

Brief Communication

GLUTATHIONE PEROXIDASE AND SELENIUM IN BLOOD
FROM EGYPTIAN WATER BUFFALOES*

Glutathione peroxidase activity in blood or erythrocytes is a useful indicator of selenium status in European cattle and sheep (*Anderson et al.* 1978). The present investigation was undertaken to elucidate whether this is also the case in water buffaloes.

Blood samples from 89 water buffaloes were collected at slaughter-houses in Egypt; 0.2 ml of isotonic sodium citrate solution per ml of blood was used as anticoagulant, and the samples were kept at 4°C during transport to Copenhagen. The samples were then centrifuged, and plasma and erythrocytes stored separately at -20°C until analyzed. Glutathione peroxidase activity (GSH-Px) was measured as described by *Jørgensen et al.* (1977), and selenium was determined fluorometrically (*Olson* 1969). Glutathione peroxidase activity was undetectable in plasma. Unfortunately the volume of sample available from each animal was too small to allow determination of both GSH-Px and selenium in erythrocytes, therefore, the latter was only measured in plasma.

The GSH-Px activity in erythrocytes ranged from 34 to 140 u/g of haemoglobin with a mean value of 73 ± 2.4 u/g Hb. The selenium concentration was determined in 33 samples chosen to represent animals over the entire range of GSH-Px values. The mean plasma selenium content was 0.029 ± 0.002 p.p.m., and the range was 0.011—0.045 p.p.m. A significant linear correlation was found between erythrocyte GSH-Px activity and plasma selenium concentration as shown in Fig. 1, the correlation coefficient was 0.559 ($r \neq 0$, $P < 0.001$).

Taking into account the dilution of plasma with citrate solution the plasma selenium concentrations of Egyptian water buffaloes are comparable to those found in Holstein-Frisian cows (*Scholz & Hutchinson* 1979). GSH-Px activity in erythrocytes seems to be slightly higher in water buffaloes than in

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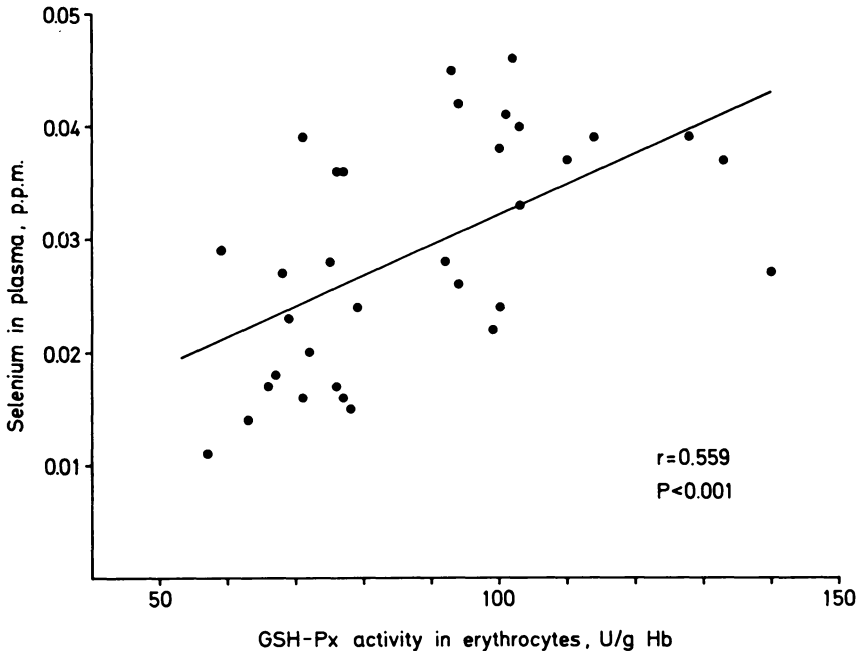


Figure 1. The relationship between erythrocyte glutathione peroxidase activity and plasma selenium concentration in Egyptian water buffaloes ($n = 33$).

European cattle breeds (*Thompson et al. 1976, Scholz & Hutchinson*). The correlation coefficient between GSH-Px activity and selenium concentration presented here is considerably lower than those found in the literature for the relationship between the two parameters in whole blood (*Arthur et al. 1979, Scholz & Hutchinson*). This is, however, not surprising since GSH-Px (and selenium) in erythrocytes reflects the selenium status of an animal over a long period, while plasma selenium is more closely related to the actual status at the time of sampling. Nevertheless, the results of this study indicate that erythrocyte GSH-Px activity can be used as a measure of selenium status of water buffaloes.

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REFERENCES

- Anderson, P. H., S. Berrett & D. S. P. Patterson:* Glutathione peroxidase in erythrocytes and muscle of cattle and sheep and its relationship to selenium. *J. comp. Path.* 1978, 88, 181—189.
- Arthur, J. R., J. Price & C. F. Mills:* Observations on the selenium status of cattle in the north-east of Scotland. *Vet. Rec.* 1979, 104, 340—341.
- Jørgensen, P. Fogd, J. Hyldgaard-Jensen & J. Moustgaard:* Glutathione peroxidase activity in porcine blood. *Acta vet. scand.* 1977, 18, 323—334.
- Olson, O. E.:* Fluorometric analysis of selenium in plants. *J. Ass. off. anal. Chem.* 1969, 52, 617—634.
- Scholz, R. W. & L. J. Hutchinson:* Distribution of glutathione peroxidase activity and selenium in the blood of dairy cows. *Amer. J. vet. Res.* 1979, 40, 245—249.
- Thompson, R. H., C. H. McMurray & W. J. Blanchflower:* The levels of selenium and glutathione peroxidase activity in blood of sheep, cows and pigs. *Res. Vet. Sci.* 1976, 20, 229—231.

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