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Effect of vitamin AD3E utilization at the pregnancy period and parturition on blood parameter for dairy cattle

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Abstract

Effect of feeding dairy cattle on vitamin AD3E during three periods was studied by different places with same (Frezian strain) in Shaqlawa technical institute farm and private local farm. All groups were fed a control diet covers their energy and vitamin requirements,9 of female cows divided into 3 groups three cow for each the 1st group represents 2 weeks before pregnancy, 2nd represent late pregnancy and 3rd for 2 weeks after parturition , all cows received vitamin AD3E (4 ml/50)kg body weight weekly during the data of this research showed that there was a significant increase ($p>0.01$) in hemoglobin concentration, PCV, ESR, WBCs total number, RBCs total number in 2 weeks after parturition group and a non-significant increase in those parameters in the group of late pregnancy in comparison with the data taken from the group of two weeks before pregnancy .Its concluded from this results that vitamin AD3E of a beneficial effect on blood parameters when the body needs high demands during pregnancy and after parturition.

Keywords: vitamin AD3E, Frezian strain, pregnancy, parturition.

Introduction

Some vitamins has been recognized as having unique influence on immunity during vaccination, affecting both humoral and cell mediated response (Reddy *et al.*, 1987). This immune- stimulatory effect reported is proven in vitamin A, E and D in livestock (Reddy *et al.*, 1985). Several researched showed that vaccination efficacy can be more improved by supplementations especially vitamins which have effect on immune system such as vitamin A,E and D (Priyantha *et al*., 2012).

Some studies refer to that the deficiency in the vitamins& minerals may increase the incidence of retained fetal membrane (RFM) in dairy cows (Akar & Yaldiz., 2005) injection of AD3E weekly during the

last month of gestation before calving improved the reproductive parameters with normal placental dropping , rapid uterine involution and high incidence of pregnancy as compared with control group (Abdulhameed *et al.*, 2009).

Also another study concluded that the supplementing periparturient lactating buffalo with protected fat and injecting vitamin AD3E mixture increase milk production efficiency throughout the final 100 days of lactation (Hafez, 2012).

Fat soluble vitamins (i.e. A and E) are potently antioxidants. Animals cannot produce these vitamins in their bodies; hence an exogenous regular supply is

needed to cover the physiological requirements and to sustain high production performance. During the per-parturient period (transitional period) the concentrations of these vitamins reduce dramatically in the peripheral blood (Goff, Stabel, 1990 and Weiss *et al.*, 1994). Thus, animals are vulnerable to different metabolic disorders, contagious diseases and a reduction in milk production and quality during this period (Block, 2010).

The aim of the current study is to evaluate the effect of AD3E vitamins in blood parameters during different reproductive periods in dairy cattle.

Materials and Methods

Experimental intervention

The study has been conducted in a farm that belong to shaqlawa technical institute and private local farm.

1-Vitamin AD3E dosage

The vitamin solution composed of vitamin A 80,000 IU, vitamin D3 40,000 IU and vitamin E 20 mg .4 ml/50 kg body weight of the vitamin AD3E solution were used as intramuscular injection weekly, the vitamin solution were preserved under room temperature and protected from light.

2-Animals groups

The scheme and design of experiment was using nine dairy cattle were used in this study and divided in three groups, C group No pregnancy,G1 Group 1Without injection Vit. AD3E and G2 Group 1With injection Vit. AD3E.each of G1and G2 contents three treatment of represent different period of pregnancy and after parturition, T1First three month of pregnancy, T2 Last three month of pregnancy,T3After two week of parturition into 3 groups : first group composed of 3 animal represent the period of two weeks before pregnancy , the second group (3) animals represents the period of lasted 3 months of pregnancy, and the third group (3) animals represents the period of two weeks after parturition.

3-Blood samples and tests

At the end of the treatment period, blood samples were collected and send to the lab to make several tests, like hemoglobin concentration, PCV, ESR, RBCs &WBCs counting.

4-Statistical analysis

For the statistical design and data analyses, complete random design of experiment with C and two groups each of group included three treatments. Treatments were determined. Data in all experiments were subjected to ANOVA procedures appropriate for a completely randomized design and the significance of differences between the means estimated using Duncan test (Duncan's new multiple range test). Probability level of was P 0.01 considered for Significance in all comparisons with chemical parameters which was considered. Values in percentage were subjected to transformation. All statistical analyses were performed using the software SPSS 17.5 for Windows® (SPSS Inc., Chicago, IL).

