Journal of Animal and Veterinary Advances 9 (11): 1681-1683, 2010
ISSN: 1680-5593

The Biogeochemical Properties of Selenium and its Effect on Buffalo Offspring

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Abstract: Selenium has an enormous impact on the living organisms. This element is also important for its biological role. In the Republic of Azerbaijan, unlike other examples identified, biogeochemical regions are affected by selenium deficiency. In Azerbaijan according to the studies on amount of selenium in malnourished animals especially in buffalo offspring are lack and white muscle and muscular dystrophy based diet (nutritional muscular dystophy) diseases are seen. The animals have white muscle disease feeding on forages and this forage has 8 times lower amount of selenium than healthy animals forages. Water buffaloes found on the swamp during the day eat reed living in water. This causes the disease. But sheep eat milk vetch after the first snow fall. Therefore, white muscle disease in sheep is not visible in Azerbaijan.

Key words: Selenium, Azerbaijan, living organisms, buffalo, offspring, dystrophy

INTRODUCTION

The more or less occurrence of elements in the environment in living organisms causes endemic diseases. Such elements are called the Biogeochemistry element. Vernadskiy is the pioneer of the introduce Biogeochemistry as science. The rapid development of science in the process of globalization in the information age brings a new dimension to one of science Biogeochemistry. Biogeochemistry, live in the biosphere of the effect of elements transportation is one of the science teaching. Fersman (1959), Gulahmedov (1986) and Halilova (1974) reveals abnormalities in the environment of chemical elements have to explain the Biogeochemistry. This is the basis of science, some geology, biology and chemistry has created problems.

Earth element selenium is found in trace amounts in many materials. The amount of Selenium in earth is determined as the average 0.09 ppm (Lakin, 1972). Selenium has been determined in many types of rocks, minerals in the volcanic material in fossil fuels, soils, plants and in the presence of water. When the main material of the soil broken, selenium appear and transferred to soil and taken by plants. When the plants died back to soil, selenium in the body is returned to soil. Some amount of selenium is evaporated into atmosphere. Selenium in the atmosphere obtained by plants and these plants named as concentrators plants and return to the soil. Animals and humans also receive selenium from the plants (Halilova, 1976; Halilova and Suzudogru, 2000). More or less selenium microelement affects the environment. The biological importance of selenium was not known until the discovery of selenium caused toxicity in the death and abnormalities of farm animals fed with certain plants in Wyoming and Dakota in USA (Franke, 1934).

Selenium poisoning of animals recorded in Canada, Colombia, Ireland and Israel. Later research on the role of selenium in living organisms showed that selenium in animal and plant organisms should be in the specific criteria indicated. Causes degradation of these criteria, toksikoz disease can be seen. In normal situation, the amount of selenium should be not excess 6×10^{-5}% in plants and animal organs. In selenium deficiency situation in malnourished animals (especially youth), white muscle disease, muscular dystrophy based diet (nutritional muscular dystrophy) and reproductive disorders can be seen (Kacar and Katkat, 1998). White muscle disease due to selenium deficiency is common in the province accepted biogeochemical region. This disease recorded in Estonia, Belarus, Russia and Azerbaijan (Halilova, 1996). The reason of increase white muscular diseases of animals is a result of poor quality fodder. The low amount of selenium in straw is the result of too late harvest and stay long time under rain.

MATERIALS AND METHODS

The reason of the search microelement, selenium in the soil and plants in the Republic of Azerbaijan is that white muscle disease in buffalo offspring is visible. The symptoms of white muscle disease have seen in

Azerbaijan's November-Ismail, Berd, Samhor, Han and the other 25 regions. In soil, forage crops and in the organs of the buffalo offsprings, selenium microelement was determined by 3.3 diaminobenzidin method (Nazarenko and Yermakov, 1971).

RESULTS AND DISCUSSION

Previously studies conducted in Azerbaijan (Dilbazi, 1969; Halilova, 1974, 1976) and white muscle disease is seen a total 25 regions. Lack of selenium in the animals feed rations may have resulted white muscle disease in animals. The change of protein, minerals and vitamins in diseased animals are observed. In general protein and carotene decrease, the amount of protein in the urine becomes increase and sugar and acetone compounds will also increase. Triple phosphates, leukocytes and erythrocytes are found in residual urine. The amount of selenium found in non-white muscle diseased areas are between 0.06-1.19 mg kg^{-1}. Selenium mostly found in cotton seed, clove and milk vetch. However, milk vetch as food is inedible by the buffaloes and buffaloes eat reed growing in water. This causes the disease. But sheep eat milk vetch after the first snow fall. Therefore, white muscle disease can not be seen in Azerbaijan on shep. The minimum and maximum limit of selenium should be found in feed of animals expressed as dry matter basis are determined as 0.02 and 0.3 ppm, respectively.

As a microelement in nutrition, selenium is first time determined in 1957 by Schwartz and Foltz in rats because it prevented liver necrosis in vitamin E deficiency conditions in rats. Previously, nutrition professionals who are interested in toxicity of selenium, this discovery of the metabolic function and selenium deficiency after the results of the research began to be created. Many investigators showed that selenium has not the only metabolic functions as well as the failure of many human diseases has proved to be linked (Anonymous, 1983).

The amount of selenium in forage crops depends on plant and soil. The selenium is abundant in gengiz (1.9), clover (1.0) and milk vetch (0.9). The amount of selenium in plants grown in the swamp area is very low (0.03 ppm) (Table 1). The white muscle disease symptoms in buffalo offspring has determined in Azerbaijan in the first time by Dilbazi (1969). The amount of selenium in the organs and blood of diseased and non-diseased buffalo offspring was investigated. As a result of research, selenium element exists in the organs of both diseased and non-diseased animals. According to research, the highest amount of selenium in the organs of healthy buffalo offspring can be found in limfa nodules, lung, spleen, eye and muscle

Table 1: The amount of selenium in forage lead white muscle disease found in diseased and free of disease buffalo offspring

Forage	Without disease (ppm)	With Disease (ppm)
Wheat straw	0.06	0.06
Cotton seed	0.07	0.07
Clove	1.00	0.07
Gengiz	1.90	1.90
Barley straw	0.06	0.06
Wheat (Dry hay)	0.06	0.06
Dry hay	0.50	-
Milk vetch	0.90	0.80

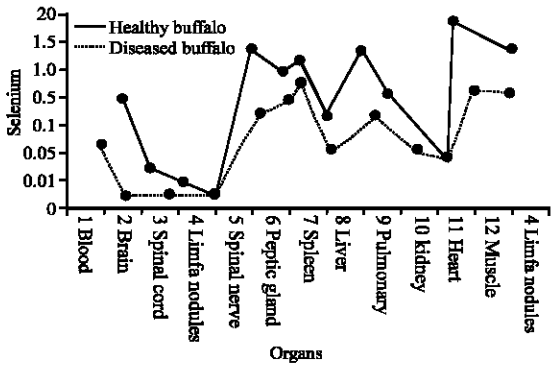

Fig. 1: The amount of selenium (ppm) found in different organs in buffalo offspring

(Fig. 1). The same organs in animals and patients, even a small amount of selenium is higher than other organs. The amount of selenium in eye and muscle of diseased animals decreased sharply compared healthy animals.

CONCLUSION

Gengiz, geven and clover plants are high in selenium element and therefore it can be recommended that these plants should be added to feeding rasions in cattle. According to research, whether healthy or disease conditions, the amount of selenium in brain and heart of animals does not change.

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