*J. Agric. Sci. Mansoura Univ., 34 (5): 4481 - 4492, 2009*

# NUTRITIONAL STUDIES OF SOME HALOPHYTIC PLANTS BY RANGE SHEEP AND GOATS.

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## ABSTRACT

Browses plant leaves and stems from *Suaeda vera* and *Artemisia monosperma* hays were evaluated for nutritive potential (chemical composition and digestibility characteristics by sheep and goats).Berseem hay was used for comparison and barley grains were offered to cover 50% of maintenance requirements for sheep and goats , while the tested hay were offered *ad.lib.* The results showed that values of CP for shrub species tested were 9.58% and 9.7% for *S.vera* and *A.monosperma* , respectively, while CF and ADL were 28.5%, 15.9% and 6.7%, 10.4%, respectively.

The average daily DM intake by both sheep and goats from tested plants only were 18.99 and 20.73 g/kgw$^{0.75}$, respectively, while the means were 35.07 and 36.05g/kgw$^{0.75}$ for ration, respectively.

Nutrients digestibility coefficients of range plants rations were better than Berseem hay. Also, the nutritive values of range plants rations recorded highest values than Berseem hay, while the CP digestibility of both *S.vera* and *A.monosperma* were comparable to that of Berseem hay. All rations by sheep and goats recorded positive N. balance, but the highest value was recorded with *S.vera* ration, while the lowest value with Berseem hay.

It was concluded that *S.vera* and *A.monosperma* hay after supplemented with barley grains can be used in feeding both sheep and goats.

**Keywords**: Halophytic plants – chemical composition- digestibility- sheep- goats.

## INTRODUCTION

Halophytic plants are widely distributed throughout the world particularly in arid areas. Palatable plant species are few and are always over- grazed and disappear fast. Less palatable species are numerous and have a patchy distribution.

Unpalatable halophytes are widely distributed and represent about 60-70% of the natural rangeland vegetation in several parts in the world. Many species are highly resistant to salinity and drought- attributes which improve their survival in desert that represent a high proportion of the developing world in the mid- latitude regions a high proportion of the developing world in the mid- latitude regions (Gihad and El- Shaer, 1994).

Halophytes (halo= salt, phyte= plant) are not a single taxonomic group, but are represented by several thousand species of forbs, grasses, shrubs and trees. There are leafless succulents and leafy bushes; there are species found only in salt marshes and species that grow in the deserts. Halophytes are distributed from coastal areas to mountains and lowland deserts (Victor, 1994).

Halophytic plants play a significant role in nutrition of ruminant livestock. Halophytes species, because of their resistance to heat, drought, salinity, alkalinity, drifting sand, grazing and repeated cutting, are the major feed resources during the dry season (Fagg and Stewart, 1994). In addition, a major advantage of halophytes over herbaceous legumes and grasses is their higher crude protein content. However, due to the presence of secondary plant metabolites (particularly tannins) in halophytes, digestibility of protein and organic matter in these feeds is low (Terrili et al. 1992 and Waghorn and Shelton, 1997).

Ahmed (2003) summarized the reasons which affecting the nutritive value of halophytes as follows

1- plant species and varieties. 2- Stage of growth. 3- Environmental factors such as soil and climate 4- Physical and chemical defenses.

The purpose of the present study is to evocate the performance of sheep and goats fed some halophytic plants as a hay form comparison with Berseem hay.

## MATERIALS AND METHODS

This study was conducted at Nubaria Experimental Farm, El- Bostan, Behaira Governorate and Laboratories of Animal Production Department, National Research Center, Giza, Egypt. Succulent twigs of *Suaeda vera and Artemisia monosperma* shrubs naturally grown in Nubaria desert area were cut and sun dried.

Hay making:

Hay made by chopping succulent parts (leaves and stems) of two plants *S. vera* and *A. monosperma* which were air dried separately on thin plastic sheet to avoid mechanical losses or sand contamination.

Animals and feed managements:

Three mature male local sheep (40 Kg) and 3 mature male Baladi goats (30kg) were used to evaluate nutrients digestibility and N utilization of *Suaeda vera* hay, *Artemisia monosperma* hay and Berseem (*Trifolium alexandrinum*) hay (BH) rations. The BH was used as a control ration. Crushed barley grains were offered to cover 50% of maintenance requirements for sheep (NRC, 1985) and goats (NRC, 1981), while tested forages were offered *ad-lib*. Drinking fresh water was available for all experimental animals.

