

Original Research Article

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Comparison between Concentrations of Cholesterol and Progesterone of Pregnant and Non Pregnant Recipients Cattle in Studies Including Flax Seed Supplementation and Embryo Transfer

Mukesh Sahu^{1*}, Shiv Prasad¹, Sudhansu Pratap Singh² and Avaneesh Kumar Singh³

¹Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Sciences G. B. Pant University of Agriculture and Technology, Pant Nagar, Uttarakhand, India

²Department of Veterinary Gynaecology and Obstetrics, Bihar Veterinary College, Bihar Animal Sciences University, Patna, Bihar, India

³Department of Veterinary Gynaecology and Obstetrics, DUVASU, Mathura (U.P.), India

*Corresponding author

ABSTRACT

Keywords

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The present study was designed to observe the effect of supplementation of PUFA enriched diet on Cholesterol concentration and how it affects the progesterone concentration and conception. Flax seeds, source of PUFA of the Omega-3 family were fed @ 300 g/100 kg body wt/day orally for 21 days to the animals as a supplement with routine diet. Blood sampling was done in recipient cows at 0, 7, 14 and 21 days of estrous cycle. Donor (n=6) and crossbred recipient cows (n=24) were selected and divided into four groups viz; control (no treatment), T-1 (treatment given to recipient only), T-2 (treatment given to donor only) and T-3 (treatment given to both recipient and donor). According to results recipients reshuffles in three group, non treated non pregnant, treated non pregnant and treated pregnant and comparison done in these three groups. The Cholesterol concentration differs nonsignificantly between non treated non pregnant and treated non pregnant but differs significantly with treated pregnant (164.19 ± 2.05 , 210.90 ± 2.80 , and 222.81 ± 0.79 mg/dl) and similar result found with Progesterone concentration (4.80 ± 0.51 , 7.68 ± 0.75 , and 8.02 ± 0.58 ng/ml). On the basis of result, it can be concluded that cholesterol and progesterone concentration vary in similar fashion in all groups and the flax seeds supplementation may helps in conception with increasing Progesterone and Cholesterol Concentration.

Introduction

In animal husbandry, artificial insemination (AI), synchronization of estrous, multiple ovulation and embryo transfer (MOET), and use of various other reproductive technology

may be of great use for rapid multiplication, propagation and development of animal species (Mondal *et al.*, 2014). To improve genetic make up of their herds and increase high pedigreed animal numbers quickly, Embryo transfer has become the most

effective tool with scientists (Weldegebriel, 2015). In this technique, genetic contribution of both the male and female are utilized simultaneously leading to faster genetic improvement. But the demerit with technique is low conception rate like Pregnancy rates following fresh embryo transfer was 24%. Embryo transfer from Indigenous donors produced 30% pregnancies while crossbred donors produced 23 % pregnancies (Patel *et al.*, 2013). Management of reproductive functions by supplementation of fat source in cattle is fairly a recent development, it affecting the dominant follicle's size, increasing the luteal phase progesterone concentration, manipulating uterine prostaglandin synthesis and improving embryo quality (Santos *et al.*, 2008). Hence, the supplementation of polyunsaturated fatty acids (PUFA) of the Omega-3 family (e.g. eicosapentaenoic acid, docosahexaenoic acid) which can be obtained from flaxseed, sunflower, fish oil etc. is proved to be beneficial. For better conception, normal blood biochemical parameters are also essential. Therefore, in the present study, attempt has been made to evaluate the cholesterol and progesterone on supplementation of Flax seed.

Materials and Methods

The present study was conducted on Sahiwal and crossbred cattle at Instructional Dairy Farm, Nagla, G.B. Pant University of Agriculture and Technology, Pantnagar, District – Udham Singh Nagar (Uttarakhand). Animals were divided in to 04 groups as control (no treatment given to any animal), T-1 (treatment given to recipient only), T-2 (treatment given to donor only) and T-3 (treatment given to both donor and recipient) each containing 03 donors and 6 recipient cows. Donor animals were used repeatedly. Flax seeds were fed @ 300g/100kg body weight/day orally for 21 days to the animals

