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# Fatty acid composition of erythrocytes in selenium deficient and selenium supplemented pigs

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Erythrocytes have constantly to cope with highly reactive oxygen–derived free radicals. High content of hemoglobin and iron, as well as oxygen, well known as lipid prooxidant factors, increases the possibility of cell membrane injury. Cell membrane contains large amount of polyunsaturated fatty acids (PUFA) in their phospholipid structures that are very susceptible to oxidative stress. Erythrocyte defense mechanisms against free radical attack comprise natural antioxidants and antioxidative enzymes. One of the enzymes is selenium-dependent gluthatione peroxidase. The activity of this enzyme is in correlation with dietary selenium intake (Hakkarainen et al.,1978). Se content of locally produced feeds in Serbia is low because the natural concentration in soils is low. Several investigators showed that in Serbia livestock fed on usual feeds have low selenium concentration in tissues (Mihailovic et al., 1991, Maksimovic et al., 1992).

The aim of this work was to establish the effect of selenium deficiency, as well as the possible effect of long- term selenium dietary supplementation with inorganic or organic Se on fatty acid composition of erythrocyte lipids.

Eighteen experimental animals were fed basal corn + defatted soybean meal low in selenium for 4 weeks depletion period. Level of natural selenium in basal diet was 17 μg/kg. The main fatty acids in the diet were linoleic (50.8%), oleic (27.2%), and palmitic (11.8%). The animals were after depletion period divided into three experimental groups. Next dietary treatments were applied to the pigs for five months period: (a) basal diet (control); (b) basal diet supplemented with 0.3ppm selenium from sodium selenite (group I); (c) basal diet supplemented with 0.3ppm selenium from selenized yeast (group II).

Blood was sampled by neck venepunction from the animals that at the time of the end of the experiment weighted approximately 75kg liveweight. After separation of plasma washed erythrocytes were frozen until further investigation. Total lipids were extracted from erythrocytes with methanol –chloroform mixture (2:1,v/v). Fatty acids were separated after alkaline saponification and fatty acid methyl esters were prepared with boron trifluoride solution. Analyses of fatty acid composition were accomplished on gas chromatograph Varian 1400 with FID detector. Differences between experimental and control groups were evaluated using Mann-Whitney test.

Main fatty acids (FA) in erythrocyte lipids were palmitic, stearic, oleic, linoleic, and arachidonic. Their relative amounts are shown in table (mean value).

Table: FA composition of erythrocyte lipids (%)

| Fatty acid | Control | Group I | Group II |
|---|---|---|---|
| Palmitic | 26.6 | 19.1 | 23.2 |
| Stearic | 17.4 | 17.1 | 18.7 |
| Oleic | 26.1 | 30.4 | 29.3 |
| Linoleic | 12.6 | 13.7 | 12.3 |
| Arachidonic | 2.5 | 6.1 | 4.9 |

Erythrocyte lipids from Se deficient animals contained significantly less PUFAs (linoleic + arachidonic) than in both supplemented groups. Noticed difference was more distinctive when arachidonic acid was concerned which could be explained with the presence of more double bonds in its molecule. Dietary supplementation with inorganic Se was more effective in protection of erythrocyte PUFAs than supplementation with selenized yeast.

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