RESPONSE OF HOLSTEIN COWS TO LEPTADEN FEEDING

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Various kinds of drugs have been tried with dairy cows in an attempt to increase milk yield or the fat content of milk. Leptaden is one of such drugs which has been tried with dairy cows and buffaloes of India to boost milk production. This herbal drug, Leptaden, consists, in equal proportions, the extracts of two indigenous medical plants, namely *Leptadenia reticulata* (Jeevanti) and *Brevnia patens* (Kamboji). The usefulness of Leptaden has been reported in cases with history of threatened abortions, habitual abortions, still-births, premature deliveries, and its lactogenic properties both in human beings and animals have also been reported by Achari and Sinha (1966), Mangeshikar (1957), and Patel (1947). Published clinical experience shows that in most cases Leptaden stimulates lactation within 12 hr.; and lactation is maintained after the Leptaden treatment is discontinued (Trivedi 1956). The drug has produced no observable harmful effects on the health of cows (Narasimhamurthy 1969).

On the basis of the lactogenic and galactagogue properties of Leptaden as evidenced with Indian cows and buffaloes, the research reported in this paper was undertaken to determine whether Leptaden would elicit a similar response in Holstein cows.

EXPERIMENTAL PROCEDURE

Trial 1: Six Holstein cows in late lactation were paired on the basis of milk production, age, and breed. One cow of each pair was randomly assigned to the Leptaden and the other to the no-Leptaden (control) group. Feeding and management were kept identical in both of the groups throughout the experimental periods. The cows were kept in stanchions and fed twice daily the same silage, hay, and grain mixture that had been fed prior to the experiment. Individual feed intake data were recorded.

The experiment was divided into three periods of 3 weeks each; pre-treatment, treatment, post-treatment. Both groups of animals received same ration and were allowed to get accustomed to the change in environment from free stall to stanchion barn. During the treatment period the cows in the Leptaden group were fed 10 Leptaden tablets (268 mg/tablet) twice daily. Leptaden treatment was discontinued with the onset of post-treatment period.

Each cow was weighed at the start of the experiment and once each week during the trial. Daily milk production of all cows was recorded. Milk samples were taken on the third week of each period and analyzed for milk fat and total solids by A.O.A.C. (1965) methods. General health of the cows was examined regularly. Rectal temperatures, heart rates, and respiratory rates were checked during each of three periods. Blood samples were taken during the third week of each period and examined for differential leucocyte counts, total red blood cells (RBC), white blood cells (WBC), hemoglobin (Hb) content, hematocrit (HCT) values, blood sugar by standard procedures (Davidsohn and Wells 1962) and protein-bound iodine (PBI) by the Hycel Cuvette PBI determinations (1970). Leptaden tablets were analyzed for iodine following the procedures of Binnerts (1954).

Trial 2: Six Holstein cows in early lactations were used. They were paired and assigned to the Leptaden and control groups as in Trial 1. Feeding, management and experimental design were like Trial 1. The only change during the treatment period was that the cows in Leptaden group received 15 tablets twice daily.

RESULTS AND DISCUSSION

The effects of Leptaden on body weights and feed consumption of the cows are shown in Table 1. The body weight gains and feed intakes of the cows in Leptaden-group were not significantly different from that of no-Leptaden (control) cows.

Table 2 shows that average daily milk production of Leptaden and no-Leptaden cows was similar, milk fat and solids content

TABLE 1

Body Weights and Feed Consumption of Leptaden-fed Cows Compared to No-Leptaden-fed (Control) Cows

Period	Group	Body Weight	Grain	Hay	Silage
		(kg)			
Pre-treatment	Control	599.9	9.4	4.2	15.4
	Leptaden	651.1	9.6	4.1	17.3
Treatment	Control	639.8	9.0	2.7	16.4
	Leptaden	645.9	9.2	2.5	15.6
Post-treatment	Control	641.4	9.4	2.9	17.8
	Leptaden	646.4	9.4	2.8	16.9

TABLE 2

Milk Yield and Composition of Leptaden-fed Cows Compared to No-Leptaden-fed (control) cows

Period	Group	Milk Yield	Milk Fat	Milk Solids
		(kg)	(%)	(%)
Pre-treatment	Control	28.8	4.3	13.0
	Leptaden	29.1	4.2	12.9
Treatment	Control	29.2	4.2	13.1
	Leptaden	29.4	4.4	12.8
Post-treatment	Control	26.6	4.1	13.0
	Leptaden	27.1	4.2	12.9

TABLE 3

Influence of Leptaden on White and Red Blood Cells, Hemoglobin, and Hematocrit Values

Period	Group	WBC	RBC	Hb	HCT
		(10^3/mm^3)	(10^6/mm^3)	(g/100 ml)	(%)
Pre-treatment	Control	7.23	6.73	11.8	34
	Leptaden	7.81	6.98	11.6	34
Treatment	Control	7.29	7.23	11.1	34
	Leptaden	7.50	8.00	11.3	35
Post-treatment	Control	6.39	7.55	12.1	35
	Leptaden	7.95	8.57	12.2	36

did not appear to be influenced by Leptaden treatment.

