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Efficacy evaluation of a polyherbal antistressor premix at reducing summer stress-associated losses in dairy cows

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ABSTRACT

Heat stress is a very common type of stress in dairy animals. Exposure to heat-stress can result in decreased yield and poor, watery consistency of milk. Here, the results of an efficacy trial of a polyherbal antistressor premix at reducing summer stress-associated milk yield losses in dairy cows are reported. 12 healthy lactating Gir cows in early to mid of first to third lactations were randomized to one of two groups. The first group was left unsupplemented while the second group received supplementation with a polyherbal anti-stressor (Stresomix™ premix, M/s Ayurvet Limited, India) for seven days. Daily milk yield was recorded over a 30 days' period of moderate heat stress (THI = 81.9). Protein and fat content of milk and serum cortisol levels were also measured at specific intervals. The polyherbal antistressor-supplemented group T1 showed significant improvements in milk fat content, fat-corrected milk yield, and serum cortisol levels over the untreated control group T0, attesting the efficacy of the polyherbal antistressor supplement in heat-stressed dairy cows. Based on the results of the study, the polyherbal antistressor, Stresomix premix, at 1 Kg/tonne of feed for 7 days, was found efficacious for the reduction of stress and improvement of milk fat content in dairy cows under summer stress.

Keywords: Heat stress, dairy animals, polyherbal antistressor

INTRODUCTION

Heat stress is common in livestock and depending on its magnitude, mild to severe disturbances in physiological and behavioural functions may be manifested, resulting in losses of production both in terms of quantity and quality [1,2]. Upon exposure to heat stress, water consumption is initially increased and later decreased, feed intake is reduced, transit of feed through the gut is slowed, and blood circulation and nutrient resources are diverted from production towards coping with the stress. Such physiological alterations ultimately cause losses due to hypogalactia and poor, watery consistency of milk [2-5].

Anti-stress interventions in heat-stressed dairy animals should address animal welfare by reducing the levels of stress, and improve profitability by restoring production levels and reverting the losses of milk solid content. Polyherbal preparations are a popular choice for the management of heat stress in dairy animals. Several traditional Indian herbs are known for their ability to reduce stress and improve stress tolerance. Polyherbal preparations, based on such herbal constituents, have been shown to reduce somatic levels of stress in the dairy animals, and improve appetite and reverse changes in milk production and milk solid concentration [6-11].

Here, we report the results of a trial on the evaluation of efficacy of a polyherbal antistressor premix at reducing stress and improving milk production and milk fat content in heat-stressed dairy cows.

MATERIALS AND METHODS

The trial was held at Ganga Dairy Farm, Mehergaon, Dhule (20.9° N 74.78° E, 250 m above msl) in Maharashtra state of India. Twelve apparently healthy Gir cows, testing negative for mastitis in California Mastitis Test, in early to mid of their first to third lactations were randomized to one of two groups, as shown in Table 1.

Both groups of animals were allotted same floor space of 50-60 sq. ft. per animal. Temperature and relative humidity inside the barn were measured with a digital hygrometer at about 11.00 hrs. and the THI was calculated as per the method of Madder *et al* [12].

The animals received similar feed consisting of maintenance and production ration along with *ad lib* access to drinking water and green and dry fodder as per the standard farm practice.

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Daily record of milk yield was kept during the experimental duration of 30 days for both groups. Random milk samples from each group were subjected to estimation of fat and protein content on days 0, 7, 14, 21 and 30 of the treatment. Serum cortisol levels were also measured on days 0 and 7 of treatment by bovine cortisol ELISA kit (Cusabio Biotech Co., Ltd, Wuhan, China) as per the manufacturer's recommendations.

The statistical significance of the differences in results between the groups was tested by analysis of variance (ANOVA) [13]. Unless stated otherwise, all statistical inferences were drawn at $p \leq 0.05$.

Table 1: Trial design

Group (n = 6)	Treatment
T0	Untreated control
T1	Stresomix @ 1 Kg/ tonne of feed for 7 days

RESULTS AND DISCUSSION

The average THI during the period was calculated to be 81.9, which can be classified as moderately high stress [5]. Treatment with the polyherbal antistressor, Stresomix premix, for 7 days @ 1 Kg/tonne of feed, improved milk protein and fat contents (Fig. 1); however, the improvements in milk protein were statistically non-significant ($p < 0.05$).

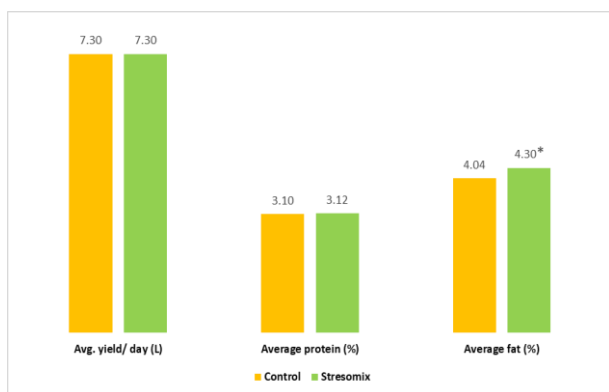


Figure 1: Group-wise average daily milk yield, and milk protein and fat contents per cow over 30-days' period of study

The improvement in milk yield of the Stresomix-supplemented group was evident when corrections for 4% fat content were applied (Fig. 2); supplementation of the cows with Stresomix premix for 7 days resulted in an increase of 0.47 litres in daily average fat-corrected yield over a 30-day period, equating to 14 litres or 6.38% extra fat-corrected milk per cow per month in the Stresomix-supplemented group.