Animals were kept in pens and fed on their rations for three weeks as adaptation period. During this period, the animals were fed gradually to avoid any adverse effect then they were kept individually in wooden metabolic crates for 15 days as a preliminary period followed by 7 days for total feces and urine collection. Feces and urine were collected once daily at 07:00 a.m. The animals were usually offered their diet once daily at 08:00. Residual rations if any were daily weighed and represented samples of rations offered and residues were taken for DM determination. At the end of each digestion trial, rumen liquor samples were taken from each animal before feeding (zero) and 4 hrs post feeding then filtered. Values of pH were immediately measured after sampling by the digital combination electrode pH meter. The concentration of ammonia- nitrogen and total volatile fatty acids in the rumen

liquor were determined according the Conway and O'Malley (1942) and Warner (1964), respectively. Nutrients digestibility of the experimental rations were determined by differences using the values of barley obtained by Abd EL- Rahman (1996).

Chemical analysis:

Proximate analysis was determined for feed ingredients and feces according to A.O.A.C.(1990) methods. Goering and Van Soest (1970) methods were used to determine cell wall constituents (CWC).

Statistical analyses:

Data obtained from this study was statistically analyzed using SAS (1990).One-way classification analysis of variance was used.Differences among means were examined using multiple range test according to Duncan (1955).

RESULTS and DISCUSSIONS

The chemical composition and cell wall constituents of the two tested range plants compared to Berseem hay are presented in Table (1).

Suaeda and Artemisia hay showed the same value of CP (9.58 and 9.70 %, respectively). These values were lower than the CP content in berseem hay. The present results agreed with that obtained by Abd El-Rahman et al (2008). They found that the desert range contained protein level that would satisfy most of the protein requirement of ruminant animals.

The CF contents of *A. monosperma and S. vera* were lower (15.9 and 28.5%) than that found in Berseem hay (34.59). El-Shaer and Attia-Ismail (2002) showed that the CF content of range plants ranged between 14-30% depending on the seasonal differences and the stage of growth.

*A.monosperma* contains the highest value of EE (6.3%) compared with Berseem hay or *S.vera* (4.17 and 1.5%, respectively). The high value of EE in *A. monospera* may be attributed to the high ratio of waxes and essential oils compared to true fats present in this plant (Wardeh, 1982).

The two tested plans showed highest values of ash contents compared with that found in Berseem hay. These high values of ash might be due to their high content of salt which could be predicted from the high Na and Cl contents (Mohamed, 1996).

**Table 1: Chemical composition and cell wall constituents of Berseem hay, Artemisia hay, Suaeda hay and barley.**

| Item | Berseem hay | Artemisia hay | Suaeda hay | Barley grain |
|---|---|---|---|---|
| **Chemical composition on DM basis%** | | | | |
| OM | 84.14 | 81.30 | 79.10 | 96.90 |
| CP | 10.50 | 9.70 | 9.58 | 10.50 |
| CF | 34.59 | 15.90 | 28.50 | 9.80 |
| EE | 4.17 | 6.30 | 1.5 | 2.50 |
| NFE | 34.88 | 49.40 | 39.52 | 74.10 |
| Ash | 15.86 | 18.70 | 20.90 | 3.10 |
| **Cell wall constituents on DM basis%** | | | | |
| NDF | 38.47 | 42.00 | 35.70 | 26.6 |
| ADF | 20.50 | 33.90 | 18.50 | 8.10 |
| ADL | 11.25 | 10.40 | 6.70 | 2.30 |
| Hemicellulose | 17.97 | 8.10 | 17.20 | 18.5 |
| Cellulose | 9.25 | 23.50 | 11.80 | 5.80 |

The tested plants also contained fluctuated values of NDF, ADF and ADL, however, *S.vera* contained the lowest value of ADL(6.70 %) compared with the other plants. The highest value of ADL was found in Berseem hay. In this connection, Abd EL-Rahman et al (2008) found that the values of ADL in different range plants ranged between 3.5-12%.

Data of the DM consumed of both whole rations and hay alone by the different animal species expressed as g/kgw$^{0.75}$ are illustrated in Table (2). The DM consumption among the different rations or hay by the two animal species showed valuable results, therefore, the mean results were used for comparison.

