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Effect of Prosyn-NC in a conventional refractory anestrus cross-bred cow

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Abstract
A 5-year-old crossbred cow was presented to the veterinary Dispensary of V.Agaram, Villupuram District, of Tamil nadu with a history of anetrus for the past six months,on per rectal examination it was observed that the uterus was flaccid, both the right and left ovaries were smooth and not functional. Earlier, this case was treated with the routine protocol like regular deworming, mineral mixture, injection of Vit AD$_3$E, Phosphorus, Vit-E, Selenium and boluses of Clomiphene citrate with Copper Sulphate KIT. However, not responded to the treatment and remained anestrus. Other conditions like endometritis, cystic ovarian disease and uterine infection were ruled out. In this case, an absorbable ready to apply progesterone cream of 2 grams containing 1.2 grams active ingredient (Prosync-NC®-Product of Translational Research Platform for Veterinary Biologicals, TRPVB, TANUVAS) was applied on a neatly clean shaven area below the knee joint of the forelimb and covered with a dotted bandage given with the product and left undisturbed for 5 days and removed as per the product catalogue. Estrus has to occur within three days after removal of the progesterone bandage. In this case, on day six, the animal came to estrus, resulting in an exhibition of estrous signs, followed by fixed time insemination was done. After three months of AI, the animal was found to be pregnant, delivered a male calf and reported.

Keywords: Induction of estrus, Conception, Prosyn-NC, transepidermal nano progesterone cream, cow

1. Introduction
Standard reproductive efficiency requires each cow to calve regularly each year to maximise economy due to reduced calf crop especially in rural area (Yavas and Walton, 2000) [23]. Not only does it lenghthen the postpartum interval (a period from parturition to oestrus), withdrawal period following treatment and the cost of managing prolonged postpartum anoestrus (Mwaanga and Janowski, 2000) [15]. Treating anestrus cows with progesterone increased LH pulse frequency, estradiol concentration, and LH receptors in granulosa and theca cells of the preovulatory follicle (Rhodes *et al*., 2003) [18]. The succcess of the dairy cattle and buffalo lies in the proper and optimal reproductive rhythm of each individual cow and buffalo in the herd within the normal physiological range (Dhaliwal, 2005) [5]. In Punjab, 17-67% cattle and 31-55% buffaloes experience anestrus (Dua, 2003 and Singh *et al*., 2006) [6, 19]. Any deviation or prolongation in breeding rhythm results in progressive economic loss due to widening of dry period and reduced lactation during the lifespan of animal (Singh *et al*., 2006) [19]. Duration of postpartum acyclicity is inflenced by suckling status, nutritional status, calving season, age and several other factors (Yavas and Walton, 2000) [23].
Poor reproductive performance, on the other hand, results in financial burden to dairy farmers in terms of reduced production, anestrus, extended dry period, decreased calving percentage, less number of lactation in lifetime, less number of calf born, increased cost of management and culling of the animals (Inchaisri *et al.*, 2009) [7]. It is estimated that about 18 - 40% of cattle and buffaloes were culled mainly due to infertility problems (Khan *et al*., 2009) [12]. Pawshe *et al*. (2011) [17] reported an estimated loss from anetrus in cattle around 193.00 per cow per day. Among the infertility issues, anestrus and repeat breeding causes most devastating losses to livestock owners in India. It is almost 45 years since the first report on estrus synchronization appeared in buffalo (Baruselli *et al*., 2013) [2].
The estimation of various financial losses due to anestrus is based on prevalence rate of anestrus (13.34% in crossbred, 13.10% in indigenous cattle and 36.54% in buffaloes) and

stimulation models based on certain assumptions (Malik, 2018) [14].

The success of estrus synchronization and timed insemination in dairy and beef cattle (Bridges and Lake, 2011; Colazo and Mapletoff, 2014) [3, 4] has led to increased adoption of seasonality of reproduction. The higher portion of sub estrus among cows determined as anestrus indicates that poor estrus detection is a much more serious problem than true anestrus (Kamal *et al*., 2014) [11]. Islam (2011) [8] reported that numbers of estrus synchronization programmes are available in cattle based on the use of various hormones like progesterone, prostaglandin F2α and their various combinations with other hormones like estrogen and gonadotropin releasing hormone (GnRH).

In all the reproductive problems of dairy cattle, anestrus is the most important clinical manifestation that ends up in the substantial losses to the farmers due to reduced calf crop with high treatment cost (Parkinson, 2019) [16]. Anestrus in cattle is generally described as failure of estrus due to functional disturbances in the ovary, many at times characterized by ovary without any of the palpable structure (Parkinson, 2019) [16]. The objective of the present study is to assess the efficacy of "Prosyn-NC Nano cream and its application below the knee and its effect through transepidermal absorption in induction of estrus.

Materials and Methods

A five-year-old crossbred cow was presented to the Veterinary Dispensary of V.Agaram, Villupuram District, of Tamil nadu with a history of anestrus for the past six months. In this case, an absorbable ready to apply progesterone cream of two grams containing 1.2 grams active ingredient (Prosync-NC®-Product of Translational Research Platform for Vetrinary Biologicals, TRPVB, TANUVAS) was applied on a neatly clean shaven area below the knee joint of the forelimb and covered with a dotted bandage given with the product and left undisturbed for five days and removed as per the product catalogue.

