

# BIOCHEMICAL ATTRIBUTES VIS-A-VIS OESTRUS RESPONSE IN CROSS BRED HEIFERS TREATED WITH COMPOUNDED HERBAL DRUGS

S. K. SINGH<sup>1</sup>, D. P. SINGH\*, RAM NIWAS, SHAILESH BHUSHAN SRIVASTAVA AND V. K. PASWAN

<sup>1</sup>SMS (Animal Science), KVK, Sohaon, Ballia - 277 504 (U.P.)

Department of Animal Husbandry and Dairying, Institute of Agricultural Sciences,  
Banaras Hindu University, Varanasi - 221 005, U.P., INDIA

e-mail: devipdsingh@gmail.com

## KEY WORDS

Compounded herbal drugs  
Biochemical parameters  
Oestrus response  
Cross bred heifers

## Received on :

03.07.2012

## Accepted on :

11.11.2012

\*Corresponding author

## ABSTRACT

The effect of compounded herbal drugs (M:A:W and A:W:M) on biochemical parameters of blood viz, serum protein, glucose, total erythrocyte count (TEC) and haemoglobin (Hb) concentration, cholesterol and their relationship with oestrus response were observed on eighteen anoestrus cross-bred heifers in three different seasons that is spring, rainy and winter. The results revealed that compounded herbal drugs have significant ( $p < 0.05$ ) impact on all aforesaid biochemical parameters of blood. It was found maximum in M: A: W ( $T_2$ ) treated group under normal range. When analysing the relative importance of biochemical parameters with oestrus response it was also found maximum (72.22 %) in M: A: W ( $T_2$ ) treated group followed by A: W: M ( $T_3$ ) and minimum in control ( $T_1$ ) group. In respect of seasons only blood cholesterol was significantly ( $p < 0.05$ ) affected in treated groups while serum protein, glucose, TEC and Hb were found to be non-significant. The level of blood cholesterol and oestrus response was found best (171.16 mg/100mL and 66.67%, respectively) in spring season. Where as the combined effect of treatments and seasons did not reveal any significant impact on biochemical parameters. But in case of oestrus response it was found best (100%) in spring season treated with M: A: W ( $T_2$ ) compounded herbal drugs.

## INTRODUCTION

Efficiency of reproduction constitutes the fundamental base for production of the livestock economy. High fertility coupled with a sustained and regular reproduction comprises the base for profitable production. The level of nutrition and feed supplements greatly influence the growth rate of the heifers to reach to puberty. Scientists are trying to regulate the breeding not only to safe guard the health of animals but also to adjust animal reproduction coherently so as to suit the managerial practices. In addition to above, the herbal medicines are being used primarily in the developing countries from very long time and the scientists have understood the test of time for their safety, efficacy, cultural acceptability and lesser side effects. Koutecka (1997), Sawale and Dhoble (1999) and Deshpande *et al.* (2000) have used herbal preparations proved to be more effective than hormonal treatment. Recently, Mehrotra *et al.* (2009) and Patil *et al.* (2011) have found promising effect of herbal preparation on induction of heat in goats. A lot of modern medicines are being used to overcome the aforesaid problem but it produced higher side effects and these are too costly. The certain blood constituents are associated with abnormal oestrus cycle of the cows. Low level of blood glucose in anoestrus cows stand as the indication of sub-normal energy status (Mc Clure, 1965). Prasad *et al.* (1984), Sharma (1984) and Manowar and Singh (2001) reported that the blood glucose concentration was higher in cycling cross-

bred heifers and cycling lactating cows than non - cycling heifers and lactating cows. Purohit and kohli (1977) reported that Cholesterol is reckoned to play an important role as a precursor of all steroid sex hormones and estimation of its level serves as a complementary aid to determine the functional status of pituitary gland. Herbal formulation have not only improved the fertility rate; also shown significant increase in blood protein, glucose and on other side reduced total urea levels in the blood of crossbred cows (Arzumanzan and Dorotjuk, 1964; Agarwal *et al.*, 1982; Saba *et al.*, 1999; Kumar *et al.*, 2010). Similarly the total erythrocyte count and haemoglobin concentration where found higher in lactating cows treated with herbal drugs. The present study has been conducted with a view to see the efficacy of three herbs Ashwagandha (*Withania somnifera*), Satavari (*Asparagus recemosus*) and Kapi-Kachchu (*Mucuna pruriens*) along with certain minerals (Zn, Co, Fe and Cu) on biochemical parameters of blood and its relative importance with oestrus response of anoestrus crossbred heifers.

