

## Association of iodine, selenium and sulfur in soil and forage with serum levels of thyroid hormones and glutathione peroxidase activity in sheep in Ramhormoz city

Ali Abbas Nikvand<sup>1\*</sup>, Fatemeh Rastmanesh<sup>2</sup>, Seyedeh Missagh Jalali<sup>3</sup>  
and Negin Mollaei<sup>4</sup>

<sup>1</sup> Assistant Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>2</sup> Assistant Professor, Department of Geology, Faculty of Earth Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>3</sup> Associated Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>4</sup> MSC Student of Bio-environmental Geology, Faculty of Earth Sciences, Shahid Chamran University of Ahvaz, Ahvaz, Iran

Receive:10.06.2019

Accepted: 09.09.2019

### Abstract

Iodine and selenium have been identified as essential elements for animal health. Primary or secondary deficiencies of soil and forage iodine could be associated with thyroid glands dysfunction and abortion and selenium deficiency could be related to white muscle disease and decreased fertility in sheep. This study was aimed to evaluate the association of iodine, selenium and sulfur of soil and pastoral forages with serum levels of thyroid hormones and enzyme activity of glutathione peroxidase in sheep in Ramhormoz city, southwestern Iran. Four areas in Ramhormoz city were selected and eight soil samples, 8 forage samples (2 samples from each zone) and 60 sheep serum samples (15 samples from each zone) were obtained. With alkaline digesting, the soil samples were read by ICP-OES method. Forage samples were also analyzed using inductively coupled plasma mass spectrometry (ICP-MS). Serum levels of thyroid hormones and glutathione peroxidase enzyme activity (GPx) were measured by laboratory kits. The mean values of sulfur content in soil ( $2010 \pm 658$  mg/kg) and forage ( $21443 \pm 2999$  mg/kg) were significantly higher compared to its standard levels ( $p < 0.01$ ). The mean iodine and selenium of forage and serum thyroid hormones were in the normal range compared to the standard values. The mean sheep blood activity of GPx in two areas was in deficient status and two other areas were in the marginal levels. In conclusion, the amount of forage iodine in all areas was sufficient to meet the nutritional needs of sheep, and the levels of thyroid hormones were in the normal range. It seems, besides selenium was sufficient in forage, the high levels of soil and forage sulfur resulted in reducing selenium bioavailability for sheep as well as a deficiency to borderline deficiency status for GPx in sheep in the study area.

**Key words:** GPx, Iodine, Selenium, Sheep, Ramhormoz city

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\* **Corresponding Author:** Ali Abbas Nikvand, Assistant professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran, E-mail: a.nikvand@scu.ac.ir



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