Results and Discussion

The present work was undertaken to evaluate the effect of different of Vitamin AD3E in different reproductive periods in dairy cattle, it was observed that the usage of the vitamin increased the concentration of hemoglobin , ESR , PCV , total RBCs counting, in group of after parturition and in lower rate in late pregnancy group in comparison with before pregnancy group , this results agreed with Sarker *et al* ., (2014) which show that the usage of AD3E enhances growth in broilers with significant increase hemoglobin, PCV, ESR.

WBC

From the table (1) the results of experiment shows that insignificant between T2, T3 in G1 but significant among all another treatments (G1&G2)

T1 G1 view significant among all another treatments ((G1&G2).Control shows insignificant with (T1, T3) G2 while T2 G2 proved insignificant with T1, T3 at same group but significant with all treatments in G1 and control. This can be attribute by the again in dairy cattle by effect of release estrogen hormone be incentive of LH, FSH and prolactin hormones to be sensitive of strange body so increase of WBC at first period of pregnancy after that build of corpus luteum the percentage of WBC come back , this case without injection of Vit AD3E but in G2 established of percentage just calcite differs but insignificant, this clearly shows of role Vit AD3E to arrangement of incentive hormones while ovulation, these result agree with (Hafez, 2012).

Table (1) Effect of vitamin AD3E on treatments

Properties/ unit	C No pregnancy	Group 1 Without injection Vit. AD3E			Group 2 With injection Vit. AD3E		
		T1 First three month of pregnancy	T2 Last three month of pregnancy	T3 After two week of parturition	T1 First three month of pregnancy	T2 Last three month of pregnancy	T3 After two week of parturition
WBC/ ($\times 10^9/L$)	0.15 c \pm 9.33	0.59 d \pm 11.97	0.55 a \pm 2.57	0.21 a \pm 3.37	0.73 bc \pm 8.98	0.19 b \pm 8.55	0.30 bc \pm 9.54
RBC/ ($\times 10^{12}/L$)	0.49 b \pm 8.97	0.21 b \pm 8.83	0.80 c \pm 12.40	0.25 d \pm 19.90	0.17 a \pm 7.18	0.03 a \pm 7.06	0.37 a \pm 7.55
PCV (Fl)	0.50 bc \pm 36.53	1.00 bc \pm 35.00	1.52 a \pm 24.67	0.59 b \pm 34.57	0.97 c \pm 37.44	0.37 d \pm 40.82	1.28 d \pm 43.22
HB (g/dL)	0.50 d \pm 80.53	2.51 c \pm 77.33	1.00 b \pm 30.00	1.10 b \pm 32.00	0.06 a \pm 11.04	0.16 a \pm 11.12	0.41 a \pm 12.78
MCV (fL)	0.44 b \pm 15.50	1.55 a \pm 13.07	1.41 ab \pm 15.00	0.21 c \pm 32.83	0.58 d \pm 50.33	0.32 e \pm 54.93	1.16 e \pm 55.96
MCH (pg)	0.32 a \pm 4.77	0.96 a \pm 4.10	5.05 b \pm 16.93	0.26 a \pm 5.70	0.24 b \pm 15.13	2.31 b \pm 15.53	0.66 b \pm 16.44

a,b,c,d,e means with different superscript within row are significantly different (P< 0.01).

*Values are x \pm Std. Deviation of each treatment 3 dairy cattle

RBC

As depend on statistical analysis of role Vit AD3E on number of RBC it two different group, the table clear that insignificant of treatments in group 2 but significant with G1, while in G1 C and T1 were insignificant in one hand, in other hand significant with each of T2and T3 at same group and by looking accuracy T2, T3 between them are significance inside G1unite. It can be explain this phenomenon at the growth of embryo need more of hemoglobin and O₂ for burn energy by increasing of growth hormone so increase of RBC while in opposite we noticed regaled of RBC in G2 but by investigated of the reasons we discovered the low level of nutrient in feedstuff which bring to G2 even it treat by injection of Vit AD3E. Because suppose must be increased we did not find another reason while this group in accept situation of health.

PCV

Many references published that normal range of PCV in dairy cattle blood around 40-60 this number depend on many factors such as nutrition, state of estrous, irrigation of hormone, pregnancy ...etc. Our results shows minimum of PCV was in T2 G1 and high value prominent clearly in T3 of G2, this can be explain role of Vit AD3E to returned of uterus to normal situation

after two week of parturition while in other side table shows significant for G1 especially in T2 as significant with other treatment of all treatment in both groups 1and 2, the T1,T2 G1 were insignificant even they in low level of range but not effected of decrease PCV but in last period of pregnancy was clear affected this can be attribute of growth embryo need a huge of RBC (Akar and Yeldiz, 2005).This state agree with results of Priyantha.et al. (2012) while they studies on effect of vitamin AD3E supplementation for hemorrhagic septicemia vaccine in laboratory mice. Even the animal were differs but the same effect of PCV percentage in blood. On other hand role of injection VitAD3E was clear of all treatments in G2 was increases ascending. As we explained before.

