Observations on serum copper levels in three Omani goat breeds in different regions of Oman

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INTRODUCTION

Goats comprise a very important source of income for many Omanis, and are preferred for meat consumption. There are three economically important goat breeds in Oman, named after their local regions: Jabal Akhdar (JA), Batina (BAT) and Dofari (DOF).

Copper deficiency is an endemic problem in local livestock. Copper deficiency is known to cause many deleterious economical effects in goats including reduced growth rate (Osman et al, 2008), ataxia (Ivans, et al., 1990) and low haemoglobin concentration (Osman, et al., 2009).

Low Cu plasma levels were reported in the three breeds of goats in intensive management system (Osman, et al, 2003) and in grazing livestock (Ivans, et al, 1990).

RESULTS

145 out of the 187 goats studied (i.e. 77.5%) were sub-clinically low or deficient in serum copper. Within breeds none of the Batina goats were within the normal levels (Fig. 4). This reflected on the means of serum copper (mg/l) of all breeds which ranged from low to deficient, (Fig. 5). Batina had significantly lower levels than Jabal Akdar and Dofari.

Fig. 4: Percentage of goats with normal and low serum Cu

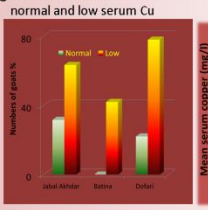
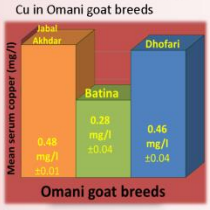


Fig. 5: Means (+/- SE) of serum Cu in Omani goat breeds



There was no significant effect (P>0.05) of age or sex or their interaction on serum Cu levels in Omani goats.

MATERIALS AND METHODS

Blood samples were collected from 184 goats of the three native breeds (Fig. 1) belonging to the geographical regions of Oman: Aljabal Alakhdar, Albatina and Dofar (Fig. 2). The goats' ages ranged between 3m to 8y (Fig. 3), and were comprised of 34 males and 150 females.

Fig. 1 Numbers of Omani goat breeds used in the study

The Jabal Akhdar goats were raised on partial range grazing plus stall supplementation while the Batina and Dofari goats were kept and fed indoors.

All animals were supplemented with extra Rhodes grass hay plus a variety of concentrates as well as mineralized salt licks that included copper.

Serum was collected from blood samples in situ, separated in vials and kept in a cool temperature, moved to the lab and frozen. They were then analyzed for total serum copper using atomic absorption spectrophotometry

Fig. 2 Geographical regions of goat breeds of Oman

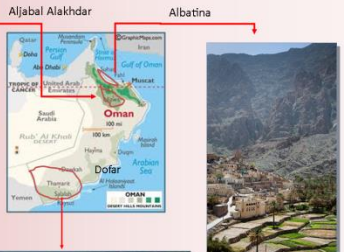


Fig. 3 Numbers of goats within each age group used in the study

DISCUSSION AND CONCLUSIONS

This study indicated that subclinical Cu deficiency in Omani goats may be prevalent in geographical regions covered in this study. That may indicate that any measurements which could have been followed by goat owners for alleviation of copper deficiency appeared to be inadequate. The copper source given to these goats, the salt-lick, was also not enough when used for growing kids (Osman, et al, 2003) or camels (Osman, 2012). Low copper, high iron and/or high sulphur and elevated molybdenum dietary levels were found in feeds offered to goats in previous studies in Oman (Ivans, et al. 1990; Osman, et al., 2003).

Studies carried on this issue in Oman are very scarce and are still within the investigation level. The economical effects and methods of alleviation of copper deficiency need to get more attention and studies. Further studies are needed to investigate levels of other minerals and trace elements in goat serum and levels in rangeland and pasture.

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FURTHER COMMUNICATIONS

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