as a supplement with routine diet. Blood sampling was done in all 24 recipient cows at 0 (day of starting of estrus), 7th, 14th and 21st day of estrous cycle. About 15 ml blood without anticoagulant was collected in sterilized test tube and kept at room temperature as a slant for 1 hour for separation of blood serum. After centrifugation at 3000 rpm for 15 minute, serum was separated and stored at -20 °C till further analysis. The serum glucose and cholesterol of crossbred recipients was analysed using standard biochemical procedures. The progesterone estimation in samples was done by using progesterone C.T. RIA kit (M/S Beckman Coulter IM 1188) at IVRI (Nuclear Research Laboratory under Division of Physiology and Climatology), Izatnagar, Bareilly, Uttar Pradesh. Total twenty four Sahiwal embryos were transferred in reproductively sound and healthy crossbred cows. Two pregnancies were confirmed in T-3 group while no pregnancy was found in rest of groups. The examination of pregnancy was done per- rectally in cows on 45th day of embryo transfer. The data obtained during experimentation were analysed for mean, standard error, and coefficient of correlation. Differences between means were compared using two sample t-test and One way ANOVA (Snedecor and Cochran, 1994).

Results and Discussion

Average Serum Cholesterol Concentration (mg/dl)

The average serum cholesterol concentration in all group was not differ much on day 0but it started to increase from 7 day to day 14 and then nearly remain same. On day 14 there was significant difference was found between treated pregnant and non treated non pregnant group while non significant difference was found between treated pregnant and treated non pregnant group (Table 1 and Fig. 1).

The mean serum cholesterol concentration of control and T-2 group found in this experiment are in agreement with reports of Kappel *et al.*, (1984), Kumar (2002), Alameen and Abdelatif (2012), Malik (2017), Maithani (2017), however these workers reported lower values of serum cholesterol

than in T-1 and T-4 groups. Ghasem Zadeh *et al.*, (2011) reported higher concentration of mean serum cholesterol concentration in Holstein cows where cows were divided into 4 groups and fed either fish oil (256.70 mg/dl), soyabean oil (292.00 mg/dl) and both (288.30 mg/dl) than above experiment.

Table.1 Mean (\pm SE) serum Cholesterol concentration (mg/dl) in non treated non pregnant, treated non pregnant and treated pregnant on 0, 7th, 14th and 21th day of estrous cycle in crossbred recipients

Day	Non treated non pregnant	Treated non pregnant	Treated pregnant
0	150.37 \pm 3.07	155.55 \pm 1.76	166.61 \pm 2.72
7	168.00 \pm 2.78	182.85 \pm 2.91	197.07 \pm 2.75
14	164.19 \pm 2.05	210.90 \pm 2.80	222.81 \pm 0.79
21	161.63 \pm 2.86	209.41 \pm 3.26	221.82 \pm 0.27

Table.2 Mean (\pm SE) serum progesterone concentration (ng/ml) in non treated non pregnant, Treated non pregnant and treated pregnant on 0, 7th, 14th and 21th day of estrous cycle in crossbred recipients

Day of estrous cycle	Non treated non pregnant	Treated non pregnant	Treated pregnant
0	0.35 \pm 0.06	0.49 \pm 0.05	0.35 \pm 0.10
7	2.12 \pm 0.20	3.26 \pm 0.44	3.25 \pm 0.34
14	4.16 \pm 0.29	5.82 \pm 0.68	9.12 \pm 3.36
21	4.80 \pm 0.51	7.68 \pm 0.75	8.02 \pm 0.58

Fig.1 Mean (\pm SE) serum Cholesterol concentration (mg/dl) in non treated non pregnant Treated non pregnant and treated pregnant on 0, 7th, 14th and 21th day of estrous cycle in crossbred recipients

