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‘Herbal Combo Therapy’ for Oestrus Induction in Postpartum Anoestrus Cows

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ABSTRACT

The research was aimed at studying the effect of a ‘Herbal combo therapy’ (HCT) on induction of oestrus and enhancement of fertility in postpartum anoestrus (PPA) in crossbred cows. Crossbred cows (n = 24) which were diagnosed for true anoestrus condition were utilized for the study. All the cows were dewormed and randomly divided into two groups (i) Control group (n = 10): No treatment schedule and (ii) Treatment group (n = 14): HCT involving a sequential administration of *Raphanus sativus*, *Aloe vera*, *Moringa oleifera*, *Cissuss quadrangularis* and *Murraya koenigii* for a period of 20 days. The animals which expressed oestrus signs during the experimental period were inseminated and pregnancy was confirmed. Diameter of the largest follicle was documented on the initiation day of experiment and at the end of the experimental period or on the day of expression of induced oestrus. Perusal of the data revealed that 71.4 per cent of the PPA animals responded to the HCT by expressing oestrus signs within the experimental period as against 10.0 per cent in control group. The follicular diameter significantly increased in HCT group (11.8 ± 2.4 mm) than the control group (9.6 ± 0.8 mm). The overall conception rate among the PPA cows treated with HCT was much higher (57.1%) than the control group (10.0%). Steroidogenic activity, rich nutrient source and anti-inflammatory properties of HCT would have potentiated the follicular development and thereby induced oestrus and improved conception rate in anoestrus cows.

Keywords: Crossbred cows, Postpartum anoestrus, Herbal combo therapy, Oestrus induction, Conception rate.

INTRODUCTION

Postpartum anoestrus (PPA) is a common cause of infertility among the crossbred dairy cows. PPA contributes for the delay in conception and prolonged inter-calving period causing heavy economic losses. Several factors such as high milk production, negative energy balance and stress during the post-partum period often result in higher incidences of ovarian disturbances [1].

GnRH or progesterone based protocols are the usual methods of treating anoestrus under field conditions. However, in-consistent results and high cost are found to be a major drawback with the endocrine therapy [2, 3, 4]. Hence, therapies utilizing various natural products of plant origin are being tried. Previously, Satheshkumar and Punniamurthy [5] had reported a successive therapeutic protocol for anoestrus heifers with supplementation of curry leaves (*Murraya koenigii*). Perusing through various reports, multiple herbs with properties of improving fertility have been identified [6, 7]. Based on these reports it was hypothesized that a combination of herbs can be effectively utilized as a multi-faceted therapeutical approach for treating PPA in cattle. Hence the present study was designed to study the efficacy of ‘Herbal combo therapy’ (HCT) in inducing oestrus and enhancing fertility among PPA cows.

MATERIALS AND METHODS

Crossbred cows in the second to third lactation, maintained under rural management conditions by the farmers in two villages of Thiruvaiyaru Taluk, Thanjavur district, Tamil nadu were utilized for the study. A total of 50 crossbred cows with the history of absence of oestrus signs even after five months of calving were subjected for routine gynaeco-clinical examination and ultrasonographic investigation using a 7.5-MHz trans-rectal linear transducer (Sonoray). Based on the investigations, 24 animals, which were found to be having smooth ovaries without any luteal structures were diagnosed as true anoestrus animals [1] and subjected for further studies.

Experimental groups

All the 24 PPA cows were dewormed and randomly divided into two groups and experiment was conducted for a period of 30 days (i) Control group (n = 10): The animals were not given any treatment schedule during the experimental period and (ii) HCT group (n = 14): The animals were administered with

the following combination of fresh plant materials for a continuous period of 20 days (Day 0 to Day19) in the sequence mentioned below based on the previous recommendations [8].

Days	Herbs	Preparation	Dose and route of administration
0 - 3	<i>Raphanus sativus</i> rhizomes	Whole	100 gm; PO daily once
4 - 7	<i>Aloe vera</i> whole leaves	Sliced	100 gm; PO daily once
8 - 11	<i>Moringa oleifera</i> leaves	Whole	100 gm; PO daily once
12 - 15	<i>Cisuss quadrangularis</i> nodes	Mashed	100 gm; PO daily once
16 - 19	<i>Murraya koenigii</i> leaves	Mashed	100 gm; PO daily once

All the animals in both the groups were observed for the exhibition of oestrus signs throughout the experimental period. The number of animals which expressed oestrus signs during the experimental period was recorded. The animals which showed oestrus signs were inseminated for two consecutive days. Inseminated animals were observed for next 20 days and inseminated again when cycle was repeated. Pregnancy was confirmed by ultrasonographic examination around 45 days post insemination.

Ultrasonographic study of ovaries

The ovarian status of animals in both the groups were examined ultrasonographically on the day of initiation of experiment (Day 0) and at the end of the experimental period (Day 29) or on the day of expression of induced oestrus, whichever was earlier. The diameter of

the largest follicle was assessed in all these animals by calculating the average of length and breadth of the structure [9].

