Dr. Mohamed Bekker associate prof in the central lab for fish research and member of the demsisa project for supplying the plant.

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دراسات على نبات الدمسيصة كإضافة إلى عليقة الأغنام

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استخدم في هذه الدراسة ١٠ حملان ذكور من سلالة الكيوس ، أعمارهم تتراوح ما بين ٨-٩ شهور بمتوسط وزن ٣٣,٠ كجم وذلك لدراسة تأثير نبات الدمسيصة كنبات عشبي ينمو ويزرع على جوانب الترع والقنوات المائية وقسمت هذه الكباش إلى مجموعتين عشوائيتين وأضيف نبات الدمسيصة إلى العليقة بنسبة ٢% من المخلوط المركز وقدمت العليقة لهذه الحيوانات بنسبة ٣% من وزن الجسم والمادة الخشنة هي تبن الفول الذي كان يقدم لحد الشبع .

وكانت النتائج المتحصل عليها كالتالي:-

- ١- إضافة نبات الدمسيصة إلى غذاء الأغنام بنسبة ٢% من العلف المركز أدى إلى انخفاض في وزن الجسم وبالتالي انخفاض معدل النمو اليومي ، هذا الانخفاض كان معنوياً.
- ٢- انخفاض معدلات الهضم لكل المركبات الغذائية ولكن هذا الانخفاض كان غير معنوي فيما عدا EE , NFE فالانخفاض كان معنوي.
- ٣- زيادة تكلفة كيلو النمو مقارنة بالمجموعة المقارنة وذلك لارتفاع ثمن نبات الدمسيصة حيث يصل ثمن الكيلو جرام ٨ جنية.
- ٤- انخفاض معنوي في درجة pH الكرش وكذلك تركيز الأحماض الدهنية الكلية قصيرة السلسلة.
- ٥- هناك فروق معنوية كانت بين المجموعتين المعاملة والمقارنة لصالح المجموعة المقارنة في بعض قياسات الدم ومنها مستوى الجلوكوز والجلوبيولين والألبومين والكوليسترول ولكن هناك فروق معنوية في بعض القياسات لصالح المجموعة المعاملة منها ALT+AST والالكالين فوسفاتيز والكرياتينين .