ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(6): 265-267
www.allresearchjournal.com
Received: 02-04-2016
Accepted: 03-04-2016

Eshburiev Sobir
The Department of Non-contagious animal diseases, obstetrics and gynecology, Faculty of Veterinary Medicine, Samarkand Agricultural Institute, Samarkand, Uzbekistan, 140103

Correspondence
Eshburiev Sobir
The Department of Non-contagious animal diseases, obstetrics and gynecology, Faculty of Veterinary Medicine, Samarkand Agricultural Institute, Samarkand, Uzbekistan, 140103

Etiopathogenesis and symptoms of vitamin-mineral metabolism violation in cows

Eshburiev Sobir

Abstract
Productive cows metabolism violation reasons are sugar-protein ratio, calcium and phosphorus balance disorder and also the lack of carotene, the nutrient content of microelements (cooper, cobalt, manganese and zinc) amount which do not satisfy the necessity of these microelements in cows.
Vitamin and mineral metabolism violation in cows are characterized by appetite changes (lambitus), hypotonia of front parts of stomach pale mucous membranes (anaemia), skin elasticity decrease and dryness, the skin layer brightness decline, rough skin, the spine shape change (lordosis), enlarged joints change of hooves shape, cutting teeth loosening, the last tail vertebra displacement symptoms and also decrease of red blood cells in blood, hypohaemoglobinaemia, hypoglykaemia, hypocarotinaemia, hypophosphoremia, hypocalciemia, hypocobaltosis, hypocuprosis, the activation of acid phosphotaza ferment and increase of acidity in stomach fluid (acidosis) and decline of the number of infusorians.

Keywords: substances metabolism exchange, vitamins, ferments, minerals, osteodystrophia, endemic goitre (struma endemica), hypocobaltosis, anaemia, acidosis, lordosis, Infusorians.

1. Introduction
In productive cows coming across different noninfectious character diseases such as A, D, E-hypovitaminosis, calcium, phosphorus, iron, copper, cobalt, manganese, zinc minerals metabolism disorder bring to the abrupt decline of productivity, increased food costs and veterinary expenses, susceptible to diseases and death of newborn calves and the cattle farms are facing a great economic damage. As a result of cattle vitamin and mineral violation the pathologies like osteodystrophia, endemic goiter, hypocobaltosis, hypocuprosis, hoof diseases, nutritional in fertility, delay in the placenta, mastitis and endometritis appear.
The problem of cows' vitamin and mineral violation spreading economic damage, the study of the symptoms and syndromes causes, diagnosis and effective methods of preventing are the current case of present time. Many scholars trace microelements and vitamins biological importance like the following: microelements are the cofactors of a number of ferments and compose physiologically active substances components (cobalt B_{12} vitamin, iodine the component of thyroid hormones); trace activity of proteins structure change of microelements ferments and influence their activity and individuality; microelements are absorbed into the blood by thin intestines part in the form of metalloproteinase complex.
Vitamins are very important physiologically and take part in most important chemical process of substance exchange. In particular "A" group vitamins A_1, A_2, A_3 are antixerophthalmical vitamins and their deficiency slow down the growth of animals and tissue regeneration. Alike all animals "A" hypovitaminosis are injured by respiratory and digestive organs, coming across the pathological changes of reproductive system in the mucous membranes of the epithelium tissue, eye and nasal mucosal inflammation, xerophtalmia eye cornea lackluster and night blind (hemeralopia) Sherbakov T.G. A.V. Korobov 2003. I.P. Kondrahin, V.I. Levchenko 2005 [3, 2].
The main reasons of vitamin and minerals metabolism violation in cows are the elements dis-balance in ration that is 12-15% copper, zinc from 18 to 35% from 5 to 7% of manganese 41% of carotene, vitamin E 13% to 97% deficiency of vitamin "A", 20-24% of iron superfluous (O.V. Tankova 2011) [10].
Attention is paid to the microelementosis suspected animals with clinical examination to fatness level and skin surface condition. Fatness sharp decrease is observed in hypocobaltosis and other endemic microelementosis period.

