

# Effects of Feeding Leptaden to Dairy Cows<sup>1</sup>

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## Abstract

Three trials with Brown Swiss and aged Holstein cows were conducted with Leptaden (extracts of plants—*Leptadenia reticulata* and *Breynia patens*) added to a standard ration. The cows were in late, early, and middle stages of lactation in Trials 1, 2, and 3, respectively. Following three weeks pretreatment, cows in the Leptaden group were administered 10 Leptaden tablets (268 mg/tablet) twice daily in the first trial and 15 tablets twice daily in the second and third trials for 21 days. This period was succeeded by a three week post-treatment period. Leptaden feeding did not produce any significant effect on average feed intake. Both control and experimental groups lost body weight during the trials, but there was no significant difference in weight change between the groups. Leptaden-fed cows did not increase in milk production or change in the content of fat or total solids in their milk compared to the controls. Heart rates, respiratory rates, and rectal temperatures of all cows were within normal ranges in all periods. The serum protein-bound iodine and blood glucose indicated that Leptaden did not impair thyroid activities of the cows. No significant differences were noted in other health related data between the Leptaden-fed and control cows.

## Introduction

Leptaden is a herbal drug which was recently introduced to the market by Alarsin Pharmaceuticals, Bombay. It consists of the extracts of the two indigenous medical plants, namely *Leptadenia reticulata* (Jeevanti) and *Breynia patens* (Kamboji) in equal proportions. In 1947, Patel (18) first drew the attention of gynecologists to the usefulness of Leptaden in prevention of habitual abortions and allied

conditions in women and later pointed out its lactogenic and galactagogue properties. Clinical data (1, 14, 16, 19, 22) showed that in most cases Leptaden stimulated lactation within 12 hr; flow was easy, and lactation was maintained after the Leptaden treatment was discontinued. The drug has produced no harmful effects on the health of women or cows. The chief galactopoietic property of Leptaden was not similar to that of thyroprotein feeding (17). So far all animal experiments on Leptaden have been in India with Indian breeds of cows and buffaloes.

This study was to determine effects of feeding Leptaden to Holstein and Brown Swiss cows on milk production and composition, to determine apparent effects of Leptaden on thyroid activity, and to study the influence of the drug on general health of cows.

## Experimental Procedure

Six cows in each of three trials were paired as alike as possible with respect to milk production, stage of lactation, age, breed, and body weight. One cow of each pair was randomly assigned to the Leptaden group and the other to the no-Leptaden (control) group. Cows were in late, early, and middle stages of lactation during respective trials.

Feeding and management were identical in both groups throughout experimental periods. Cows were kept in stanchions and fed twice daily the same hay, silage, and grain mixtures that had been fed prior to the experiment. Individual feed intake data were recorded. The grain mixture was fed at 1 kg for 2 kg of milk yield. Seven kilograms of alfalfa hay were offered to each cow and weigh-backs of uneaten hay recorded. Corn silage was fed free choice, and the excess was weighed back.

Each experiment was divided into three periods of 3 weeks each; pre-treatment, treatment, and post-treatment. During the pre-treatment period both groups of animals received the same ration and were allowed to become accustomed to the change in environment from free stall to stanchion barn. During treatment, cows in the experimental group in Trial 1 were fed 10 Leptaden tablets (268 mg/tablet) twice daily, and in the second and

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third trials they received 15 tablets twice daily with their grain mixture. Leptaden was not fed to any cows during post-treatment periods.

Each cow was weighed at the start of the experiment and once each week during the trials. Daily milk production of all cows was recorded. Milk samples were taken on the third week of each period and analyzed for milk fat by the Babcock method (24) and total solids by the Mojonnier method (3). General health of the animals was checked regularly. Rectal temperatures, heart rates, and respiratory rates were taken during each of the three periods. Blood samples were taken during the third week of each period in the first and second trials and examined for differential leucocyte counts, total red blood cells, white blood cells, hemoglobin content, and hematocrit values by standard procedures (7). In addition, protein-bound iodine was estimated by Hycel Cuvette PBI method (12), and blood sugar was determined. Leptaden tablets were analyzed for iodine following the procedures of Binnerts (4).

