J. Natn. Sci. Coun. Sri Lanka 1981 9 (1):

SHORT COMMUNICATION

Hormonal Induction of Lactation in Buffaloes (*Bubalus bubalis*) A Preliminary Study

R. RAJAMAHENDRN, K. P. M. PATHIRANA AND M. THAMOTHARAM*

Department of Animal Husbandry, University of Peradeniya, Peradeniya, Sri Lanka.

(Date of receipt: 23 July 1980)

(Date of acceptance: 1 January 1981)

Development of a reliable procedure to induce lactation in cattle and buffaloes will have considerable practical as well as theoretical significance. Through this procedure, it may be possible to meet the consumer demand of liquid milk, derive profits from uneconomical cows and heifers and salvage unproductive cows that are otherwise culled due to reproductive disorders or prolonged calving intervals.

A review of the literature on artificial induction of lactation reveals that many different procedures have been used to induce lactation in cattle, with exogenous hormones. Generally lactation milk yields were higher following prolonged treatments with various combination of oestrogen and progesterone[2,3,5] as compared to oestrogen alone.[3] Smith and Schanbacher[4] modified earlier procedures by increasing the daily oestrogen dose 100 fold and injecting subcutaneously oestradiol 17 β (0.05 mg/kg bodyweight) and progesterone (0.125 mg/kg bodyweight) dissolved in absolute ethanol, 15 times at 12 hr interval. Although lactogenesis occurred in a majority of animals within 1 to 4 weeks after treatment, rates of milk production varied widely among individuals. However this method has several advantages such as short duration of treatment and also the post treatment oestrus is short and fertile.[1]

The use of above hormone treatment schedule for the induction of lactation in buffaloes has hitherto not been investigated. The purpose of this preliminary study was to determine whether the short term progesterone oestrogen treatment was as effective in inducing lactation in buffaloes as in cattle.

This study was conducted at the National Livestock Development Board Farm, Malsiripura, in the Kurunegala district. Surti buffalo breeds are maintained in this farm. Nine animals, four non-pregnant primiparous cows and five cycling non-pregnant heifers were made available for this study. The

* National Livestock Development Board, Malsiripura.

average age and weight of cows was 50 months and 400 kg and the heifers 24 months and 300 kg. All the experimental animals were rectally palpated before treatment to assess their ovarian and uterine status and they were allocated at random to two treatment groups. Two cows and two heifers were assigned to Group I and the remaining two cows three heifers were assigned to Group II. Hormones used were oestradiol 17 β (E_2) and progesterone (P) dissolved in absolute alcohol. Hormone injections were given subcutaneously behind the scapula at 12 hr intervals and each dose contained 0.05 mg of E_2 and 0.125 mg of P per kg of body weight. Animals in Group I received 15 injections (7 days) while Group II animals received 29 injections (14 days). An intramuscular injection of dexamethasone sodium phosphate (0.03 mg/kg bodyweight) was given to each animal seven days after the last P+E_2 treatment. Manual stimulation of the mammary glands, twice daily were carried out after the dexamethasone treatment and regular milking was commenced when the glands became full and turgid.

The following observations were made on the animals a) udder and teat development during treatment and lactation, b) the milk yield for 2 weeks after induction, c) the composition of induced milk during peak lactation and d) interval to oestrus and pregnancy following treatment.

Udder and teat developmont were assessed by visual observations and by handling the mammary glands and teats before the first P + E_2 injection and on days 10, 20 and 30 after the first injection. The degree of udder and teat development were more pronounced in heifers than in cows. Maximum development was observed around 30 days after the commencement of P + E_2 treatment. Since pregnancy period in buffaloes is about 310 days, we rationalised that a longer hormone injection period might prove beneficial to mammary development. However no difference was observed in the udder and teat development between the two treatments groups. Lactation was initiated in all the treated animals. However the amount of milk yield as expected was more in cows than in heifers. (Table 1). Of the 4 cows treated 2 of them had peak lactation of about 3 litres. This yield was 75% of their previous lactation yields. Three out of 5 heifers had peak lactation of about 1 litre. The peak lactation yield was attained around 50 to 70 days after initiation of lactation. The composition of milk namely fat%, total solids and solids not fat obtained during the peak lactation were not different from normal milk. The results also indicates that the reproductive state of the animal before the commencement of the treatment did not have any effect on initiation of lactation. Oestrus

Table 1 – Average milk yield per day in liters for eleven weeks following hormone induced lactation in Buffalo cows and heifers

TREATMENT Group I	Animal No.	1*	2	3	4	5	6	7	8	9	10	11
Progesterone + Oestradiol 17β for 7 days	62 cows	0·6	1·1	1·7	2·0	2·7	2·7	3·1	3·2	3·4	3·6	3·1
	130 cows	0·004	0·001	—	—	—	—	—	—	—	—	—
(15 injections at 12 hrs interval)	165 heifers	0·02	0·02	0·07	0·09	0·1	0·07	0·05	—	—	—	—
	176 heifers	0·004	0·005	0·2	0·7	1·1	0·9	1·1	0·9	1·0	1·0	0·7
Group II												
Progesterone + Oestradiol 17β for 4 days	163 cows	0·018	0·1	0·3	0·8	0·9	0·8	1·0	0·9	0·8	0·9	0·9
	166 cows	0·028	1·6	2·4	2·6	3·2	3·4	3·6	3·2	3·4	2·9	2·8
(29 injections at 12 hrs interval)	77	0·016	0·5	1·0	0·9	1·3	0·7	0·8	0·8	1·2	0·9	1·1
	78 heifers	0 ·005	0·4	0·8	0·8	0·9	0·8	0·8	0·7	1·1	0·9	1·2
	164	·101	0·4	0·3	0·3	0·2	—	—	—	—	—	—

* Week

signs were not exhibited by the animals during the course of the treatment. Most of the animals returned to oestrus within 30 days after treatment and 3 animals were diagnosed pregnant 90 days later.

The results obtained from this preliminary study is very encouraging. Further studies on a large number of reproductive problems of animals should be carried out to determine the lactation length and total milk yield; hormone levels in milk following induction; fertility following induction treatment; cost benefits of this induction treatment, before recommending this procedure to the dairy farmer.

Acknowledgements

The authors wish to acknowledge the cooperation of the Project Manager and staff of National Livestock development Board, Malsiripura, Sri Lanka.

References

1. ERB, R.E., MONK, E.L., MOLLETT, T.A., MALERN, P. & CALLAHAN, C. J., (1976) *J. Anim. Sci.*, **42**(3): 644.
2. HANCOCK, J., BRUMPY, P. J. & TURNER, C.W. (1954) *N. Zealand Jl. Sci. Technol.* **36**: 111.
3. MEITES, J. (1961). *In S. Kon and A. T. Cowis (Ed.)* Milk: *The mammary gland and its Secretion*, Vol. II P. 321. Academic Press New York. N. Y.
4. SMITH, K.L. S. & SCHANBACHER, F.L. (1973) *J. Dairy Sci* **56**: 738
5. TURNER, C. W., YAMAMOTO, H. & RUPPER J.H.L (1956) *J. Dairy Sci.*, **39**: 1717