

SHORT COMMUNICATION

Effect of Dietary Supplementation of Crushed Soybean and Flaxseed on Estrus Attributes in Postpartum Crossbred Cows

Anand R Ratnaparkhi¹, Shyam G Deshmukh^{2*}, Chaitanya H Pawshe³, Mahesh V Ingawale², Milind G Thorat⁴, Shailendra V Kuralkar⁵, Manoj S Patil⁶, Anil U Bhikane⁷, Sunil P Waghmare⁸

ABSTRACT

The objective of the present study was to examine the effect of dietary supplementation of crushed soybean and flaxseed on estrus attributes and preovulatory follicle size in postpartum cows. A total 20 postpartum crossbred multiparous cows from 2nd to 4th lactation with normal calving history were selected and randomly divided into two groups viz. Group 1 (T₁) cows fed with roasted crushed soybean @10% of DM (300 g/100 Kg of body weight/day) till 50 and then after continued with crushed flaxseed @ 15% of DM (300 g/100 Kg of body weight/day) and group 2 (T₂- without additional fat). Cows from both the groups were subjected to an ovsynch synchronization protocol on day 60 postpartum and observed for induced estrus response, time required for onset of induced estrus, intensity and duration of induced estrus. The diameter of preovulatory follicles was studied transrectally with a linear-array 7.5 MHZ probe before the second buserelin acetate injection.

The dietary supplementation of soybean and flaxseed influenced estrus response, intensity of estrus and time required for onset of induced estrus and duration of estrus however the difference was statistically non significant. At the same time the mean preovulatory follicle diameter was significantly higher in supplemented group.

Keywords: Crushed soybean, Estrus response, Flaxseed, Intensity of estrus.

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INTRODUCTION

In the past, it has been well accepted that dietary fats exert positive effects on dairy cows' reproduction and that the fatty acids (FAs) composition of the supplied fats plays a pivotal role in this effect (Mattos *et al.* 2000, Wathes *et al.* 2007, Santos *et al.* 2008). Supplementation of polyunsaturated FA (PUFA) to dairy cows has been shown to alter ovarian follicle dynamics, ovulation, corpus luteum (CL) function, and progesterone (P₄) secretion (Abayasekara & Wathes 1999, Mattos *et al.* 2000). Animals cannot synthesize n-6 or n-3 FAs *de novo*, therefore these need to be supplied in the diet (Wathes *et al.* 2007). Soybean and flaxseed are rich source of omega-6 fatty acid and omega-3 fatty acid, respectively.

Increased PGF_{2α} or PGE₂ associated with higher omega-6 could stimulate early luteolysis of the corpus luteum and earlier onset of estrus (Mattos *et al.*, 2000), while inhibition of PGF_{2α} by omega-3 has the potential to have the opposite effect. As there is minimal data on the effect of dietary soybean and flaxseeds (omega-6 and omega-3 fatty acids) on bovine reproductive function, the objective of our investigation was to study the effect of dietary supplementation of crushed soybean and flaxseed in postpartum cows for improving the reproductive performance in terms of estrus attributes.

MATERIALS AND METHODS

The approval of "Institutional Ethics Committee for Veterinary Clinical Research (IEC-VCR) was obtained vide Resolution

^{1,2,3,6}Department of Animal Reproduction, Gynaecology and Obstetrics, Post Graduate Institute of Veterinary and Animal Science, Akola

⁴Department of Veterinary Surgery & Radiology, Post Graduate Institute of Veterinary and Animal Science, Akola

⁵Department of Animal Genetics & Breeding, Post Graduate Institute of Veterinary and Animal Science, Akola

^{7,8}Department of Veterinary Clinical Medicine, Post Graduate Institute of Veterinary and Animal Science, Akola

Corresponding Author: Shyam G Deshmukh, Department of Animal Reproduction, Gynaecology and Obstetrics, Post Graduate Institute of Veterinary and Animal Science, Akola, e-mail: dr.sgdeshmukh@rediffmail.com

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number. 02/07 of 2019. A population of 20 normally calved crossbred multiparous cows were selected from Instructional Livestock Farm Complex Dr. Punjabrao Deshmukh Krishi Vidyapeeth, Akola. The cows were subjected to gynecological examination using transrectal ultrasonography before

inclusion in the study. Cows were confined for the entire period of study to a barn with access to an open shelter space. The selected cows were equally divided in two groups. The cows from group T₁ were fed with roasted crushed soybean @ 10% of dry matter(DM) (approximately 300 g/100 Kg of body weight/day) started from day of calving ie, 0 day and continued till day 50 postpartum and thereafter, supplemented with crushed flaxseed @ 15% of DM (approximately 300 g /100 Kg of body weight/day) was started from day 51 postpartum and continued up to 85 days postpartum. The supplementation of crushed soybean and flaxseed was fed over and above the routine feed. Whereas control Group T₂ cows were fed routinely with regular feed. The routine feed of cows from both the groups comprised of 2/3rd roughages (2/3rd dry fodder+ 1/3rd green fodder) and 1/3rd concentrates along with mineral mixture. The dry matter requirement was estimated @ 2.5 kg/100 kg body weight. The animals were provided clean drinking *ad lib*.