Sheep consumed lower value of DM expressed as g/kgw$^{0.75}$ than goats. The mean values of DM intake by sheep and goats were 18.99 and 20.73 g/kgw$^{0.75}$, respectively.

Regardless to animal species, the DM intake from Berseem hay in ration or alone was higher than the tested plants hay. The DM intake of tested ration varied within (22.07- 32.94 g/kgw$^{0.75}$). However, *A. monosperma* hay showed the lowest DM intake compared with the other hays which might be due to its high content of some untinutritional factors like phenolic compounds , oxalates , steroids and coumarins (El-Shaer and Attia-Ismail ,2002). Van Soest (1965) and Kandil and El-Shaer (1990) showed that there is a significant negative correlation usually exists between forage lignin content and either DM intake or nutrient utilization.

The data of dry matter digestibility (DMD) of tested rations by the different animal species are illustrated in Table (2). The average values of DMD by the two animal species regardless to the different rations ware 74.25 and 75.67% for sheep and goats, respectively.

Regardless to animal species, the results showed that *A.monosperma* recorded highest DMD than the other tested ration. The DMD of the tested rations ranged between 70.92- 77.66%.

The CP digestibility (CPD) of rations by the two animal species showed that regardless to the different rations, the average values of CPD by sheep and goats fed different rations were nearly the same .

Regardless of animal species, the lowest value of CPD was recorded with Berseem hay. However ,the values recorded for *A. monosperma* hay and *S. vera* hay were very close . The high CPD recorded with *A. monosperma* and *S. vera* compared with B. hay might be due to low CF in these two tested plants and low ADL content. Abd EL- Rahman et al (2008) showed that the concentration of tannin in *A.monosperma* and *S.vera* are very low, for that the digestibility of CP recorded high values.

Concerning crude fiber digestibility (CFD), the results showed that, redardless to the different rations, the average values of CFD by sheep and goats fed different rations were nearly the same . These results disagree with those reported by Gihad (1979) and Gihad et al (1988). Those authors found that goat digested CF better than sheep. However , regardless animal species ,*S.vera* ration recorded the highest CF digestibility , while *A.monosperma* ration had the lowest value .

Data of ether extract digestibility (EED) showed that the average values of EED for the rations by the different animal species ranged between

(59.81- 77.53%) Regardless to plant species, the average values of EED for the rations were 71.50 and 68.96% for sheep and goats, respectively .

Regardless to animal species, data of EED of the experimental rations indicated that *A. monosperma* ration recorded higher ($p<0.05$) value than the other rations. These results disagreed with those obtain by Wardeh (1982) how found that desert forages have high EE content owing to their high wax and essential oil content, therefore, they showed low EE digestibility.

Sheep and goats recorded very close values for NFE digestibility . Regardless animal species , *A. monosperma* ration recorded the highest NFE digestibility followed by *S .vera* ration.

Data of nutritive values expressed as TDN and DCP are presented in Table ( 2 ) . The overall average of TDN values regardless to experimental rations were 68.27 and 69.10 for sheep and goats , respectively and 5.84 and 6.07 for DCP,respectively. Regardless to animal species, it was clear that the highest value of TDN were recorded with *A. monosperma* ration, followed with *S. vera* , the same trend was obtained by DCP values .

The reason for decreasing the nutrients digestibility and nutritive values recorded for Berseem hay ration compared with the other two tested rations may be due to the roughage : concentrate ratio in Berseem hay ration was 66:34 while were 30: 70 and 55 : 45 for *A .monosperma* and *S .vera* , respectively . Increasing the level of roughage in the ration may be recorded the nutrients digestibility of the rations

**Nitrogen utilization:**

Data of nitrogen utilization expressed as $g/kgw^{0.75}$ for sheep and goats are presented in Table (3). The mean values of N intake recorded for two animal species were 542.7 and 538.33 $g/kgw^{0.75}$ for sheep and goat, respectively.

The highest values of N intake regardless to animal species were recorded with Berseem hay ration followed with *A.monosperma* hay ration, while the lowest value was recorded with *S.vera.* The high N intake which was recorded with Berseem hay might be due to the high protein content and high DM intake of Berseem hay.

