



**Zabol University**

**School of Veterinary Medicine**

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**Title:**

**Survey of copper content in sheep and goats in Zabol city**

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**Winter 2025**

## Abstract

Copper is a rare metal essential for energy production, the activity of enzymes related to the formation of elastin and collagen, melanin synthesis, and the integrity of the nervous system, as well as for the natural formation of red blood cells. This study involved random sampling from 100 sheep and goats in the districts of Zabol, Hirmand, Hamoon, Zahedan, and Nimruz. In addition, two soil samples and one water sample were collected from each region. For soil analysis, one sample was taken from a depth of 0-20 centimeters. Based on the results obtained from the atomic absorption analysis of the samples, the average concentration of copper in sheep was found to be  $0.7647 \pm 0.24455$  mg/L, while in goats, it was  $0.6482 \pm 0.27199$  mg/L. The overall average serum copper concentration in all animals was  $0.7349 \pm 0.23905$  mg/L. In sheep, 4.8% exhibited severe copper deficiency, 37.1% had marginal copper deficiency, and 58.1% were within the normal range. In goats, 15.8% had severe copper deficiency, 55.3% were marginally deficient, and 28.9% fell within the normal range. Furthermore, the average concentrations of copper in water and soil were  $35.3620 \pm 8.28450$  ug/L and  $6/3701 \pm 1/48612$  mg/kg, respectively. The average concentrations of molybdenum in water and soil were  $0/4313 \pm 0/15141$  ug/L and  $0/5462 \pm 0/26636$  mg/kg, respectively. The average sulfur concentrations in water and soil were  $324/9100 \pm 90/11027$  ug/L and  $1054/8700 \pm 246/85421$  mg/kg, respectively. The average iron concentrations in water and soil were  $275/2430 \pm 60/47540$  ug/L and  $365/4740 \pm 100/96328$  mg/kg, respectively. The average sulfur level was found to be above the global standard, while molybdenum and iron levels were within the normal range, and the copper levels were below the expected values.

**Keywords:** Copper, Zabol, Sheep, Goat