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ASSESSMENT OF SELENIUM STATUS IN HORSES

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The essentiality of selenium (Se) for membrane integrity, growth, reproduction and immune response in horses is well established. The dietary Se requirement in the horse is estimated to be 0.15-0.2 (Gesellschaft für Ernährungsphysiologie, 1994) or 0.15-0.3 mg/kg, respectively (NRC, 1989) and plasma Se levels between 100-200 µg/l are considered adequate. The objective of this study was to assess Se status in horses under various management and feeding conditions. Se in plasma and in feed samples as well as GSH-Px activity in whole blood as an indicator of Se status were measured in 304 horses of different ages, breeds and feeding regimes. Blood was collected by jugular venipuncture into vacuum tubes containing lithium heparin. Se concentration in plasma and in feed samples was determined by atomic absorption spectroscopy. GSH-Px activity in whole blood was analyzed by photometry and related to hemoglobin in blood. Results are presented as mean ± s.d. Regression analysis was used to evaluate the relationship between GSH-Px activity in whole blood and Se concentration in plasma. Plasma Se concentration (n=304) ranged from 16 to 291 µg/l with a mean of 116 µg/l, and GSH-Px activity extended from 2 to 190 U/g hemoglobin with a mean of 92.6 U/g hemoglobin. The relationship between plasma Se concentration and GSH-Px activity is best described by the linear regression equation: $y = 0.78x + 43.1$, $r = 0.49$. There was wide variation in measures of Se status, even if horses received the same feed supplement. 26% of the horses had plasma Se levels below 70 µg/l (dietary Se <0.15 mg/kg DM), but there was no evidence of myopathy in performance horses or reproductive difficulties in mares associated with low plasma Se levels. Horses that were given a mineral supplement containing selenium (255 mg/kg Se DM) had critically high plasma Se levels (about 300 µg/l). The results of this study raise some questions with regard to the consequences of a marginal selenium supply. In spite of low plasma Se levels, no medical problems were observed. Beyond that there is a high variability in Se status among horses even under the same feeding and management conditions.

