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# دراسة نشاط أنزيم الجلوتاثيون بيروكسيديز وعلاقته بعنصر السلينوم في دم الجمال

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تمت الدراسة على عدد عشرون جمل لدراسة العلاقة بين أنزيم الجلوتاثيون بيروكسيديز وعنصر السلينوم في دم الجمال • وبعد التحليل الكيميائي الحيوي وتحليل النتائج احصائيا تبين أن هناك علاقة متوازية بين أنزيم الجلوتاثيون بيروكسيديز وعنصر السلينوم •

ونظرا لكون العنصر جزءا أساسيا في مكونات الأنزيم • لذا يعتبر قياس مستوى نشاط الأنزيم في كريات الدم الحمراء مؤشر لمستوى العنصر في الجمال •

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# *GLUTATHIONE PEROXIDASE ACTIVITY IN CAMELS ERYTHROCYTES (CAMELUS DROMEDARIUS) IN RELATION TO BLOOD SELENIUM CONCENTRATION*

*(With One Table & One Fig.)*

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## *SUMMARY*

Glutathione peroxidase activity (GSH-Px) and selenium concentration (Se) were determined in the blood of camels (Camelus Dromedarius) under field conditions. There was a highly significant correlation (r=0.935, P/ 0.001) between glutathione peroxidase activity (GSHPx) in R.B.Cs and whole blood selenium concentration.

Our results suggest that GSH-Px activity in erythrocytes could be used as a basis for rapid monitoring method for assessing the selenium status in camels, and that is the preliminary data on normal levels in camels.

## *INTRODUCTION*

Determination of an animal's selenium requirement and status was until recently depending on time consuming methods and highly specialized laboratory equipment. The discovery that selenium is an integral part of the enzyme glutathione peroxidase (GSH-Px) and that selenium through this enzyme exerts protection against peroxidative damage like vit E (ROTRUCK, et al. 1973 & TAPPEL, 1974) has, however, contributed considerably not only to a better understanding of the synergistic effect of two nutritive elements, but also to the development of sensitive index of the selenium status. It sppears that, the blood selenium and GSH-Px content is closely correlated in various species including cattle and sheep (ALLEN, et al. 1975 and THOMPSON, et al. 1976). Thus, analysis of this enzyme in blood may therefore provides a valuable index to monitor abnormal levels of enzyme activity related to improper selenium supplementation.

In camels, there is no available literature have been published previously concerning selenium status and GSH-Px activity.

Therefore, the present work was planned to give a preliminary study on the relationship between selenium (Se) and glutathione peroxidase activity (GSH-Px) of camels under field conditions. Another object was to investigate the usefulness of blood GSH-Px assay in determining Se-status of camels.

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## MATERIAL and METHODS

Twenty camels (Camelus Dromedarius, L.) 3 to 5 years old, and weighted from 350-500 k.g. B.Wt., were used in this study. These camels included 15 males and 5 females (non-pregnant).

These animals were clinically healthy, proved from general clinical examination, in addition to their blood and faecal samples that were free from blood and/or internal parasites.

Blood samples were obtained from jugular vein into a 20-ml heparinized evacuated tube[a], while camels kept were in a recumbent position.

Glutathione peroxidase (GSH-Px: glutathione $H_2O_2$ oxidoreductase 1.11. 1 g) activity was determined in 3 times washed red blood cells, according to the modification by ALLEN, et al. (1975) of the method of PAGLIA and VALENTINE (1967). Enzyme activity was expressed as units, where one unit was equivalent to 1 Umol NADPH oxidized/min./gm Hb at 25°C. While whole blood selenium concentration (se) was determined by the technique of KOH and BENSON (1983).

Standard statistical methods were used for calculating the correlation coefficient between glutathione peroxidase activity (GSH-Px) and whole blood selenium concentration (Se) after SNEDECOR and COCHRAN (1973).

## RESULTS

The results of blood seleinium (Se) concentration and glutathione peroxidase activity (GSH-Px) of 20 healthy camels of both sexes were summarized in Table (1). The blood selenium levels were ranging from 0.048 to 0.102 with a mean vlaue of 0.065±0.008 Ug/ml and 0.046 to 0.090 with a mean vlaue of 0.065±0.009 Ug/ml for both male and female camels, respectively. Their Their corresponding glutathione peroxidase activity (GSH-Px) were ranging from 16.923 to 35.727 with a mean value of 25.002±0.641 Iu/gm Hb and from 16.007 to 32.842 with a mean vlaue of 23.73±0.172 Iu/gm Hb for both male and female camels, respectively.