## MATERIALS AND METHODS

The present study was carried out in the Department of Animal Husbandry and Dairying, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (U.P.), India. Eighteen (18) growing crossbred heifers of approximately similar bodyweight were selected before each experimental trail and distributed

randomly into three treatment groups viz T<sub>1</sub> (Control), T<sub>2</sub> (M:A:W treated) and T<sub>3</sub> (A:W:M treated) comprising six heifers in each group. Experimental trials were conducted in three different seasons categorized as spring (February to April), rainy (July to September) and winter (November to January) seasons. The period of each experimental trail was three months including one month of pre-experimental feeding. Pre-experimental feeding has done to reduce the effect of nutritional variability of experimental heifers. In the present investigation Ashwagandha (*Withania somnifera*), Satavari (*Asparagus recemosus*), Kapi-kachchu (*Mucuna pruriens*) and certain minerals (Cu, Fe, Co and Zn) were used into two different compounding designated as M:A:W (*Mucuna pruriens* – 50%, *Asparagus recemosus*-24%, *Withania somnifera*-24% and Minerals-2%) and A:W:M (*Asparagus recemosus* - 50%, *Withania somnifera*-24%, *Mucuna pruriens*-24% and Minerals-2%). During the entire period of each experimental trail, all the experimental crossbred heifers were maintained under an identical management system with balanced feeding. The quantity of compounded herbal drug was 2% of concentrate (1.5kg) given to a treated crossbred heifers in each treated group (M: A: W or A: W: M). The data regarding biochemical parameters of blood obtained by the analysis of serum protein in blood by Modified Biuret and Dumass method (1971), glucose content by glucose oxidase and peroxidase (GOD-POD) method, blood cholesterol by the method adopted by (Wybenga *et al.*, 1970) total erythrocyte or red cells count (TEC) and haemoglobin (Hb) concentration where determined by the procedure of Kolmer *et al.* (1969). The oestrus response of cross-bred heifers were observed by the visual and rectal observation and denoted in percentage. The data obtained from biochemical observation were analysed by appropriate statistical tools as per methodology enunciated by Snedecor and Cochran (1968).

## RESULTS AND DISCUSSION

The efficacy of compounded herbal drugs on biochemical parameters of blood and their relativity with oestrus response in reference to treatments are presented in Table 1. An insight data in the table showed significant ( $p < 0.05$ ) impacts on all the biochemical parameters of blood excluding TEC in the present investigation. Serum protein, blood glucose and blood cholesterol were found maximum (7.92g, 55.61mg and 170.36

**Table 1: Impact of compounded herbal drugs on biochemical parameters and oestrus response in different groups of cross bred heifers**

Parameters	Groups			CD ( $p < 0.05$ )
	T <sub>1</sub> (Control)	T <sub>2</sub> (M:A:W)	T <sub>3</sub> (A:W:M)	
Serum Protein (g/100mL)	7.61	7.92	7.81	0.18
Blood Glucose (mg/100mL)	52.02	55.61	54.14	1.42
Blood Cholesterol (mg/100mL)	160.50	170.36	168.22	4.20
Total Erythrocyte count (million/mm <sup>3</sup> )	6.95	6.99	7.06	NS
Haemoglobin g%	10.24	10.69	10.54	0.20
Oestrus response (%)	11.11	72.22	50.00	-

**Table 2: Impact of compounded herbal drugs on biochemical parameters of blood and relativity with oestrus response in reference to seasons**

Parameters	Seasons			CD ( $p < 0.05$ )
	Spring	Rainy	Winter	
Serum Protein (g/100mL)	7.70	7.80	7.83	NS
Blood Glucose (mg/100mL)	53.88	53.08	54.82	NS
Blood Cholesterol (mg/100mL)	171.16	166.62	161.30	4.20
Total Erythrocyte count (million/mm <sup>3</sup> )	7.09	6.97	6.94	0.12
Haemoglobin g%	10.58	10.38	10.52	NS
Oestrus Response (%)	66.67	27.78	38.89	—

