Physico-chemical properties of Caeruloplasmin and its relationship with serum copper concentrations in dromedary camels and cows

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ABSTRACT

Adult and young camel caeruloplasmin (Cp) was isolated and purified. The molecular mass of the protein was approximately 130000 Da. The electrophoretic mobility of camel Cp is slightly higher as compared to human and sheep protein suggesting that the camel Cp is homogeneous, compact and more acid. The copper content was estimated to be 5.8 $\pm$ 0.3 atoms per molecule. The spectroscopic feature includes an absorption maximum at 610 nm, which could be attributed to type 1 copper. The kinetic parameters of the adult camel Cp for the specific activity as p-phenylendiamine oxidase were determined as *Km* = 0.42 mM and *V*max = 0.93 µM NADH/mn/mg Cp. The optimum pH for the activity was 5.7.

The relationship between caeruloplasmin and plasma copper concentration was investigated in camel and cows. ln the first experiment, five camels and five cows were fed with a similar basal diet during six months. They received oral trace element during 3 months. The linear correlation coefficient between copper concentration and caeruloplasmin (Cp) activity was 0.87 and 0.69 in cows and camels respectively. The increase of the mean caeruloplasmin activity in supplemented camels was more important compared to the correspondent bovine activity over the range of copper concentration investigated. ln a second experiment, four groups of 5 camels received one injection of copper and zinc (IM-group), an oral supplementation with copper sulphate (Cu-group), or zinc sulphate (Zn-group), and no supplementation (control-group). Copper plasma and caeru1oplasmin activity increased significantly in the lM and Cu-groups during the supplementation stage. The highest linear correlation coefficients (plasma copper Cu/Caeruloplasmin) activity were observed in IM and Cu-groups (0.84 and 0.79 respectively).

Keywords: Caeruloplasmin; Copper; Camel; Cow; Nutrition

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