The relationship between glutathione peroxidase activity (y) and selenium concentration (x) in blood was determined by analysis of samples collected from camels (Fig. 1). The enzyme activity was positively correlated to the selenium concentration ($P \leq 0.001$, r=0.935). The regression equation was $y = -0.167+357.252\ x$.

There was no significant difference in both values of selenium and glutathione peroxidase activity (GSH-Px) between male and female examined camels blood.

## DISCUSSION

The identification of more and more vitamin and trace element enzyme associations forms the basic of a new methodology by which deficiencies may be detected with a sensitivity not obtainable by current methods. The recent discovery that glutathione peroxidase activity (GSH-Px) is a seleno-enzyme has widened considerably the possibilities not only for the elucidation of the biochemical role of this trace element, but also for the detection of selenium deficiency status.

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[a] Vacutainer, Becton-Dickinson and Co., Rutherford, N.J. 07070.

## BLOOD SELENIUM IN CAMELS

The results of this study showed a strong and positive correlation between selenium (Se) concentration and glutathione peroxidase activity (GSH-Px) in erythrocytes of camels (P/ 0.001, r = 0.935) Fig. 1, with a mean value of 0.066±0.008 and 0.065±0.009 Ug/ml for selenium concentrationin both male and female camels, respectively. While their corresponding glutathione peroxidase activity (GSH-Px) were 25.002±0.041 and 23.73±0.172 I.U/gm Hb, for both male and female camels, respectively (Table 1).

Similar correlation had been established in cattle, sheep and pigs (ALLEN, et al. 1975; THOMPSON, et al. 1976 and JORGENSEN, et al. 1977).

Therefore, it can be concluded that, glutathione peroxidase activity (GSH-Px) determineded by simple enzymatic analysis, appears to be a satisfactory indicator and a rapid mointoring method for assessing the selenium status in camels.

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**Table (1)**
**Results of blood selenium (Se) and glutathione peroxidase activity (GSH-Px) in camels under field conditin**

| Sex | No. | GSH-Px (Iu/gm Hb) | | Selenium (Ug/ml) | |
|---|---|---|---|---|---|
| | | Mean ± S.E. | Range | Mean ± S.E. | Range |
| Male | 15 | 25.002±0.841 | 16.923-35.727 | 0.066±0.008 | 0.040-0.102 |
| Female | 5 | 23.73 ±0.172 | 16.077-32.154 | 0.65 ±0.009 | 0.046-0.090 |

- Selenium concentration (Ug/ml)
- Enzyme activity was expressed as units, where unit was equivalent to 1 Umol NADPH oxidiz ed/min/gm Hb.

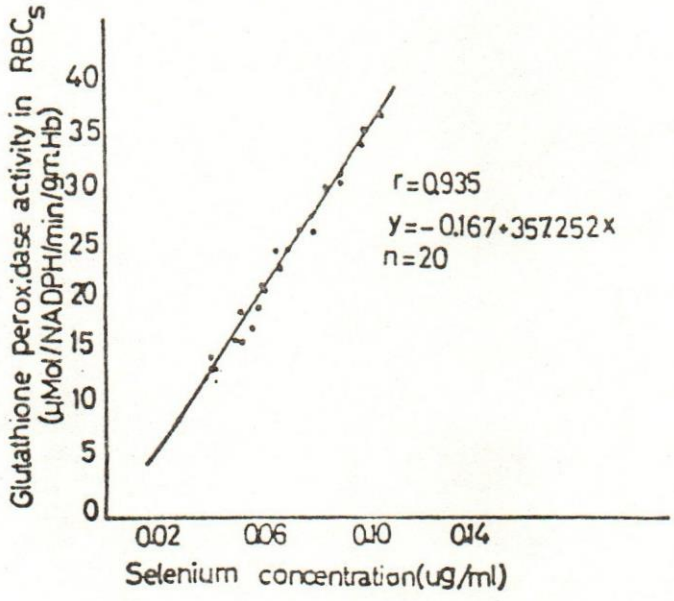


Fig. (1)

**Correlation between whole blood selenium (Se) concentration and glutathinone peroxidase activity in R.B.Cs of camels**