NS: Non-significant

mg/100mL of blood, respectively) under normal range in T<sub>2</sub> followed by T<sub>3</sub> treated groups while the minimum (7.61g, 52.02mg and 160.5mg/100mL of blood, respectively) in control (T<sub>1</sub>) group. But TEC content was more (7.06) in T<sub>3</sub> group followed by T<sub>2</sub> (6.99) group and minimum (6.95) millions/mm<sup>3</sup> in T<sub>1</sub> group and a reverse trend was observed in respect of haemoglobin concentration. The compounded herbal drugs have not only influenced the biochemical parameters of blood but also influenced the oestrus response of crossbred heifers. It was also observed maximum (72.22%) in T<sub>2</sub> followed by T<sub>3</sub> treated groups and minimum (11.11%) in control (T<sub>1</sub>) group. Further, Table also elucidated that positive relativity of biochemical parameters with oestrus response of cross-bred heifers in reference to treatments. As perusal of result shown in Table 2 revealed that the impact of compounded herbal drugs on biochemical parameters of blood and relativity with oestrus response in reference to seasons. The effect of seasons on serum protein, blood glucose and Hb concentration were found to be statistically non-significant but they are analysed maximum (7.83g and 54.82mg/100mL blood, respectively) in winter season followed by rainy and spring seasons. While TEC count was found maximum (7.09) in spring followed by rainy (6.97) and minimum (6.94) millions/mm<sup>3</sup>. When the data of blood cholesterol were taken into account the higher level of blood cholesterol (171.16mg/100mL blood) under normal range was analysed in spring season followed by rainy (166.62mg/100mL blood) and minimum (161.30mg/100mL blood) in winter season. Cholesterol level in the blood was significantly ( $p < 0.05$ ) influenced by the seasons and it was also positively correlated with the oestrus response of cross-bred heifers. The oestrus response in present study was observed maximum (66.67%) in spring season followed by winter (38.89%) and rainy (27.78%) season. The result presented in Table 3 clearly indicates the combined effect of seasons and treatments on biochemical parameters of blood and their relativity with oestrus response. The table illustrated that the combination between seasons and treatments (S×T) did not reveal any significant effect on the biochemical parameters, while in case of oestrus response it was observed maximum (100%) in spring season in T<sub>2</sub> treated group and minimum (0%) in rainy and winter seasons with control group (T<sub>1</sub>). When considered the relativity of oestrus response with biochemical parameters it was observed that oestrus are positively correlated with the level of blood cholesterol in all seasons. The findings reveal that T<sub>2</sub> group comprising higher concentration of *Mucuna pruriens* might have increase the oestrogenic level in circulating blood through increased level of blood chole-

**Table 3: Combined effect of seasons and treatments on biochemical parameters of blood and relativity with oestrus response**

Seasons and Treatments	Serum Protein (g/100mL)	Blood Glucose (mg/100mL)	Blood Cholesterol (mg/100mL)	Total Erythrocyte count (million/mm <sup>3</sup> )	Haemoglobin g%	Oestrus response (%)
S × T <sub>1</sub>	7.55	51.67	165.77	7.02	10.32	33.33
S × T <sub>2</sub>	7.77	56.53	175.93	7.10	10.78	100.00
S × T <sub>3</sub>	7.79	53.43	171.77	7.16	10.65	66.67
R × T <sub>1</sub>	7.67	52.40	161.83	6.87	10.10	0
R × T <sub>2</sub>	7.95	53.27	169.17	7.02	10.58	50.00
R × T <sub>3</sub>	7.79	53.57	168.87	7.02	10.45	33.33
W × T <sub>1</sub>	7.60	52.00	153.90	6.96	10.32	0
W × T <sub>2</sub>	8.04	57.03	165.97	6.86	10.70	66.67
W × T <sub>3</sub>	7.84	55.43	164.03	7.01	10.53	50.00
Mean	7.78	53.92	166.36	7.00	10.49	44.44

NS: Non-significant (S = Spring season, R = Rainy season W = winter season, T<sub>1</sub>-Control T<sub>2</sub> - M: A: W and T<sub>3</sub> - A:W:M).

terol seem as the immediate precursor for formation of the steroid hormones and spring season play a catalytic role in increasing the level of cholesterol in blood. Such findings bear parallelism with the earlier thinking of (Agarwal *et al.*, 1982; Kumar *et al.*, 2010) reported that a little higher value of serum protein in the crossbred cows during oestrus period. Similarly, (Saba *et al.*, 1999) reported that the serum protein along with fertility rate have increased in calves when treated with certain herbal and mineral supplements. Patil *et al.* (2011) have also reported that herbal uterine tonic improved the fertility rate in goat and both finding are collaborating with the present findings. A positive relationship between higher blood protein levels and fertility rate in cows was reported by Arzumanjan and Dorotjuk (1964). Serum protein concentration in blood is increasing after herbal treatments might be due to herbal medicines also contain some amount of protein and may be utilized by experimental heifers. In case of blood glucose (Prasad *et al.*, 1984) marked a low blood glucose level in crossbred cows under anoestrus as compared to oestrus condition. Similar results have reported by Sharma *et al.* (1984) and Manowar and Singh (2001). While, in reference to blood cholesterol Purohit and Kohli (1977) reported that cholesterol concentration in the blood undergoes as steep rise during oestrus. The compounded herbal drugs probably increase the concentration of blood cholesterol which is precursor of steroid hormones by which heifer comes under oestrus condition. Lastly, it can be concluded that compounded herbal drug influenced the biochemical parameters of blood under normal range which ultimately affects the oestrus response of cross-bred heifers.