There was no significant difference among animal species in faecal N, however, sheep excreted more faecal N, than goats. The average faecal N by the two animals regardless to tested plants were 214.67 and 210.02 $g/kgw^{0.75}$ for sheep and goats, respectively.

Also,goats showed the lowest value of urinary nitrogen , the averages urinary N were 227.77 and 206.64 $g/kgw^{0.75}$ for sheep and goats, respectively.

The highest value of N retention expressed as $g/kgw^{0.75}$ was recorded by goats, while the lowest one was recorded by sheep. The mean values of daily nitrogen retention were 100.26 and 121.59 $g/kgw^{0.75}$ for sheep and goats, respectively. These results indicated that goats can utilize the desert plants better than sheep These results were in agreement with those obtained by Abd EL- Rahman (2008) who found that goats can utilize the helophytic plants better than sheep. Regardless animal species , animals fed the two desert hays had higher N retention than those given Berseem hay

**Table (2): Daily DM intake g/kg W.$^{0.75}$, nutrients digestibility and nutritive values of experimental rations by sheep and goats**

| plants / Animals | Berseem hay | *A.monosperma* hay | *S.vera* hay | Mean±SD |
|---|---|---|---|---|
| | DM intake g/kg W.$^{0.75}$ (**hay only)** | | | |
| Sheep | 30.76$^{a}$ | 8.41$^{C}$ | 17.80$^{b}$ | 18.99 ±6.67 |
| Goats | 38.32$^{a}$ | 5.07$^{C}$ | 18.80$^{b}$ | 20.73 ± 9.53 |
| Mean ± SD | 34.54$^{a}$±1.31 | 6.74$^{C}$ ±2.56 | 18.3$^{b}$±1.38 | |
| | DM intake g/kg W.$^{0.75}$ (**rations**) | | | |
| Sheep | 47.58$^{a}$ | 24.59$^{C}$ | 33.04$^{b}$ | 35.07 ± 9.32 |
| Goats | 55.76$^{a}$ | 19.55$^{C}$ | 32.83$^{b}$ | 36.05 ±10.62 |
| Mean ± SD | 51.67$^{a}$±3.56 | 22.07$^{C}$±3.26 | 32.94$^{b}$±0.57 | |
| | **Digestibility, %** | | | |
| **DM** | | | | |
| Sheep | 70.92$^{b}$ | 76.34$^{a}$ | 75.49$^{a}$ | 74.25 ±2.09 |
| Goats | 72.32$^{b}$ | 77.66$^{a}$ | 77.03$^{a}$ | 75.67 ±3.89 |
| **OM** | | | | |
| Sheep | 71.69$^{b}$ | 77.66$^{a}$ | 76.33$^{a}$ | 75.23 ±4.89 |
| Goats | 72.69$^{b}$ | 77.40$^{a}$ | 73.96$^{b}$ | 74.68 ±4.29 |
| **CP** | | | | |
| Sheep | 58.14$^{b}$ | 61.27$^{ab}$ | 63.76$^{a}$ | 61.06 ±3.75 |
| Goats | 59.25$^{sa}$ | 63.96$^{b}$ | 60.70$^{a}$ | 61.30 ±3.23 |
| **CF** | | | | |
| Sheep | 61.28 | 59.18 | 62.61 | 61.02 ±0.98 |
| Goat, | 61.93 | 58.61 | 62.77 | 61.10 ±0.97 |
| **EE** | | | | |
| Sheep | 59.81$^{b}$ | 77.53$^{a}$ | 77.16$^{a}$ | 71.50 ±10.25 |
| Goat, | 60.35$^{b}$ | 73.84$^{a}$ | 72.69$^{a}$ | 68.96 ±8.66 |
| **NFE** | | | | |
| Sheep | 73.33$^{b}$ | 88.18$^{a}$ | 83.38$^{a}$ | 81.63 ±7.52 |
| Goat, | 80.38$^{b}$ | 84.46$^{a}$ | 80.63$^{b}$ | 81.82 ±0.97 |
| | **Nutritive values,%** | | | |
| **TDN** | | | | |
| Sheep | 61.41$^{C}$ | 74.83$^{a}$ | 68.56$^{b}$ | 68.27± 4.59 |
| Goat, | 65.53$^{b}$ | 75.90$^{a}$ | 65.88$^{b}$ | 69.10± 6.29 |
| **DCP** | | | | |
| Sheep | 5.46 | 6.06 | 6.00 | 5.84 ±0.02 |
| Goat, | 6.11 | 6.42 | 5.68 | 6.07 ±0.03 |