### Results and Discussion

**Body weight.** During the entire experimental period of Trial 1 the average body weight gain

per cow in the no-Leptaden group was 23.8 kg while in the Leptaden group it was only 3.0 kg. Cow 849 in the Leptaden group lost 5.2 kg body weight which accounted for the difference in weight gain between the two groups. In Trial 2, cows in both groups lost body weight. The average loss of weight per cow in the no-Leptaden group was 10.4 kg compared to 12.4 kg weight loss in the Leptaden group. There was a gain of 6.9 kg in weight per cow in the Leptaden group in Trial 3. The no-Leptaden group lost 57.6 kg weight per cow. There was great individual variation in weight changes during these three trials.

Figure 1 illustrates the average body weight changes of Leptaden and no-Leptaden cows. The average loss of weight during the experimental period was 13.5 kg per cow for the no-Leptaden (control) group and 1.0 kg for the Leptaden group. However, this difference in weight between the no-Leptaden and Leptaden groups was not statistically significant.

It was expected that Leptaden, by virtue of its tonic and stimulant actions, would enhance body weight of the cows. However, under the regime of feeding and management of these trials cows did not respond to the drug.

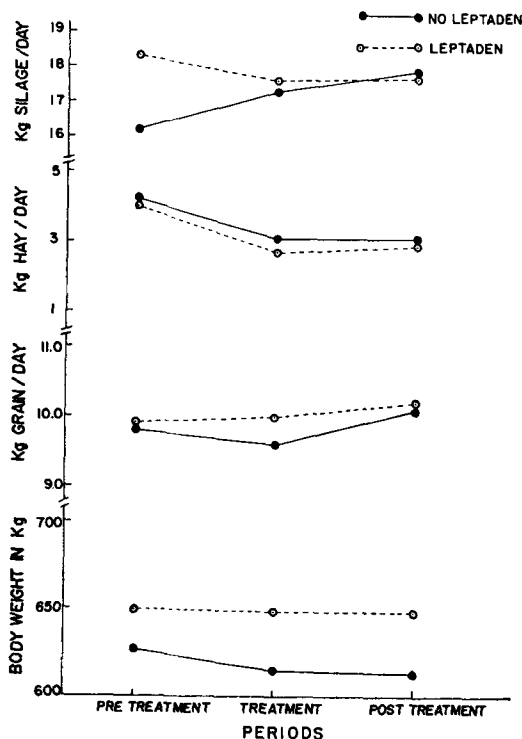


FIG. 1. Effect of feeding Leptaden on average daily body weights and feed intakes.

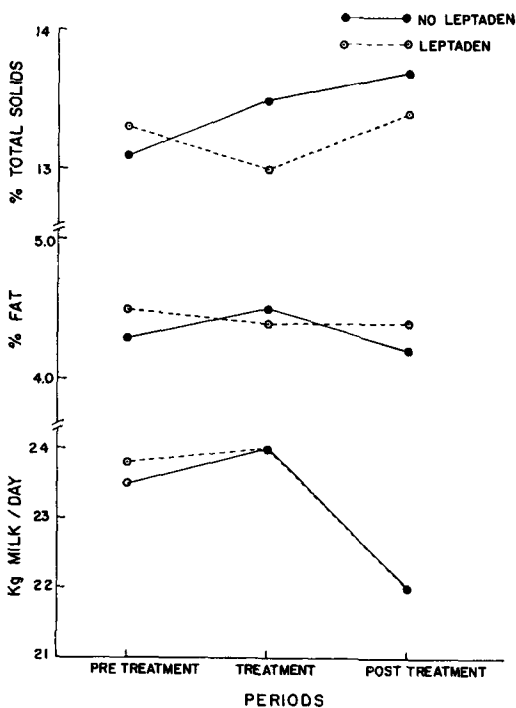


FIG. 2. Effect of feeding Leptaden on milk yields and composition.

TABLE 1. Effect of Leptaden on average heart rates, respiratory rates, temperatures and blood components.

