UTJECAJ DODATKA SELENA U HRANU OVACA NA PROIZVODNA SVOJSTVA, ANTIOKSIDATIVNI STATUS I METABOLIČKI PROFIL JANJADI

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Disertacija [(2)]

Cilj ovoga istraživanja bio je utvrditi utjecaj dodatka selena (organskoga i anorganskoga) u krmnu smjesu visokogravidnih ovaca, na proizvodne pokazatelje janjadi, koncentraciju selena u krvi ovaca i njihove janjadi, pokazatelje antioksidativnoga statusa u krvi ovaca i njihove janjadi, metabolički profil ovaca i njihove janjadi te koncentraciju hormona štitaste žlijezde. Ovce su bile u posljednjoj trećini gravidnosti, prosječne dobi 4 godine, zdrave i u dobroj kondiciji, podijeljene u tri skupine po 10 grla. Istraživanje je trajalo 4 mjeseca, odnosno 2 mjeseca na ovcama u razdoblju visoke gravidnosti i 2 mjeseca s ovcama u laktaciji te u njihove janjadi u razdoblju sisanja. Kontrolnoj I. skupini ovaca obrok je bio sastavljen od 300 g/danu/životinji krmne smjese bez dodatka selena i 150 g/danu/životinji ječma te sijena lucerne, koje su imale na raspolaganju po volji. Drugoj skupini ovaca dodan je u krmnu smjesu dodatak od 0,3 mg/kg organskog izvora selena (Sel-Plex®), a trećoj skupini ista količina anorganskoga selena (natrijev selenit). Dodatak selena u krmnu smjesu ovaca nije značajno utjecao na proizvodne pokazatelje njihove janjadi nakon partusa. U ovaca i njihove janjadi dodatak selena u krmnu smjesu značajno je utjecao ($P<0,01$; $P<0,05$) na rast koncentracije selena, GSH-Px i SOD u punoj krvi u odnosu na kontrolnu skupinu. Organski izvor selena imao je značajniji utjecaj na porast koncentracije selena i aktivnosti GSH-Px u krvi. U ovaca i janjadi utvrđen je pad koncentracije MDA u krvi s porastom koncentracije selena u krvi. Dodatak selena utjecao je na porast broja WBC ($P<0,05$), odnosno udjela limfocita u krvi ovaca i janjadi. Utvrđen je porast broja RBC, HGB i MCV u janjadi te MCH i MCHC u ovaca koje su imale dodatak selena u krmnoj smjesi. Koncentracija Ca, Cl, Na i Fe značajno je porasla u krvi ovaca hranjenih dodatkom selena u krmnoj smjesi. U ovaca dodatak selena u krmnu smjesu utjecao je na značajan rast koncentracija ureje i triglicerida te tendenciju porasta glukoze. U janjadi je utvrđen značajan pad kolesterola, triglicerida, globulina, HDL kolesterola te HCO_3^-, a značajan rast ureje, albumina i LDL kolesterola u krvi pri dodatku selena u hranu. Anorganski izvor selena utjecao je na značajan porast pO_2 u krvi ovaca ($P<0,05$) te tendenciju porasta u janjadi. Razlika jakih iona (SID) i *z*-vrijednost u krvi janjadi prosječne dobi od 23 dana značajno su pale pri dodatku anorganskoga selena u krmnu smjesu. Anorganski dodatak selena u hrani visokogravidnih ovaca utjecao je na značajan porast anionskoga procjepa. Utvrđena je veća aktivnost AST-a i LDH-a te niža aktivnost CK-a u serumu ovaca koje su u obrocima imale dodatak selena, dok je u janjadi, uz dodatak organskoga i anorganskoga selena, utvrđena značajno niža aktivnosti AST-a, GGT-a i CK-a. U visokogravidnih ovaca dodatak selena utjecao na rast koncentracije T_3 i T_4 u krvi. Anorganski dodatak selena u ovaca u laktaciji značajno je povisio koncentracije T_3. U janjadi, prosječne dobi od 23 dana dodatak selena povisio je koncentracije T_3 i T_4, dok je u dobi od 63 dana utjecao na rast T_3 i pad T_4. Najviša koncentracija selena u mlijeku utvrđena je u ovaca koje su imale dodatak organskoga selena u obrocima. Značajno pozitivna korelacija između koncentracije selena i aktivnosti GSH-Px u krvi ovaca i janjadi utvrđena je pri dodatku organskoga selena u krmnu smjesu. Također, utvrđena je pozitivna korelacija između koncentracije selena u punoj krvi ovaca i njihove janjadi, koja je bila značajna pri dodatku organskoga selena. Dobra povezanost utvrđena je između GSH–Px, SOD i MDA u punoj krvi ovaca i janjadi, koja je bila jača pri organskom, u odnosu na anorganski dodatak selena u hrani ovaca i janjadi. Dodatak organskoga selena u hrani ovaca značajnije je povisio njegovu koncentraciju u krvi ovaca i janjadi te utjecao na rast aktivnosti enzima GSH-Px, koji je pouzdaniji pokazatelj u praćenju opskrbljenosti organizma selenom.