Statistical analysis

The levels of significance between the mean values of the follicular diameter were analyzed by oneway ANOVA [10]. SPSS.10.0® software was used for analysis of data.

RESULTS AND DISCUSSION

The number of PPA animals which responded to HCT by oestrus expression, follicular biometry, number of animals which conceived and overall conception rate were represented in Table 1. Perusal of the data revealed that 71.4 per cent of the PPA animals responded to the HCT by expressing oestrus signs within the experimental period. It was documented earlier that, eventhough PPA cows are acyclic, follicular wave properties in ovaries were very much active with the follicular diameter reaching more than 9 mm, but failed to induce oestrus signs and to ovulate [11]. Similarly, in our study we could record that the mean diameter of the largest follicle on Day 0 was > 9mm in all the animals. Insufficient production of steroid hormones by the growing dominant follicle and aberrant endocrine milieu within the follicular microenvironment would have affected the oestrus expression and ovulation [12, 13]. Proteomic analysis of the granulosa cells derived from follicles of acyclic buffaloes revealed that failure of the intra-follicular insulin like growth factor (IGF) system, probably due to deficient nutritional status would have led to follicular dysfunction and ovulatory disturbances [14]. Hence improving the follicular quality and maturation in order to enhance its steroidogenic capacity might be therapeutically appropriate approach for the ailment.

Table 1: Response to ‘herbal combo therapy’ among anoestrus crossbred cows

Treatment group	No. of animals that exhibited oestrus	Diameter of largest follicle (mm)		No. of animals become pregnant		
		Day 0	Day 30 / Day of induced Oestrum	1 st insemination	2 nd insemination	Overall Conception (%)
Control (n = 10)	1 (10.00%)	9.5 ± 0.82 ^a	9.6 ± 0.8 ^a	1 (10.0%)	--	1 (10.0%)
Treatment (n = 14)	10 (71.4%)	9.6 ± 0.51 ^a	11.8 ± 2.4 ^b	5 (35.7%)	3 (21.4%)	8 (57.1%)
Significance		N.S	**			

Values within columns with different superscripts differ significantly

** P < 0.01 N.S Not significant

In an earlier study, supplementation of *M. koenigii* leaves for a period of 30 days was found to have induced oestrus in 60.0 per cent of the anoestrus heifers [5]. The increased oestrus induction rate (71.4%) in the present study could be attributed to the utilization of a combination of plant materials. *M. oleifera* leaves are a source of insulin like proteins [15] and are also rich in minerals and vitamins [16]. Phytoestrogen rich fraction of *C. quadrangularis* is reported to have the capacity to increase the blood calcium level, vitamin D3 and serum oestrogen [17]. Mehrotra *et al.* [18] recorded that supplementation of *M. koenigii* leaf extracts caused early onset of puberty in rats and suggested that the higher steroidogenic activity of the extract would have stimulated granulosa cells mitosis in the developing follicles. These facts were evident in the present study where we could record a significantly (P < 0.01) increased follicular diameter in HCT group (11.8 ± 2.4 mm) than the control group (9.6 ± 0.8 mm) post treatment. Thus it could speculated that HCT would have potentiated the follicular development

and steroidogenesis, thereby effected induction of oestrus expression in PPA cows.

The overall conception rate among the PPA cows treated with HCT was much higher (57.1%) than the control group (10.0%). Ovulatory efficiency of the follicle and infection free uterine environment to support the embryonic sustenance are the key factors in the establishment of pregnancy. *A. vera* and *R. sativus* were reported to possess anti-microbial and anti-inflammatory activities [19, 20]. While the combination of *M. oleifera*, *C. quadrangularis* and *M. koenigii* improved the follicular maturation and thereby their ovulating capacity, *A. vera* and *R. sativus* would have cleansed the uterine environment by clearing the sub-clinical uterine infections, paving the pathway for better conception rate [21].

The sequence of the herbal administration postulated in the HCT was framed in such a way to improve the uterine health initially, followed

by supplementation of essential nutrients for follicular growth and finally activating the follicular maturation and steroidogenesis. Therefore the study indicated that synergistic and sequential effects of the phyto-principles in the designed HCT is successful in inducing oestrus activity and enhancing the conception rate in the PPA crossbred cows without any deleterious effects.

CONCLUSION

HCT involving a sequential administration of *R. sativus*, *A. vera*, *M. oleifera*, *C. quadrangularis* and *M. koenigii* for a period of 20 days is an effective therapy for inducing cyclicity and improving conception rate among the PPA cows. Steroidogenic activity, rich mineral and vitamin source and anti-inflammatory properties of HCT would have potentiated the follicular development, improved sero concentrations of essential nutrients, alleviated uterine infections and thereby induced oestrus and improved conception rate in anoestrus cows.

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Conflict of interest

The authors declare no conflict of interests.

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