**a,b and c : Means within row with different superscripts are significantly different at (p<0.05)**

**Table 3: Nitrogen utilization by sheep and goats fed the experimental rations .**

| **Plants** / **Item** | **Berseem hay** | ***A.monosperma*** hay | ***S.vera*** **hay** | **Mean ±SD** |
|---|---|---|---|---|
| | **Nitrogen g/mg $^{0.75}$** | | | |
| **N. Intake** | | | | |
| Sheep | 740.00$^{a}$ | 498.43$^{b}$ | 389.66$^{C}$ | 542.70 **±**98.55 |
| Goats | 810.00$^{a}$ | 491.12$^{b}$ | 313.57$^{C}$ | 538.33 **±**05.07 |
| **F.Nitrogen** | | | | |
| Sheep | 309.76$^{a}$ | 193.04 | 141.21$^{b}$ | 214.67 **±**110.84 |
| Goats | 330.07$^{a}$ | 177.00$^{b}$ | 122.98$^{c}$ | 210.02 **±**113.26 |
| **U.Nitrogen** | | | | |
| Sheep | 364.34$^{a}$ | 205.28 $^{b}$ | 113.69$^{C}$ | 227.77 **±**151.37 |
| Goats | 354.01$^{a}$ | 185.57$^{b}$ | 80.34$^{C}$ | 206.64 **±**201.73 |
| **N.Balance** | | | | |
| Sheep | 65.9$^{C}$ | 100.11$^{b}$ | 134.76$^{a}$ | 100.26 **±**57.28 |
| Goats | 125.92 | 128.55 | 110.25 | 121.59 **±**201.73 |

**a,b and c : Means within row with different superscripts are significantly different at (p<0.05).**

Data of water balance expressed as ml/kgw$^{0.82}$ are presented in Table (4). Goat consumed the lowest values of total water than sheep. The mean values of water intake were 105.71 and 96.51 ml/ kgw$^{0.82}$ for sheep and goats, respectively. The present results agree with the findings of Mohamed (1996), who found that goats had significantly less water intake than sheep.

The overall average of water intake by the two animal species fed the different experimental rations, regardless to any environmental effect might indicate the following :

1) The water intake increased with the ration which has high protein content (Reynolds, 1983), also, El-Banna (1993) showed that increasing dietary protein level increased total water intake.
2) Water intake also increased with the ration with high salt content (Gihad and El- Shaer, 1994). This result showed that B. hay ration recorded a highest value of water intake, this result might be due to high content of Na and Cl in B. hay.

The mean values of feacal water excreted were 10.84 and 7.71 ml /kgw$^{0.82}$ for sheep and goats, respectively. The corresponding values of urinary water were 34.07 and 24.84, respectively.

It is worthy to note that the difference between water intake and feacal plus urinary water loss is considered as water loss, being 60.8 and 63.96 ml /kgw$^{0.82}$ for sheep and goats, respectively. These results indicated that sheep showed the lowest values of insensible water loss (ml /kgw$^{0.82}$). Similar conclusion was reported by Mohamed (1996).

**Table4: Water balance ml/kgw$^{0.82}$ by sheep and goats fed the experimental rations**

| Plants<br>Item | **Berseem hay** | ***A. momosperma* hay** | ***S.vera* hay** | **Mean ±SD** |
|---|---|---|---|---|
| Total water intake ml/kgw$^{0.82}$ | | | | |
| Sheep | 129.00$^{a}$ | 89.16$^{b}$ | 98.96$^{b}$ | 105.71±30.19 |
| Goats | 123.37$^{a}$ | 80.08$^{b}$ | 86.08$^{b}$ | 96.51±25 |
| Faecal water ml/kgw$^{0.82}$ | | | | |
| Sheep | 16.39$^{a}$ | 8.62$^{b}$ | 7.50$^{b}$ | 10.84±3.25 |
| Goats | 12.78$^{a}$ | 6.61$^{b}$ | 3.74$^{C}$ | 7.71±3.75 |
| Urinary water ml/kgw$^{0.82}$ | | | | |
| Sheep | 54.80$^{a}$ | 24.16$^{b}$ | 23.25$^{b}$ | 34.07± 6.25 |
| Goats | 51.13$^{a}$ | 15.75$^{b}$ | 7.65$^{C}$ | 24.84±18.79 |
| Insensible water loss ml/kgw$^{0.82}$ | | | | |
| sheep | 57.81b | 56.38b | 68.21a | 60.8 ±2.37 |
| Goats | 59.46b | 57.72b | 74.69a | 63.96 ±5.87 |

