

Serum constituents and thyroid hormones in sheep fed *Kochia scoparia* hay

A. Riasi¹ and M. Danesh Mesgaran²

¹Department of Animal Science, Faculty of Agriculture, University of Birjand, Iran; ²Department of Animal Science, Faculty of Agriculture, Ferdowsi University of Mashhad, Iran;

riasi2008@gmail.com

Introduction

Kochia scoparia is a halophytic plant that typically grows in salty lands and seashores. During the last two decades, there has been increased interest in planting *Kochia* spp. and other halophytes in arid and semi-arid regions of Iran to improve animal production particularly when higher quality feeds are too expensive or not available in sufficient amounts (Rezvani Moghadam and Koocheki, 2003). The general nutritional characteristics of *Kochia scoparia* have been well defined and reported (Riasi *et al.*, 2008). However, the physiological effects of this plant need greater attention for effective use as a forage resource (Rankins *et al.*, 1991). The aim of study was to compare the effects of *Kochia scoparia* and lucerne hay on blood serum constituents and thyroid hormones of Baloochi ewes.

Material and methods

Ten Balouchi ewes (50±3 kg BW) were transferred to metabolism cages and randomly allocated to two dietary treatments (100% *Kochia* hay or 100% lucerne hay) for 45 days. *Kochia* and lucerne were harvested at mid bloom stage. The animals had *ad libitum* access to feed and water. During the last 3 days of experiment, blood samples were taken just before morning feeding and analysed for Ca, Mg (AOAC, 2000), bilirubin, GGT, GPT, GOT, T₃, and T₄ (using standard laboratory kits). The 3 days of data were averaged for each sheep before statistical analysis. During the final day of the experiment, blood samples were taken at different times (0, 2, 4, 6 h) after morning feeding and analysed for glucose and blood urea nitrogen (BUN). All data from experiment were analysed as a completely random design using the MIXED procedure of SAS[®] (1998). The differences between treatment means were declared significant at $P<0.05$. Trend towards significance were considered at $P<0.10$.

Results

The serum glucose ($P<0.01$) and BUN ($P<0.05$) levels were significantly lower at the different times after feeding *Kochia* compared with lucerne hay (Table 1). Linear relationship for the sampling time tended to be significant ($P<0.09$) for glucose and was not significant ($P>0.05$) for BUN. The quadratic relationships were significant ($P<0.05$) for both glucose and BUN. No differences were found between *Kochia scoparia* and lucerne hay in regards to serum Mg, glucose, bilirubin, GGT and T₃ hormone. However, there were some differences for the other serum constituents. Compared with lucerne hay, feeding *Kochia* significantly ($P<0.05$) elevated the activity of GOT (98.25±2.03 vs. 89.33±2.11 U/L), and GPT (39.17±1.23 vs. 30.56±1.71), and the concentration of T₄ hormone (16.72±0.24 vs. 10.52±0.46 µg/dl). Feeding *Kochia* significantly ($P<0.05$) decreased the serum concentration of Ca (6.3±0.12 vs. 9.4±0.28 mg/dl).

Table 1. Glucose and BUN (mg/dl) in blood serum at different times after feeding *Kochia scoparia* or Lucerne hay to 10 ewes.

| | | Forages | | Treat | | Linear | | Quadratic | |
|---------|-----|---------|---------|---------|------|---------|-----|-----------|-----|
| | | Kochia | Lucerne | P-value | SE | P-value | SE | P-value | SE |
| Glucose | 0 h | 40.4 | 49.3 | <0.01 | 1.3 | <0.09 | 0.6 | <0.05 | 0.3 |
| | 2 h | 42.3 | 51.3 | | | | | | |
| | 4 h | 42.1 | 55.1 | | | | | | |
| | 6 h | 41.2 | 52.4 | | | | | | |
| | | | | | | | | | |
| BUN | 0 h | 16.2 | 19.2 | <0.05 | 0.45 | >0.05 | 0.5 | <0.05 | 0.4 |
| | 2 h | 17.4 | 19.9 | | | | | | |
| | 4 h | 17.3 | 20.3 | | | | | | |
| | 6 h | 19.0 | 18.1 | | | | | | |
| | | | | | | | | | |

Discussion and conclusion

This study showed that *Kochia scoparia* affects some serum constituents and thyroid hormones of Iranian Baloochi ewes. Increasing the cellular enzymes (GOT and GPT) could be due to the mild toxicosis of *Kochia scoparia* that might have been unrecognised without blood clinical profiles. It appears that the energy, CP and Ca content of *Kochia scoparia* are not high enough to cover ruminant requirements. It is concluded that using this plant can be recommended for short-term feeding of sheep or only as a maintenance feed. There is a need to investigate the anti-nutritional factors of *Kochia scoparia* and the regimens for preventing its toxicity.

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