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SHORT COMMUNICATION

Influence of Prepartum Injection of Vitamin E and Se on Postpartum Reproductive and Lactation Performance of Dairy Cattle

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ABSTRACT

The present study was conducted to evaluate the effect of vitamin E and Selenium given prepartum on reproductive and lactation performance of dairy cattle. Twenty pregnant animals in their last trimester were randomly divided into two groups. Group I animals were kept as control and Group II animals were given two injections of vitamin E and selenium 7 days apart. First injection was given 30-60 days before the expected calving. The placental expulsion period and involution period was significant higher in Group I compare to Group II animals and there was a non significant increase in clostrum production, lactational yield, lactational length and mean calf birth weight of Group II animals.

Keywords: Vitamin E, Selenium, Prepartum, placenta

Pregnancy is a physiology state accompanied by high energy and oxygen demand that may lead to increased level of oxidative stress and development of metabolic and reproductive disorders in pregnant animals (Dimri and Ranjan, 2010). However, Successful attempts have been made to improve the reproductive as well as productive performance of cows and buffaloes by providing them with vitamin E-selenium during late gestation (Sattar *et al.* 2007, Qureshi *et al.* 2010). Vitamin E is as a cellular antioxidant, interacts with selenium containing glutathione peroxidase (GPx) to prevent the oxidative breakdown of tissue membranes. The role of vitamin E and Se supplementation in maintenance of health and fertility in dairy cows has been widely investigated and responses have been manifested as increases in fertilization and pregnancy rates, reduction on the number of days open, decrease in the incidence of ovarian cyst, and retained placenta (Harrison *et al.* 1984; Graham, 1991). Newborn animals usually have a low blood tocopherol, probably because of poor placental transfer (Paulson *et al*. 1968). Supplementation of vitamin and selenium to dam during late pregnancy have shown to boost passive immunity by enhancing IgG absorption in the new born (Moeini and Jalilian, 2014).

MATERIALS AND METHODS

The present investigation was carried out at the Military Dairy Farm Jammu (J&K) during the period between October 2014 to January 2016. Twenty crossbred cows in their last trimester of pregnancy (30-60 days pre partum) were randomly selected and assigned to two experimental groups with 10 animals in each group. Group I animals were kept as control and injected with 10 ml normal saline intramuscularly. Group II animals were administered with two injection of Vit. E and Se (inj. vit. E-Care-Se containing 50 mg α-tocopheryl acetate and 1.5 mg selenium per ml, Vetcare, Banglore) @ 1ml/50 kg body weight i/m. First injection was given at 30 to 60 days before the expected days of calving followed by a second injection 7 days later. The experimental cows were of almost similar age and parity and were maintained under general management practice as followed for rest of the herd. All the experimental cows were observed closely

before, during and after parturition. Cows were made to parturate in individual pen and time required for expulsion of fetal membrane was recorded. Within two hours after parturition, colostrum was removed by hand milking and total colostrum quantity was measured for three consecutive days. The cows were per rectally explored twice a week after one week postpartum to assess the uterine involution period. Estrus was detected by parading bull followed by visual observation of estrus sign twice in a day and later confirmed by genitilia examination per rectum. The cows found in true estrus were artificially inseminated using frozen thawed semen of acceptable quality, 10 to 12 hours after the onset of estrus. Pregnancy diagnosis was done by rectal examination after 60 days post service. Postpartum insemination interval, lactation length, lactation yield and birth weight of calves born to the control and treated cows were also recorded.

RESULTS AND DISCUSSION

The data regarding present investigation are summarized in Table 1.

Table 1: Effect of prepartum administration of Vitamin E and Se during late gestation on reproductive and lactation performance of dairy cattle

Parameters	Group I (control)	Group II (Treated)
Placental expulsion period (Hrs)	9.25 ± 0.46^{a}	6.25 ± 0.32^{b}
Uterine involution period (Days)	61.50 ± 2.40^{a}	44.83 ± 2.58^{b}
Calving to conception period (Days)	88.50 ± 18.20^{a}	73.50 ± 8.80^{a}
Colostrum production (lit) (first three days)	6.25 ± 0.50^{a}	7.25 ± 1.21^{a}
Lactation yield	2828.00 ± 424.40^{a}	3324.5 ± 186.8^{a}
Lactation length (Days)	264.5 ± 12.64^{a}	281.84 ± 2.44^{a}
Birth weight of calves (Kg)	23.33 ± 1.14^{a}	24.50 ± 1.18^{a}

The values having different superscripts within a column differ significantly ($P<0.05$).

The present study revealed that the time required for placental expulsion and uterine involution was significant shorter in cows treated pre partum with vitamin E and selenium than those in control group. Our findings are in agreement with Sattar *et al.* (2007) who reported longer placental expulsion and uterine involution period in control animals than in animals supplemented pre partum with vitamin E and selenium. Selenium enhances uterine contraction which might be a factor involved in separation of cotyledonary villi from maternal caruncular crypts thus improving the uterine muscular function (Youssef *et al.* 1985).

Supplementing vitamin E pre partum significantly increased neutrophil chemotaxis (Politis *et al.* 1996) which possess greater phagocytic ability at calving (Hogan *et al.* 1992) thus boosting immunity of animal (Gupta *et al.* 2005) which might be a factor for quicker recognition of fetal membrane by animal immune system (Panda *et al.* 2006). Trinder *et al.* 1969 reported retention of placenta is a selenium and vitamin E responsive condition and incidence of ROP increases with selenium deficiency (Mass, 1983). However, numerous other factors have also been associated (Muller and Owens, 1974). Calving to conception interval was also reduced in vitamin E and selenium treated group. Similar finding were reported by Panda *et al.* 2006. Productive performance data showed that pre partum vitamin E and Se administration non significantly increases colostrum production, lactational yield and lactational length. Similar findings were reported by Sattar *et al.* (2003), Sattar *et al.* (2007) and Qureshi *et al.* (2010). As natural antioxidants vitamin E and selenium decreases oxidative stress because of this vitamin E and selenium supplementation is expected to increase milk yield in dairy cows (Bayril *et al.* 2015).

Supplementation with vitamin E and selenium in late pregnancy tend to increase milk production by 10% (Lacetera *et al.* 1996). This increase might be due to decreased incidence of mastitis in vitamin E supplemented cows (Chatterjee, 2002). Calves born to cows supplemented pre partum with vitamin E and selenium performed well in term of their birth weight. Supplementation of dam has been shown to enhance secretion of immune proteins, immunoglobin in colostrums by 80% and ameliorate growth and immune status and growth performance of the calves (Khan *et al.* 2015). Also selenium may provide a sparing effect on fetal body mass (Godfrey and Barker, 2000).

SUMMARY

Vitamin E and Se are essential nutrient for reproduction known to prevent oxidative damage as they show synergestic effect in their antioxidant action. Supplementing vitamin E-selenium pre partum have shown positive effect in improving the post partum reproductive as well as productive parameters in dairy cows in the present study. However, more studies on large number of animals are required to see the additional effect of supplementing antioxidants pre partum on postpartum reproductive parameters.

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