**a,b and c : Means within row with different superscripts are significantly different at (p<0.05).**

**Rumen liquor parameters :**

Data of rumimal pH of animal species receiving different experimental rations are illustrated in Table (5). Ruminal pH pre and 4 hrs post feeding indicated that goats showed highest values than sheep. The

mean values of ruminal pH pre feeding of animal species were 5.61 and 6.00 for sheep and goats, respectively. While it was 5.59 and 5.61 for the post feeding values.

This result agree with that obtained by Mohamed (1996) who stated that the mean values of pH pre and post feeding were 5.76 and 5.83 for sheep and 5.89 and 5.97 for goats, respectively.

Regardless to animal species it was clear that the highest values of pH in both pre and post feeding were recorded with B. hay. This legume plant is rich in protein content, in this connection Tjandraatmadja *et al.* (1993), showed that addition of legume plants to sheep diet significantly increased the rumen pH values.

Concerning the concentration of ruminal ammonia- N of sheep and goats, the mean values were 12.21 and 13.66 mg/l00 ml at zero time and 18,57 and 20.45 at 4 hrs post feeding, respectively.

Regardless to animal species the average values at ruminal ammonia- N showed that the high value is recorded with the ration containing high protein levels (Berseem hay). In this connection, Kandil *et al* (1991) stated that ruminal microbial protein synthesis requires an adequate supply of N to achieve maximal efficiency. Because of lower N content of other two plants than B. hay, uncoupled fermentation could occur (McMeniman,1976). These results agree with that obtained in the present study.

**Table5: Rumen liquor parameters at sheep and goats fed experimental rations.**

| Plants<br>Item | **Berseem hay** | ***A. monosperma* hay** | ***S.Vera* hay** | **Mean± SD** |
|---|---|---|---|---|
| pH | | | | |
| Pre feeding | | | | |
| Sheep | 6.42[a] | 5.07[b] | 5.33[b] | 5.61±0.39 |
| Goats | 6.68[a] | 5.71[b] | 5.62[b] | 6.00±0.46 |
| Post feeding | | | | |
| Sheep | 6.0[a] | 5.36[b] | 5.40[b] | 5.59±0.63 |
| Goats | 6.82[a] | 5.02[b] | 5.00[b] | 5.61±6.49 |
| Ammonia N. mg/l00ml Pre feeding | | | | |
| Sheep | 15.78[a] | 9.63[b] | 11.23[b] | 12.21±2.67 |
| Goats | 17.04[a] | 11.53[b] | 12.40[b] | 13.66±2.41 |
| Post feeding | | | | |
| Sheep | 23.58[a] | 16.17[b] | 15.97[b] | 18.57±2.13 |
| Goats | 24.78[a] | 18.57[b] | 17.99[b] | 20.45±2.82 |
| Total volatile fatty acids ml eq /100ml pre feeding | | | | |
| Sheep | 5.35 | 4.47 | 6.15 | 5.32±0.68 |
| Goats | 6.99 | 5.99 | 7.90 | 6.96±1.37 |
| Post feeding | | | | |
| Sheep | 10.80[b] | 10.38[b] | 14.25[a] | 11.81±2.08 |
| Goats | 11.33[b] | 12.38[b] | 16.77[a] | 13.49±2.11 |

**a,b and c : Means within row with different superscripts are significantly different at (p<0.05).**

The mean values of ruminal TVFA's were 5.32 and 6.96 ml.eq/ 100 ml at zero time for sheep and goats, respectively. TVFA's concentration in rumen reached at 3-4hrs post feeding (El- Shaer *et al* 1991 and Ibrahim, 1989). The TVFA's at 4 hrs post feeding were 11.81 and 13.49 ml eq/ 100 ml for sheep and goats, respectively. The present results showed that goats recorded the highest value while sheep recorded the lowest value. There results agree with that obtained by Mohamed (1996) who found that goats recorded high value of TVFA's than sheep when received desert plants. Also, Bhattia and Ghosal (1993) found that TVFA's production is related to many factors such as physical characteristics, chemical composition of feed, feeding frequency, method at feeding, watering and climatic conditions.

