

## Effect of Social Stress on Behavioural and Physiological Responses and its Assessment by non-Invasive Method in Zebu Cattle

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**Abstract :** The goal of the present investigation was to determine the impact of social stress on behavioural characteristics, physiological responses, and haemato-biochemical indicators under various social environments in Tharparkar cattle. Serum cortisol and faecal cortisol metabolites analysis were used to determine the stress level of Tharparkar cattle. Social isolation and social mixing were the two different social circumstances used to evaluate the animals. In both the experiments i.e., social isolation and social mixing, the lying period of animals decreased significantly ( $p < 0.05$ ) while standing period significantly ( $p < 0.05$ ) increased. Frequency and duration of activities like idling, walking, exploration, oral manipulation, and elimination increased significantly ( $p < 0.05$ ) in Tharparkar cattle after being subjected to social isolation and social mixing. Time spent in grooming (self-grooming and allo-grooming) in respect to social isolation significantly increased during isolation and post-reunion, whereas there was a significant ( $p < 0.05$ ) decline in the grooming behaviour especially allo-grooming during mixing of the animals. Feeding and rumination time also decreased significantly ( $p < 0.05$ ) in animals during both the experiments. Physiological parameters such as respiration rate, heart rate and pulse rate increased during the treatment periods. There was no significant difference in the haematological parameters for both the experiments. There was significant ( $p < 0.05$ ) increase in serum cortisol and faecal cortisol metabolites (FCM) concentration in animals subjected to social stress. Therefore, it can be concluded that social stress strongly impacts the behaviour and physiological parameters of the animals, causing stress and nervousness, proving that social stress is a valid psychological stress in animals. The higher concentration of FCM in Tharparkar cattle subjected to social stress, further supported by higher serum cortisol and behaviour manifestations, suggest that FCM could be used to assess stress response as a non-invasive method.

**Keywords :** social stress, fecal cortisol metabolites, non-invasive, animal welfare, behaviour

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