## ACKNOWLEDGMENT

Authors are thankful to the Director of Institute of Agricultural Sciences, Banaras Hindu University, Varanasi for providing the financial assistance for completion of this research.

## REFERENCES

- Agarwal, D. K., Tripathi, S. S. and Saxena V. B. 1982. Studies on progesterone and certain biochemical constituents of blood serum during oestrus cycle of cross-bred cows and buffaloes. *Indian J. Anim. Res.* **16**: 107-112.
- Arzumanzan, E. A. and Dorotjuk, E. N. 1964. The importance of biochemical factors in controlling infertility in cows. *Anim. Breed. Abst.* **33(4)**: 3327.
- Deshpande, R. S., Dhoble, R. L. and Sawale, A. G. 2000. Efficacy of

indigenous drugs in the treatment of post-partum anoestrus in buffaloes. *Indian J. Anim. Reproduct.* **21**: 115-116.

Dumass, B. T. 1971. *Clini. Chem. Acta.* 31: 87 (Cited from Practical Clinical Biochemistry edited by Alan. H. Gowenlock, 6<sup>th</sup> Ed, William Heinemann Medical Books, London).

Kolmer, J. A., Spaulding, E. M. and Robinson, W. H. 1969. Approved Laboratory Technic. *Scientific Book Agency, Calcutta.* pp.50-126.

Koutecka, L. 1997. Clinical evaluation of herbal "Prajana" for inducing ovulatory oestrus in cows & sows. *Indian Journ. Indi. Medi.* **18(2)**: 123-127.

Manowar, S. A. L. and Singh, C. 2001. Blood glucose concentration in cross-bred (Holestein Friesian X Haryana) heifers and cows. *Indian J. Anim. Sci.* **71(9)**: 848-849.

Mc Clure, T. J. 1965. A nutritional causes of low non-return in dairy herds. *Aust. Vet. J.* **41**: 119.

Mehrotra, S., Umashankar Hoque, M. and Agrawal, S. K. 2009. Follicular development and induction of oestrus in anoestrus goats by medicinal plants. *Indian Vet. J.* **86**: 527-528.

Prasad, R. S., Kharche, K. G. and Srivastava, O. P. 1984. Studies on blood glucose, Cholesterol and TLC in anoestrus Cross-bred Cows. *Indian J. Ani. Res.* **4(2)**: 10-14.

Purohit, M. L. and Kohli, I. A. 1977. Variation in the blood serum cholesterol level in Rathi cows during oestrus. *Ind Vet. J.* **54**: 286-290.

Saba, L., Debek, B. N., Stenzel, R., Tymezyzna, L. and Holoda, E. 1999. Effect of mineral and herbal mixtures on Ca, P, Mg and total protein levels and activity of some enzymatic indices in blood serum of calves. *Annales Univer. Mariae Curie Sklodowska Sectio EE Zootechnica.* **17**: 339-345.

Sawale, A. G. and Dhoble, R. L. 1999. Efficacy of herbal preparations for induction of oestrus in cows. *Indian Vet. J.* **76**: 906-908.

Sharma, M. C., Shonker, J., Gupta, O. P., Verma, R. P. and Mishra, R. R. 1984. Biochemical studies in cyclic, anoestrus and repeat breeding cross-bred cows. *I. J. A. R.* **2**: 51-53.

Snedecor, G. W. and Cochran, W. G. 1968. *Statistical methods.* 7<sup>th</sup> Ed. Oxford and International Book House, New Delhi. 625-654.

Wybenga, W. R., Pileggi, V. J., Direstine, P. H. and Giorgio Di, J. 1970. Direct manual determination of serum total cholesterol with a single stable reagent. *Clinical Chemistry.* **16(12)**: 981.

Patil, A. D., Raghuvanshi, D. S., Kumbhar, U. B. and Shivi Maini 2011. Effect of herbal drugs and minerals on fertility in post partum anoestrus Osmanabadi Goats. *Indian J. Animal Reproduction.* **32(1)**: 57-58.

Kumar, S., Mehla, R. K., Gupta, A. K. and Meena, R. K. 2010. Influence of *Asparagus racemosus* (Shatavari) supplementation during different stage of lactation on estrus behavior and reproductive performance in Karan Fries crossbred cows. *Livestock Research for Rural Development.* **22(5)**: 99.