Item	Pre-treatment		Treatment		Post-treatment	
	No-Lep-taden	Lep-taden	No-Lep-taden	Lep-taden	No-Lep-taden	Lep-taden
Heart rate <sup>a</sup> (per min)	65	65	65	67	74	76
Respiratory rate <sup>a</sup> (per min)	20	20	20	20	21	20
Rectal temperature <sup>a</sup> (C)	38.2	38.3	38.3	38.3	38.3	38.3
Red blood cells <sup>b</sup> (10 <sup>6</sup> /mm <sup>3</sup> )	6.73	6.98	7.23	8.0	7.55	8.57
White blood cells <sup>b</sup> (10 <sup>3</sup> /mm <sup>3</sup> )	7.23	7.81	7.29	7.50	6.39	7.95
Differential leucocyte counts <sup>b</sup> (per cent of total count)						
Neutrophils	33	32	32	33	34	33
Lymphocytes	64	64	66	64	63	64
Monocytes	1	1	1	1	0	0
Eosinophils	2	3	1	2	3	3
Basophils	0	0	0	0	0	0
Hemoglobin (g/100 ml)	11.8	11.6	11.1	11.3	12.1	12.2
Hematocrit <sup>b</sup> (%)	34	34	34	35	35	36

<sup>a</sup> Average of three trials.

<sup>b</sup> Average of first and second trials.

*Feed intake.* Average daily feed intake data are illustrated in Figure 1. Leptaden did not exert any significant effect on average daily feed intake. Trial effects were significant for grains, hay ( $P < .01$ ), and silage ( $P < .05$ ). Variation in hay consumption during different periods of the trials was significant ( $P < .01$ ).

*Milk yield and composition.* Figure 2 shows that average daily milk production of Leptaden and no-Leptaden cows was similar. Also, average fat contents of milk were very similar. Milk total solids, likewise, did not appear to be influenced by Leptaden feeding. The cows in these trials varied from early to late lactation. There did not appear to be any effects of Leptaden in early, middle, or late lactation. The lack of effect of Leptaden on milk yield and fat production even at the higher level is difficult to reconcile with effects recorded by Narasimhamurthy, Moulvi, and others (2, 15, 17). There have, however, been other experiments in which no significant increases in milk yield were observed in the Leptaden-fed animals (22).

*Heart rates, respiratory rates, and rectal temperatures.* The average heart rates, respiratory rates, and rectal temperatures are in Table 1. Heart rates of both groups did not change markedly, but there was a great fluctuation between periods ( $P < .01$ ). Respiratory rates and rectal temperatures were not influenced by

Leptaden. Respiratory rates, rectal temperatures, and heart rates of all cows were within normal physiological ranges in all periods of the experiment.

*Protein-bound iodine.* Figure 3 shows the average PBI of Leptaden and no-Leptaden groups of cows in three experimental periods. The PBI values of the Leptaden group were not significantly different from those of the no-Leptaden group; however trial effects were significant ( $P < .05$ ). Protein-bound iodine of all cows ranged from 6.27 to 6.88  $\mu\text{g}$  per 100 ml suggesting that all cows were within the normal physiological range. Protein-bound iodine values below 3.5  $\mu\text{g}$  per 100 ml are suggestive of hypothyroidism and above 8  $\mu\text{g}$  per 100 ml of hyperthyroidism (5, 6).

*Blood sugar.* Blood sugar of the cows was determined along with PBI during pretreatment, treatment, and post-treatment periods. Average blood sugar per cow in the control group was 59.7 mg per 100 ml compared to 63.5 mg per 100 ml for the Leptaden-fed cows (Fig. 3). During treatments blood sugar of control cows decreased to 44.7 mg per 100 ml while it decreased to 47.7 mg per 100 ml in the no-Leptaden fed cows. During the post-treatment period the average blood sugar per control cow was 48.3 mg per 100 ml and that of the Leptaden-fed cows was 51.8 mg per 100 ml. Leptaden feeding did not elevate blood

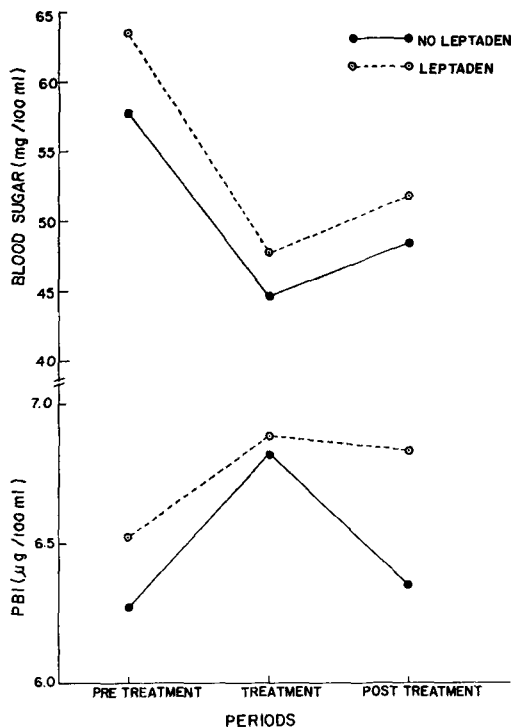


FIG. 3. Effect of feeding Leptaden on protein-bound iodine and glucose in serum of dairy cows.