Treatment and Discussion

The animal has shown estrus signs within three days after removal of the progesterone bandage. In this case, on day six, the animal came to estrus, resulting in an exhibition of estrous signs.The results of this study clearly indicated that the Prosync-NC increased in progesterone levels on third day and the level slowly decreased from fourth day. Animal attained oestrous stage on sixth day fixed time insemination was done. After three months of AI, the animal was found to be pregnant.

A short period of exposure to high progesterone during the postpartum period is important for expression of estrus and for the subsequent normal luteal function (Ambrose, 2015) [1]. On the day 5, i.e. on the day of dermal patch removal in group 1, progesterone level increased as compared with the day 0,which is comparable as described by Syafnir *et al*., 2011 and Jena *et al*., 2016 [20, 9]. Hence it could be inferred that ProSync-NF dermal patch has the effect on increasing progesterone level after affixing it on the depilated skin of the animals under treatment which is similar to our case study.

In our case we have used Progesterone based preparation for induction of estrus and resulted in positive response which is similar to the study of Kim *et al*., 2004 [13] who has reported that no single panacea are available for the correction of anestrus condition in cattle as well as buffaloes. For the treatment of anestrus progesterone based therapy could be used with variable results.

Parkinson. (2019) [16] opined that the percentage of conception is low in the animals which were evinced estrus around 5 days post transdermal patch removal. This could be attributed due to hormonal imbalance that was unable to trigger the production of gonadotropins at the appropriate time, however in our case animal had come to estrus in three days, detailed study is required to assess number of animals responding to this treatment in three days and five days.

Werven *et al*., (2013) [22] reported that usually progesterone therapy is administered through intravaginal devices or through progesterone impregnated sponges as per Kalyaan *et al*., 2019 [10] inserted into the vagina for a prolonged period of time, usually for seven days. However in our case a novel product of nano cream preparation was used in our case, resulted in positive response and easy to use, also chances of development of vaginitis is avoided.

In present scenario majority of the progesterone therapy are usually performed through intravaginal route. In such procedure problem of vaginitis were frequently reported, whereas in our case we have used Prossyn-NC nano cream transepidermal use. Progesterone may reduce fertility upto 14% but short time progesterone exposure (less than 14 days) is beneficial. Islam (2011) [8] has concluded with many studies that short term calf removal combined with other form of synchronization improves estrus synchrony and conception rate in cows which is similar to our case.

Various hormonal and non-hormonal treatments have been tried for the management of anestrus in cattle and buffaloes with variable success rate depending upon the positive factors and field and farm conditions, the materials used in our case is easy to apply by the farmers themselves, economical, donot require any special skills, non-invasive, cost incurred by the farmer towards treatment of vaginitis is avoided.

Fig 1: Clean shaven area below the knee

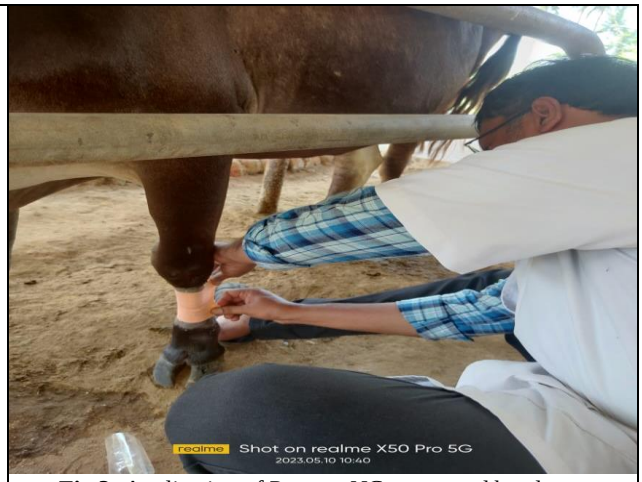

Fig 2: Application of Prosyn -NC cream and bandagag

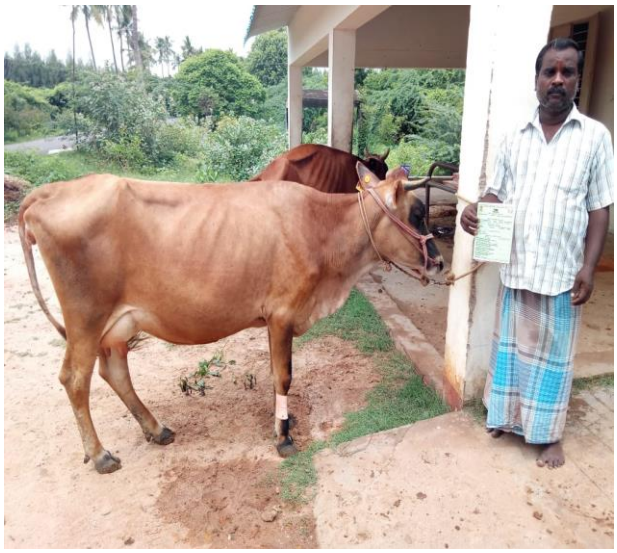

Fig 4: Animal after application of Prosyn-NC cream and bandagag

Fig 4: The same cow with its calf

Conclusion

It was concluded that use of an absorbable ready to apply progesterone cream of two grams containing 1.2 grams active ingredient (Prosync-NC®-Product of Translational Research Platform for Vetrinary Biologicals, TRPVB, TANUVAS) is effective in inducing estrus in anestrus animals and conception also not affected as in our case with trials of the product resulted in pregnancy. Maintaining appropriate temperature is important factor for drug release. When the temperature is low the drug release is slower, however at higher temperatures the polymer collapses thereby enhancing drug release. Further we need more study with more population to arrive at incidence; conception rate other related reproductive indices.

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