Blood analyses data (Table 3 and 4) indicated that the total leucocyte counts, erythrocyte counts, hemoglobin content, hematocrit values, and differential leucocyte counts were within normal physiological ranges.

Protein-bound iodine (PBI) of all cows ranged from 6.27 to 6.88 μg per 100 ml (Table 5). No significant difference was observed between Leptaden and no-Leptaden groups. Blood sugar levels of

TABLE 4

Effects of Leptaden on Differential Leucocyte Counts

Period	Group	Differential Leucocyte Counts: Neutrophils	Lymphocytes	Monocytes	Eosinophils	Basophils
		(Percent of Total Count)				
Pre-treatment	Control	33	64	1	2	0
	Leptaden	32	64	1	3	0
Treatment	Control	32	66	1	1	0
	Leptaden	33	64	1	2	0
Post-treatment	Control	34	63	0	3	0
	Leptaden	33	64	0	3	0

TABLE 5

Effect of Leptaden on Protein-bound Iodine and Blood Sugar

Period	Group	PBI	Blood Sugar
		(μg/100 ml)	(mg/100 ml)
Pre-treatment	Control	6.27	59.7
	Leptaden	6.52	63.5
Treatment	Control	6.77	44.7
	Leptaden	6.88	47.7
Post-treatment	Control	6.35	48.3
	Leptaden	6.83	51.8

the cows are shown in Table 5 along with PBI values. The results suggested that Leptaden did not elevate the blood sugar levels of the cows.

Heart rates, respiratory rates and temperatures of the Leptaden-fed cows were not significantly different from that of control cows (Table 6). These observations and other health related data

TABLE 6

Heart Rates, Respiratory Rates and Temperatures of Leptaden-fed Cows Compared to No-Leptaden (Control) Cows

Period	Group	Heart rate	Respiratory rate	Rectal Temperature
		(per min)	(per min)	(°C)
Pre-treatment	Control	65	21	38.1
	Leptaden	65	22	38.2
Treatment	Control	65	18	38.4
	Leptaden	67	18	38.2
Post-treatment	Control	74	19	38.2
	Leptaden	76	19	38.3

indicated that Leptaden had no detrimental effect on health of cows.

Iodine content of Leptaden was .9 ppm and iron content was 1050 ppm. The low iodine content of Leptaden suggested that the herbal drug did not work like other iodine preparations. The high iron content of Leptaden may be attributed to its tonic action.

Leptaden is a tonic and stimulant which is expected to influence feed intake and weight gain. But this was not evident in these trials, maybe due to the short term study. The lack of response of Leptaden on milk and fat production even at higher level is difficult to reconcile with results obtained by Anjaria and Gupta (1967), Moulvi (1963), and Narasimhamurthy (1969). Our results are in agreement with the work of Trivedi (1956).

It is suggested that an increase in milk production following exogenous administration of hormone indicates a sub-optimal secretion of that hormone (Grosvenor and Turner 1959). It may be possible that the Indian cows and buffaloes do not have optimum secretion of hormones responsible for higher milk production. Leptaden, by virtue of its oxytocic property (Sharma 1968) may be activating the lactogenic hormones and boosting higher milk production.

Another factor related to milk secretion is thyroid activity. The level of milk secretion is related to the degree of thyroid activity (Dukes 1955). The PBI values reported by Narasimhamurthy

(1969) for the Indian cows suggested that these breeds of cows and buffaloes had lower thyroid activities compared to the Holstein cows. Leptaden might be influencing the thyroid activity of the low-producing Indian cows and resulting higher milk yield.

Lack of response of Leptaden in this research suggested that the climatic condition, regime of feeding and management, difference in breed, thyroid activities and hormonal regulation of Indian cows in contrast to Holstein cows may be some possible factors responsible for increased milk production following Leptaden feeding in Indian cows, but not in Holstein cows.

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