The skin layer is rough, brittle or fall. Big wool falling in big parts of the body (alopecia), enzootic osteodystrophia, iodine, copper, cobalt and other microelements deficiency is noted (N.A. Urazaev and other, 1990).

Iodine deficiency is characterized by an increase growth of wool in head and neck parts. Forehead and neck surface wool length was to 12-15 sm and looked like a specific hire tuft. Copper deficiency brings to wool depigmentation (P. Slavik., J. Illek, T. Zeleny., 2006) [9].

Zinc deficiency is characterized by dry skin, folds of the skin, parakeratosis, enzootic osteodystrophia, hypocuprosis, endemic goitre and other endemic diseases in cardiovascular system functional and morphological changes (myocardosis), appetite changes (lambitus), the majority of hypomicroelementosis (fluorosis, caries, osteodystrophia) saliva flow, teeth, lip, buckle and the changes in tongue accompanied by difficult foods chewing (L. Pavlata, A. Podhorsky, A. Pechova, P. Chomat 2005, Butore Joseph 2005, A.P. Kurdeko and other 2009) [8, 1, 5].

Pathological changes in bone tissue accompanied in calcium, phosphorus, copper, manganese and cobalt exchange violation. The rib bones are softening, leg bones are crooked, teeth loosening, the last tail vertebra absorption, volume diminish and sometimes completely absorbed (Shcherbakov T.G, A.V. Korobov 2003, A.A. Kabish 2007) [3, 4].

2. Materials and methods

Scientific research have been carried out in some cattle farms of Samarkand region to study the cows vitamin and mineral "similar couples" 4-5 year old cows of black and white breed have been selected for dispensary inspections. Cows of 8-9 months pregnancy and 1-2 months lactation were checked to clinic, hematological and some indicators of abdominal fluid. Food composition and nutrition's food intake was analyzed to satisfy cows' body needs for vitamins and mineral substances.

Blood samples were taken from them in order to study the level of metabolism in cows the number of red blood cells (Goryaev's type of calculation), hemoglobin (hemoglobinum-cyanide method), glucose (with ortho-toluidine reaction), serum total protein (refractometer method), alkaline reserve (I.P. Kondrahin's method), alkaline phosphatase ferment activity (method of Bodanski), calcium (V.P. Vichev, L.V. Karakashov's method), inorganic phosphate (Puls method of V.F. Kromislov and L.A. Kudryavceva), carotene (method of Karr Price, Udkin modification), the amount of vitamin "A" (Besseya's method, A. Anisova modification), micronutrients content in blood (Su, Co, Mn, Zn) atomic absorption spectrophotometry method by "Hitachi" apparatus, large abdominal fluid medium (pH-meter), amount of infusorians (Goryaev's type of calculation) were identified [2].

3. The analysis of the results

Winter ration showed that 27, 6% was maize silage 20, 8% alfalfa haylage 13, 7% alfalfa hay, 6, 89% cotton meal (shrot), 10, 3% cotton husks, 6,89% was grape and 13, 7% apple scraps. The overall nutritional ration comprise 9, 32 food unit, 1312gr digest protein, 411, 6gr sugar 276mg carotene,106,9gr of calcium, 38, 1gr phosphate and 4542, 4gr of fiber.

According to nutrition food unit standard of 0, 68 was as less as 488, 4gr sugar, 174gr carotene 9, 9gr phosphorus and digestive protein 312gr, calcium 38, 9gr, fiber 1162gr was more against standard.

Digestive protein composed 1312 gr and its supply amounted to 131, 2%. One feeding unit was equal to 161gr of digestive protein in the ration. The proportion of sugar-protein was 0, 31 instead of 0, 8:1.

The amount of carotene in cows ration were 174 mg and the supply amounted to 61, 3%. Carotene deficiency in the ration brings to endogenous synthesis and stockpiles reduce of retinol in the body and as a result to metabolism of substance exchange and also to negative influence of fetus development (Porfiryev I.A 2001) [6].

Phosphorus and calcium in the ration were 0, 35 instead of 1:2. This disproportion of microelements information is given in the literature as bad intestine absorption and the decline of stockpiles of bones and also osteodystrophia diseases development in animals (I.P. Kondrahin, 2005) [2].