HG

Normal average of HG is around 80-150 in blood of dairy cattle the lower level of this average is in C of our treatment (80.53(g/dL)) nevertheless may be role of level nutrition composition this treatment is significant among all treatment in both group 1 and 2, while in G2 start the level HG decrease related with advance time of pregnancy more less than in G1 even all treatment in this group are insignificant just calculated simple differs ,the same insignificant between T2,T3 G1.These results agree reached results of Weiss et al,(1994).

MCV

MCV mean size cell volume RBC this harmonic with decrease of Vit B12 and related with low level of iron and peroxide while some diseases infection or low level of nutrition. The normal range of MCV is between (40-60f/L) by international unite in G2 the number begin increase as shown in T2,T3 at same group and they insignificant between them but significant with T1 at same group even in well level compare with measure arrange level but at least better than G1 ,as in table shows T3 significant with all treatments of G1 and G2 while T2G1 insignificant with C,T1 of same group, this clearly shown of role Vi AD3E in G2 and low level of iron content in feedstuff of G1These results agree with results of Hafez ,(2012).

MCH and MCHC

Analysis (MCH) or what is known as himocalobin pellet average (Mean corpuscular Hemoglobin) is an analysis based on a blood test to know the average hemoglobin in which levels, by averaging the mass of hemoglobin account in the red blood cells separately in a sample of blood, knowing that hemoglobin what is However, part of the blood, which acts as president in the oxygen-carrying, as is this analysis is an important indicator of iron content in the blood and which also gives red blood cells their color, and in the same context, this analysis is part of the CBC or complete blood count analysis. The results indicate a decrease in the levels of hemoglobin Central pellet under the normal range may be due to a deficiency in iron, in which case the analyzer may as iron supplements or follow the diet include iron-rich feed stuff. But if the results indicate an increase in the levels of hemoglobin pellet average above normal (normal average in airy cattle 11.0-17.0pg) it may be due to the incidence of certain other types of anemia, which may also indicate the existence of problems in the thyroid gland, which is mainly engaged in work on the secretion of important of the various hormones and functions of the body organs. It involves an analysis of hemoglobin pellet Central by taking a sample of blood through a vein, and the results are available within a few hours or the next day, depending on the lab. It is to undergo this type of analysis to determine the general health status and to detect, diagnose or monitor a variety of diseases and conditions that affect the blood cells, such as anemia, infection, inflammation and bleeding disorders or cancer. Usually divided this type of analysis within the analysis of a complete blood count (CBC) along with white blood cells, red blood cells, red pellet size (MCV), hemoglobin concentration of particulate

matter (MCHC), platelet size. The normal level of hemoglobin pellet average is between 26 and 33 pg, but if the level of more than 34, considered this too high, due usually to a large poverty in the blood due to a lack in levels of vitamin B12 or folic acid, which leads to disorder in the blood works on not produce enough red blood cells. But if the level of hemoglobin pellet average less than 26, it is considered very low, due to the loss of blood in the long term, leading to the occurrence of poverty in microscope blood and this means that there is a small red blood cells are abnormally compared with the other, and that means a smaller amount of hemoglobin.

The table has viewed for MCH in G1 was compatible in T1 insignificant with C the same results or all treatment in G2 .On C for MCH, we found low level of percentage Iron in feed stuff for that reason even insignificantly analysis but low than of normal percentage suppose be, at the last three month of pregnancy the cows need more of feed stuff to be keep balance for embryo so herdsman make more interesting and bring balance of feed stuff for that reason returned to normal level MCH in T2 G1, insignificant to allG2treatments for MCH but differs for T3 at same group after parturition this can be attribute of loosed hug of blood with parturition. These results agree with results of Reddy, *et al.*(1987).

According to the results showed in table (1) there is a slight elevation in WBCs counting in after parturition group while there was significant decrease in lymphocyte counting in after parturition group in comparison with other groups. Also there was a significant increase in monocyte counting in before pregnancy group and significant decrease in Neutrophil and in group after parturitionon different blood parameters.

Conclusion

Utilization of vit AD3E in period of last three month of pregnancy will helpful for well growth embryo and for easy born calf further that increase of blood content especially WBC but in condition care of type nutrition .

Recommendation

On depended the results we recommend

1- At the last of 3 months pregnant must the raiser take more care of management, nutrition and medical care.

2- It can be make more experiment on different type genetic of dairy cattle under on condition they have same period of pregnancy and prefer same age with same number of pregnancy.

3- Vit AD3E as a co-enzyme prefer to make experiment with different level injection to see if has more effected on blood parameter.

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