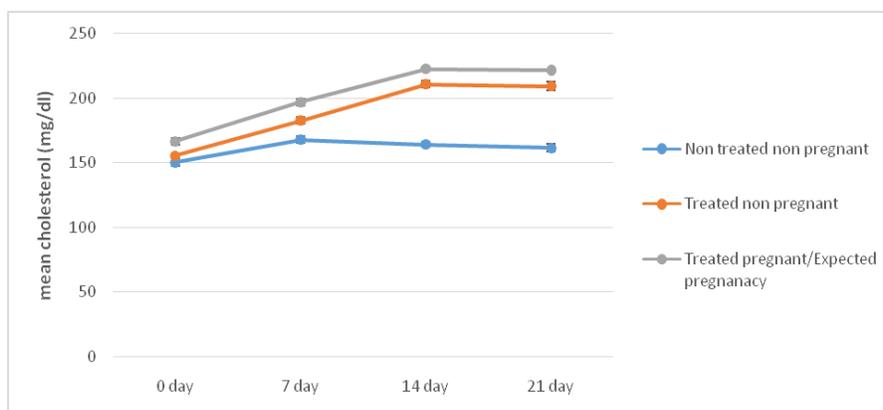
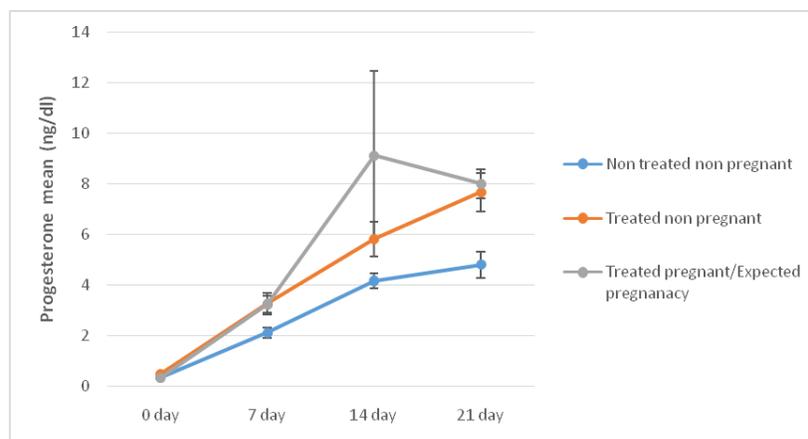


Fig.2 Mean (\pm SE) serum progesterone concentration (ng/ml) in non treated non pregnant, Treated non pregnant and treated pregnant on 0, 7th, 14th and 21th day of estrous cycle in crossbred recipients



Average serum progesterone concentration (ng/dl)

The average serum progesterone concentration in all group was not differ much on day 0 but it started to increase from 7 day to day 14 and then nearly remain same. On day 14 there was significant difference was found between treated pregnant and non treated non pregnant group while non significant difference was found between treated pregnant and treated non pregnant group (Table 2 and Fig. 2).

Rajamahendran *et al.*, (1976) have reported that progesterone level remains less than 1 ng/ml during initial days of cycle then it start to increase rapidly between 4th to 12th day and reaches a maximum level of 5.2 ± 1.1 ng/ml on day 14 of the cycle. Thereafter, the level decreases to 2.6 ± 0.6 ng/ml on day 16 and to 0.40 ± 0.1 ng/ml on day 21 of the cycle in normal cycling animal.

In two different experiments by Cordeiro *et al.*, (2015), it has been reported that mean serum progesterone level found on day 0 (0.76 ± 0.12 ng/ml), day 7 (4.72 ± 0.23 ng/ml), day 19 (3.48 ± 0.38 ng/ml) and day 21 (4.09 ± 0.60 ng/ml) in control group while in treated group it was found to be 0.88 ± 0.14 , 4.92 ± 0.24 , 5.75 ± 0.39 and 5.05 ± 0.68 ng/ml, respectively, when

samples were taken on same days as for control group in which sunflower seeds was supplemented to beef cattle.

In present study, similar values were obtained except value on day 7 where it is towards lower side. Ghasemzadeh *et al.*, (2011) reported higher concentration of mean progesterone concentration in Holstein cows than control (6.96 ng/ml) where cows were divided into 3 groups that were fed fish oil (6.47 ng/ml), soyabean oil (8.30 ng/ml), fish oil + soyabean oil (9.62 ng/ml). However, Nazir *et al.*, (2013) found lower concentrations of mean serum progesterone in both control and flax seed supplemented group than value found in present study.

Conception following transfer of Sahiwal embryos

Total twenty four Sahiwal embryos were transferred in reproductively sound and healthy crossbred cows. Two pregnancies were confirmed in T-3 group, while in other groups recipient cows returned to heat.

According to above results, it might be concluded that supplementation of flax seed (PUFA) for 21 days during estrous cycle in recipient cows results into increase in

cholesterol concentration which provide more substrate for progesterone synthesis and ultimately helps in improving conception following embryo transfer.

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