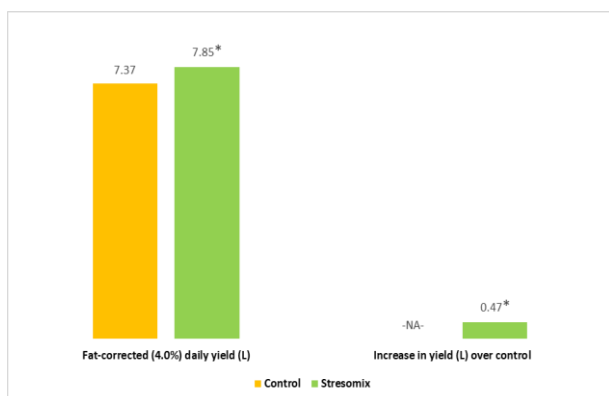


Figure 2: Group-wise average fat-corrected daily milk yield per cow over 30-days' period of study

Similarly, improvements of 0.6% ($p > 0.05$) and 6.38% ($p < 0.05$) were seen in average daily milk protein and average daily fat produced per cow, respectively, in the Stresomix-supplemented group (Fig. 3).

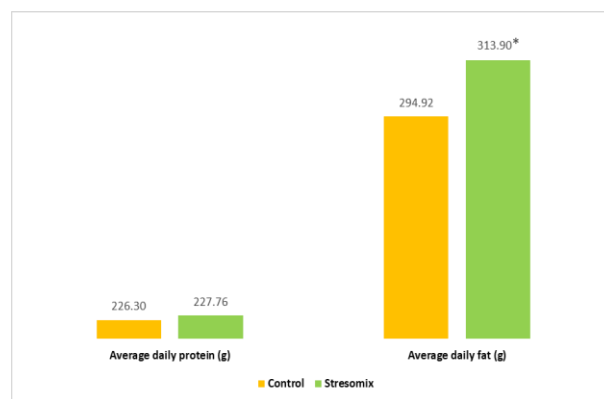


Figure 3: Group-wise average daily protein and average daily fat production per cow over 30-days' period of study

Zebu cattle breeds, such as the ones included in the present study, are more tolerant to thermal stress than exotic breeds of cattle [1]. Still, a state of heat stress during the study period is evident from the continuing increase in serum cortisol levels of the unsupplemented control group. Significant improvements ($p < 0.05$) in the serum cortisol levels could also be attributed to supplementation with the polyherbal antistressor. Over a period of 7 days, the serum cortisol levels of the cows of the unsupplemented control group increased by 4.55%, whereas those of cows of the Stresomix-supplemented group reduced by 10.00% (Fig. 4).

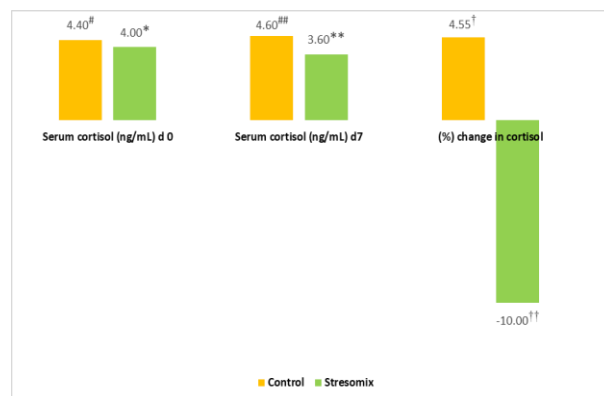


Figure 4: Group-wise mean serum cortisol levels values, and percent changes thereof, on days 0 and 7 of study

Improvements in milk yield and milk solids of heat-stressed dairy animals receiving a polyherbal antistressor formulation has also been reported previously [10,14]. Stresomix is a scientifically-formulated polyherbal antistressor and immunomodulator containing several herbal ingredients viz. *Withania somnifera* [8], *Ocimum sanctum*, *Mangifera indica* [9], and *Phyllanthus emblica* [11] that are well-known in traditional Indian *materia medica* for their antistressor properties.

Elevated glucocorticoids play an important role in the impairment of production in heat stress [1]. The ability of the constituent herbal ingredients of the polyherbal antistressor premix to diminish stress-induced increase in serum cortisol [9,10,14], as evident from our results, may be one of the important mechanisms by which losses in yield were restored.

CONCLUSION

Based on the improvements in fat content of milk and reduction in elevated serum cortisol levels in heat-stressed cows, the polyherbal antistressor, Stresomix premix, at 1 Kg per tonne of feed for 7 days,

was found to be efficacious in the amelioration of summer stress-associated losses in dairy cows.

Conflict of Interest

Stresomix is manufactured commercially by *M/s Ayurvet Limited*, India, and DT and BG are employees of *M/s Ayurvet Limited*, India. However, the nature of this affiliation did not influence the outcomes of the study in any manner.

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