Cows of both the groups were subjected to an ovsynch synchronization protocol on day 60 postpartum treated with Inj. Buserelin Acetate 10 µg I/M (PREGULATE, Virbac Animal Health India Pvt Ltd, Mumbai, Maharashtra - 66) on day 0, Inj. Cloprostenol Sodium 500 µg (PREGOVA, Virbac Animal Health India Pvt Ltd, , Mumbai, Maharashtra - 66) on day 7 and Inj. Buserelin Acetate 10 µg I/M on day 9. All the cows were observed for the estrus attributes like induced estrus response, time required for onset of induced estrus, intensity of induced estrus and duration of induced estrus. The diameter of preovulatory follicles was studied transrectally with a linear-array 7.5 MHZ probe before the second Buserelin Acetate injection.

Statistical Analysis

The data was analyzed by unequal Completely Randomized Design using online software of Web Agri Stat Package 2.0.developed by ICAR Research Complex Goa, Ela, Old Goa, Goa. 403 402. India.

RESULTS AND DISCUSSION

The estrus attributes like induced estrus response, intensity

of estrus, time required for onset of estrus, duration of estrus and the mean preovulatory follicle size observed in supplemented and control cows are depicted in Table 1.

Effect of Supplementation on Estrus Attributes

The data presented in table 1 reveals that supplementation of crushed soybean and flaxseed influences the estrus attributes; estrus response was higher in T₁ as compared to the T₂ group animals , similarly the intensity was also higher although statistically non significant . The mean time required for onset of induced estrus and mean duration of estrus was statistically non significantly lower in supplemented group as compared to the non supplemented group At the same time the mean preovulatory follicle size (mm) was significantly higher in supplemented group as compared to non supplemented group animals.

Induced estrus response (100%) observed in crushed soybean and flaxseed fed cows might be associated with higher Omega-6 fatty acid which stimulate PGF₂α synthesis results in luteolysis of the CL ultimately helps in earlier onset of estrus (Mattos *et al.*, 2000).

The present finding regarding induced estrus response in supplemented group is in close agreement with Deshmukh *et al.* (2017 a) who reported 100% induced response with supplementation of soybean oil in post partum cows, Similarly Dirandeh *et al.* (2013) reported 95 % induced estrus response in cows fed with soyabean. In no fat group our observation are in accordance with Deshmukh *et al.*(2015) and Makode *et al.* (2014).

The present findings for higher intensity of induced estrus in supplemented group are in close agreement with Deshmukh *et al.* (2017^a) who reported numerically higher intense type of intensity in cows supplemented with soybean oil and Boken *et al.*(2005) observed that feeding cows in pasture with soyabean oil refining by-product increased the number of mount during estrus compared with control. Zachut *et al.*(2010) reported higher behavioral estrus intensity in extruded flaxseed fed cows as compared to no fat fed cows.

There was no significant difference between the groups for time required for onset of induced estrus. Our observations

Table 1: Estrus attributes and preovulatory follicle size in cows (T₁) and (T₂).

Sr. No	Parameters	Groups	
		T ₁ (n=10)	T ₂ (n=10)
1.	Induced estrus response (%)	10/10=100	08/10=80
2.	Type of Intensity in induced estrus (%)		
	a.Intense	5/10 (50.00%)	3/8(37.50%)
	b.Intermediate	4/10 (40.00%)	4/8 (50%)
	c.Week	1/10 (10.00%)	1/8 (12.50 %)
3.	Mean time required for onset of induced estrus(hrs)	43.60 ± 2.56 ^a	49.62 ± 2.08 ^a
4.	Mean duration of estrus(hrs)	21.60± 0.71 ^a	22.75 ± 0.52 ^a
5.	Mean preovulatory follicle size(mm)	16.54±0.26 ^a	13.62±0.17 ^b

(means bearing different superscript in a row differ significantly)



are in agreement with Deshmukh *et al.* (2017^a) who reported lower time required for onset of estrus with soybean oil fed cows as compared to no fat fed cows. The numerically lower time required for onset of estrus in crushed soybean and flaxseed supplemented cows might be associated with higher omega-6 fatty acid which stimulate PGF₂α synthesis results in luteolysis of the CL ultimately helps in earlier onset of estrus (Mattos *et al.*, 2000).

The non significant difference between the groups was observed for the mean duration of estrus which showed that the duration of estrus was not affected by the diet containing crushed flaxseed and soybean oil and it is in accordance with the reports of Deshmukh *et al.* (2017^a). In contrast, Zachut *et al.* (2010) reported higher (18.60 ± 0.8 hrs) duration of induced estrus by feeding flaxseed supplementation.

The mean diameter of preovulatory follicle recorded in the present study are in close agreement with Deshmukh *et al.* (2017^b) who reported significant increase in preovulatory follicle size of cows supplemented with soybean oil and crushed flaxseed group as compared to no fat fed cows. Similarly, Ghasemzadeh *et al.* (2011) recorded significant increase in preovulatory follicle size in fish oil and soybean oil groups as compared to control group of cows. Ulfina *et al.* (2015) observed that the size of dominant follicle significantly higher in flaxseed group as compared to control group.

CONCLUSION

It was concluded that the supplementation of crushed soybean after calving followed by flaxseed improves the estrus attributes in terms of estrus response, intensity of estrus and the preovulatory follicle size in postpartum cows.

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