Ključne riječi: ovce, janjad, selen, proizvodna svojstva, antioksidativni status, metabolički profil, štitasta žlijezde

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INFLUENCE OF DIETARY SELENIUM SUPPLEMENTATION OF EWES ON PRODUCTION TRAITS, ANTIOXIDANT STATUS AND METABOLIC PROFILE OF LAMBS

Doctoral thesis

The aim of this study was to determine the effect of dietary selenium supplementation (organic, inorganic) of high pregnant ewes on the production traits of lambs, the concentration of selenium in the blood of ewes and their lambs, indicators of antioxidant status in the blood of ewes and their lambs, the metabolic profile of ewes and their lambs and concentrations of thyroid hormones. Ewes were in the last third of pregnancy, the average age of four years, healthy and in good condition, divided into three groups of 10 animals. The research lasted 4 months respectively, 2 months with ewes during high pregnancy, 2 months with ewes during lactation and on their lambs during suckling period. Ewes ration from control group one was composed from 300 g/day/animal feed mixture without addition of selenium and 150 g/day/animal barley and alfalfa hay that they had *ad libitum.* Feed mixture from second group of ewes was supplemented with 0.3 mg/kg organic form of selenium (Sel-Plex®), and feed mixture from third group with the same amount inorganic form of selenium (sodium selenite). Selenium supplementation of ewes feed mixture did not significantly influence on the production traits of their lambs postpartum. Selenium supplementation of ewes and their lambs had influence on a significant ($P<0.01$; $P<0.05$) increase in the concentration of selenium, GSH-Px and SOD in whole blood compared to control group of ewes. Organic selenium supplement had a more significant impact on the increase in concentration of selenium and GSH-Px in the blood. In the ewes and lambs blood was determined decrease of MDA with increasing concentrations of selenium in the blood. Generally, the selenium supplementation led to an increase ($P<0.05$) in the number of WBC and lymphocytes in the blood of ewes and lambs. Also, the increase in the number of RBC, HGB content and MCV in lambs and MCH as well as MCHC in ewes that had a selenium supplement in feed mixture were determined. Concentration of Ca, Cl, Na and Fe significantly increased in the blood of supplemented ewes. Addition of selenium in feed mixture of ewes had influence on significant increase of serum urea and triglycerides and increasing trend of glucose. In the lambs was determined significant decrease in cholesterol, triglycerides, globulin, HDL, and HCO_3^-, a significant increase in urea, albumin and LDL levels with the addition of selenium in feed mixture. Inorganic source of selenium influenced on a significant increase of pO_2 in the blood of ewes and increasing trend in lambs. Strong ion difference (SID) and the *z*-value in the blood of lambs, average age of 23 days, were significantly decreased with the addition of inorganic selenium in the feed mixture. Inorganic selenium supplement in the feed mixture of pregnant ewes influenced a significant increase in the anion gap. It was determined a slight increase in activity of AST and LDH and a decrease in serum CK of ewes supplemented with selenium, while in the lambs organic and inorganic selenium supplements influenced on a significant decrease of AST, GGT and CK. Selenium supplementation of high pregnant ewes had influence on the growth of the concentration of T_3 and T_4 in the blood. Inorganic selenium supplement in lactating ewes influenced a significant increase in concentration of T_3. In the lambs, average age 23 days, selenium supplement had influence increase of concentrations of T_3 and T_4, while aged 63 days had influence on increase T_3 and decrease T_4. The highest concentration of selenium in milk was determined in ewes that had supplement of organic selenium in the rations. A significant positive correlation between selenium concentration and GSH-Px in the blood of ewes and lambs was determined with the addition of organic selenium in feed mixture. Also, positive correlation was determined between the concentration of selenium in whole blood of ewes and their lambs, which was significant with supplementation of organic selenium. Also, positive correlation between GSH-Px, SOD and MDA was determined in whole blood of ewes and lambs that was stronger in organic compared to inorganic selenium supplement in feed mixture of ewes and lambs. Supplementation of ewes with organic selenium was significantly increased its concentration in the blood of ewes and lambs, and had influence on increase of GSH-Px, which is more reliable indicator in monitoring the supply of body with selenium.

Key-words: ewes, lambs, selenium, production characteristic, antioxidant status, metabolic profile, thyroid gland