When analyzed according to amount of microelements in the ration there was 70, 5 mg of copper instead of standard 140 g, cobalt 6g instead of 20 mg manganese 363, 8 mg instead of 400 mg and zinc 271, 5 mg instead of 300 mg. These indicators show that the dairy cows' body in microelements needs are in a negative condition.

Vitamin and minerals metabolism violation is characterized by low obesity of cows been under study, 60-70% of the animals get appetite changes (lambitus) hypotoniya of front parts of stomach, pale mucous membranes, decreased skin elasticity and dryness, folded layer of the skin appear, skin rash, and dandruff, the skin layer brightness decline, rough skin and the flow of tears, the spine shape change larger joints start limping, hooves shape change and wrong growth loosening of cutting teeth in 80% of cows.

In 80% of pregnant cows was observed the absorption of the last tail vertebra and this indicator amounted to 90% from the 2nd month of lactation.

As a result of osteodystrophia in cows of 30-40% was (lordosis), 50-60% animals got mucous white membranes (anaemia) 30-40% of animals skin pleated form, very often change of feet, deficiency of copper, cobalt and zinc in the body.

Manganese deficiency is observed by joints enlarge and deformation, tongue playing and rotating in spiral way.

The amount of hemoglobin in blood of 8 months cows pregnancy was average 98, 4±4,2g/l, 9-months pregnancy 94, 9±5, 6g/l. This indicator of the 1st - 2nd month of lactation was respectively 86, 8±6, 2g/l average and 76, 5±5, 5g/l (standard is 99-129g/l).

The concentration of glucose in cows blood was observed much less from the standard and at the 8th month of pregnancy it was average 2, 18±0,16mol/l, the 9th month 2, 12±0, 18 mol/l (standard 2, 22-2, 33 mol/l). During lactation this indicator decreased and in the 1st - 2nd month it was accordingly average 2, 10±0, 15 mol/l and 2, 06±0, 16 mol/l. The amount of glucose decrease in the blood during lactation is explained by the high needs of energy supply while milking and the latter is not enough.

The amount of blood serum alkaline reserve normal is (standard 46-66% volume CO_2) and being much less than standard compiled on the 8th month of pregnancy 49, 5±3,8 volume% CO_2, the 9th month 45, 6±4, 5 volume% CO_2. The first month of lactation average from 42, 6±4, 8 volume% CO_2, second month decreased to 38, 5±4, 6 volume% CO_2. Alkaline substances decrease in the blood shows that in milking cow's body being under acid environment i.e.

acidosis condition is strengthening.

In cows blood serum alkaline phosphatase ferment activation increase was observed during lactation and after 2 months it was average 1, 76±0, 27 mkmol h/l (standard 0, 4-1, 4 mkmol.h/l). Blood serum alkaline phosphatase ferment activity increase is explained by strengthening of calcium absorption from the bones.

Vitamins exchange in cows bodies is characterized by the quantity of retinol and carotene in blood serum last pregnancy period average 0, 392±0, 08 mg% and 50, 3±5, 20mkg% and these indicators are average 0, 283±0, 09mg% and 18, 2±5, 39mkg% decrease on the second month of lactation.

Microelements exchange in dairy cows lactation period is characterized by a general decrease in the amount of calcium and inorganic phosphorus. On the last month of cows pregnancy total calcium in blood serum was average of 2, 18±0, 32 mmol/l (standard 2, 5-3, 5mmol/l), the second month of lactation average decrease was observed to 2, 10±0, 28mmol/l.

Inorganic phosphorus respectively was average 1, 32±0, 30 and 1, 17±0, 31mmol/l. Such situation is explained as excess of calcium in cows ration in the farm microelements deficiency and because of acidosis in rumen appears the aggravation of calcium absorption.