sugar significantly. However, interactions between treatments and trials, trial effects and period effects were significant ( $P < .01$ ). None of the cows during experimental periods revealed symptoms of hyperglycemia.

**Blood analyses.** Results of blood analyses are in Table 1. Leptaden treatment of the cows did not change their blood: specifically, hemoglobin content, hematocrit readings, total erythrocyte counts, total leucocyte counts and differential leucocyte counts which were within normal physiological ranges. Similar results have also been reported by Narasimhamurthy (17).

Leptaden tablets were analyzed for iodine by the method of Binnerts (4). Iodine content of the tablets was only .9 ppm. This low iodine suggests that the drug does not work as do preparations of iodine in stimulating milk yield. Tablets contained 1,050 ppm iron. This high iron in Leptaden may be responsible for its reported tonic and stimulant properties.

Research with buffaloes and cows in India indicated that Leptaden has a galactopoietic property. This property of the drug is said to be due to its oxytocic property (20). Narasimhamurthy (17) suggested that the drug

might have some action on the hypothalamus, inhibiting release of prolactin-inhibiting factor. His arguments supporting this explanation for increased milk production appear sound.

Leptaden did not stimulate milk production or increase fat content of the milk. This lack of response to the drug is difficult to explain in light of previous work in India. It is suggested that an increase in milk production associated with exogenous administration of a hormone(s) indicates a sub-optimal secretion of that hormone(s) (10). It may be possible that the Indian cows and buffaloes do not have the optimum secretion of the hormones responsible for increased milk production. This idea is substantiated by the work of Hindery and Turner (11). They reported that although thyroxine injection of cows elevated milk production, some showed an average decrease in milk production. A favorable response was interpreted to mean less than optimal thyroxine secretion, and a limited response in some cows might indicate that thyroxine secretion was already optimum. Experiments with dairy cows using preparations of prolactin or oxytocin showed similar results (8, 9).

Milk secretion is related to thyroid activity. Hot weather decreases thyroid activity, raises rumen propionate and butyrate at the expense of acetate, and lowers milk fat (21). Johnson and Ragsdale (13) reported that climatic conditions affect thyroid activity and rumen metabolism of cattle. Both of these physiological functions are believed to be clearly associated with production potential of cattle. Lowering of the environmental temperature raises basal oxygen consumption, increases uptake, releases, and turnover of the thyroidal iodine; accelerates degradation of organic iodine, raises fecal and urinary excretion of labeled iodine; and, finally, results in increased thyroidal epithelial height and goitrogenesis. It may be possible that Indian cows and buffaloes have poor thyroid activities compared to cows in this study. Protein-bound iodine of Indian cows appear to be lower than that of cows in this experiment (17). Studies at Missouri (13) indicated many distinct, consistent, individual differences in the thyroid activity of animals. There was a striking decline in thyroid activity on exposure to higher environmental temperatures. A negative correlation between thyroid activity and temperature for each breed raised at each temperature was obtained. Breeds of cows differed in their thyroid activities.

Climatic condition, regime of feeding and management, difference in breed and thyroid

activities, and hormonal regulation of Indian cows are some possible factors responsible for increased milk production following administration of Leptaden tablets. Feed intake and body weight changes did not indicate the reported tonic and stimulant properties of Leptaden. Absence of elevated PBI, relative lymphocytosis, and a lowered erythrocyte count indicated the nonexistence of hyperthyroidism. This conclusion further has been substantiated by results of heart rate, body weight changes, and blood glucose of cows under Leptaden treatment. On the whole, Leptaden did not impair thyroid activities of these cows. The routine examination of temperature, respiration, and pulse along with blood analyses indicated that Leptaden has no detrimental effect on health of cows.

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