Regardless to animal species, the average of TVFA's values within 4.47 and 7.9 at zero time, but at 4 hrs post feeding the TVFA's values were fluctuating within a range between 10.38 and 16.77 ml eq/ 100 ml . However, animals fed *S. vera* hay recorded highest TVFA's values compared with those given other hay.

## CONCLUSION

From these results, it is recommended that to improve the native range species as well as to cultivate some of high potential shrubs, making hay of the succulent parts of less palatable and unpalatable species with other feed ingredients will increase the quality and quantity of feed resources.

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## دراسات غذائية على بعض النباتات الملحية باستخدام الأغنام والماعز الصحراوية

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أجري هذا البحث في مزرعة المركز القومي للبحوث بمنطقة النوبارية والتابعة لمحافظة البحيرة وقد تم الحصول على بعض النباتات والتي تنمو بصورة طبيعية في هذه المنطقة وتم تجفيفها شمسيا لعمل الدريس وقد أستخدم في هذه التجربة كلا من نبات السويدة والعادر وكان الهدف من الدراسة هو التقييم الكيماوي والغذائي لهاذين النباتين وإدخالهما في تغذية الأغنام والماعز بالمقارنة بدريس البرسيم مع تغطية ٥٠% من الإحتياجات الحافظة للأغنام والماعز المحلية من الشعير. وأظهرت أهم النتائج ما يلي:

كان محتوي البروتين للنباتين متقارباً (٩,٥٨%، ٩,٧%) لكل من السويده والعادر بينما كان أعلى فى دريس البرسيم (١٠,٥%). كما أن محتوي الألياف يقل عن نظيره في دريس البرسيم (حوالي ٣٣%)؛ كذلك وجد إرتفاع فى محتوي الدهن الخام لنبات العادر بالمقارنة بنبات السويده أو الدريس.

وجد أن المأكول من العليقة المحتوية على دريس البرسيم والشعير أعلي من المأكول في كل من العليقة المحتوية على نبات السويده او العادر. كذلك وجد أن الأغنام أقل إستهلاكاً للعلائق المختلفة بالمقارنة بالماعز.

ولقد وجد من النتائج الخاصة بتجارب الهضم أنه لا توجد فروق معنوية بين كل من الأغنام والماعز في هضم العلائق المختلفة كذلك سجلت الأغنام والماعز أعلي قيم لمعاملات الهضم مع العلائق المحتوية على نبات السويده اوالعادر بالمقارنة بدريس البرسيم وذلك في كل معاملات الهضم باستثناء معامل هضم الألياف حيث كان متساوياً في كل العلائق. كذلك أظهرت االقيم الغذائية للعلائق تفوق العليقة المحتوية على نبات العادر على العليقة المحتوية على نبات السويده وكان أقلهم العليقة المحتوية على دريس البرسيم. بينما كانت قيم البروتين الخام المهضوم تكاد تكون متساوية في العلائق الثلاث. ولم يلاحظ أي إختلاف بين الأغنام والماعز في القيم الغذائية.

وبالنسبة للنيتروجين المحتجز في الجسم أظهرت العليقة المحتوية على السويده أعلي القيم بينما العليقة المحتوية على دريس البرسيم أقل القيم، وعامة كان ميزان الأزوت موجباً في العلائق الثلاث. بالنسبة لقياسات الكرش وجد أن تركيز الأمونيا في سائل الكرش سجل أعلي القيم مع عليقة دريس البرسيم وكانت القيم تكاد تكون متقاربة في علائق السويده والعادر وكذلك وجد أن تركيز الأحماض الدهنية الطيارة أعلي في حالة التغذية على نبات السويده ثم العادر بينما سجلت عليقة الدريس أقل القيم.

من هذه الدراسة يمكن إستنتاج إمكانية إستخدام النباتات الصحراوية في تغذية الحيوانات الرعوية وذلك بعد إمدادها بالإضافات الغذائية ذات المستوي العالي من الطاقة مثل الشعير وذلك لتغطية الإحتياجات الغذائية لهذه الحيوانات الرعوية.