The amount of microelements in the blood of cows was less than the normal rate and on the 8^{th} – 9^{th} month of pregnancy the amount of copper was average 11,7±0, 42 mkmol/l on the 9^{th} month it was 10, 6±0, 41mkmol/l, on the first month of lactation was average 10,1±0,3mkmol/l, second month was decreasing to 9, 9±0,3mkmol/l. Accordingly the amount of cobalt in average was 0, 36±0, 03 mkmol/l 0, 29±0,03 mkmol/l, 0, 20±0, 03 mkmol/l and 0,18±0,03 mkmol/l, manganese average 2, 37±0, 07 mkmol/l, 2, 32±0,05 mkmol/l, 2, 27±0, 05 mkmol/l and 2, 16±0,05 mkmol/l and zinc was average 35, 6±1,42 mkmol/l, 29,8±1,26 mkmol/l, 26, 5±1, 20 mkmol/l and 22, 6±1, 20 mkmol/l. Last month pregnancy of cows was characterized by pH rumen liquid average 6, 04±0, 09 the second month of lactation indicator was average 5, 86±0, 07.

The number of infuse rains in cows in the final days of pregnancy was average of 311, 2±42, 8 thousand/ml on the 1^{st} and 2^{nd} month accordingly was average from 296, 5±28, 6 thousand/ml to 268, 0±28, 6 thousand/ml decrease.

Cows rumen fluid pH condition increased to acidosis and decrease of infuse rains number is characterized by hypotonic of stomach front parts and also digestion disorder.

4. Conclusions

1. The reason of vitamin-minerals metabolism violation in productive cows is the proportion of sugar and protein and calcium phosphorus balance disorder and also deficiency of carotene, not enough of microelements (copper cobalt, manganese, zinc) in cows food that do not satisfy their needs.
2. The specific clinical symptoms of rapid development of the fetus in the last months of pregnancy of cows and lactation strengthening in diary period is characterized by vitamin and minerals exchange violation features: change of appetite (lambitus), front sections of stomach hypotonia, pale mucous membranes (anaemia), the decrease of skin elasticity and dryness, folds appear, decline of brightness of skin, rough skin, change of the spine shape (lordosis), enlarged joints, hooves shape change, loosening of cutting teeth, absorption of the last tail vertebra.
3. Vitamin-minerals metabolism violation in cows follows by decline of red blood cells number in blood hypohaemoglobinaemia, hypoglykaemia, hypocarotinaemia, hipophosphoremia, hypocalciaemia, hypocobaltosis, hypocuprosis, increase of alkaline phosphatase activity and also increase of peritoneal fluid (acidosis), decline of infusorians number.

5. References

1. Joseph B. The influence of preparatus Combiolax to substance exchange and cows productivity. Auth. Ref. dissertation. Veterinary sciences candidate, Moscow, 2005, 35.
2. Kondrahin IP, Levchenko VI. Diagnostics and therapy of animals internal diseases. M. OOO Akvarium – Print, 2005, 652-653.
3. Rates and rations of agricultural animals feeding. Information manual/ A.P. Kalashnikov., V.I. Fisinina, N.I. Kleymenova, Moscow, 2003, 455.
4. Kabish AA. Etiology and principles of endemic diseases with exchange violation. Veterinary Journal. 2007; 12:43-44.
5. Microelements exchange and animals' microelementosis. A.P. Kurdeko., Y.K. Kovalyonok., S.P. Kovalyov., A.A. Macinovich., A.A. Belko, Gorki,2009, 144.
6. Porfiryev IA. Substance exchange violation of high productive cows in different conditions of keeping and feed. Agricultural biology. 2001; 2:27-40
7. Practicum on internal diseases of animals. Under publ. of Sherbakova T.G., Korobov A.B., Saint-Petersburg., Lan, 2003, 544.
8. Pavlata L, Podgorsky A, Pechova A, Chomat P. Differences in the occurrence of selenium, copper and zinc deficiencies in dairy cows, calves, heifers and bulls. Vet med-Czech. 2005 a; 50:390-400.
9. Slavik P, Illek J, Zeleny T. Zink and copper status of beef cattle in the sumava region, Czech Republic. Acta Vet Brno. 2006; 75:485-488.
10. Tankova OV. Mineral-vitamin exchange violation of cows. Auth. Ref. candid. of Vet. Sciences. Barnaul. 2011, 20.