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Nutritional interventions of environmental stress in small ruminants

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The study was conducted to ameliorate the heat stress in sheep exposed to solar radiation induced heat stress, maintained under extensive system by protein supplementation with or without herbal plant (*Tinospora Cordifolia*; common name: Guduchi/Amruta). The experiment was conducted in 12 Nellore sheep with average body weight of 31 ± 0.4 Kg were grouped into three groups. The sheep (T2) were given 30% of their protein requirement through tree foliage (*Sesbania sesban*) and protein along with herbal plant powder (at 500 mg/Kg body weight) (T3) for 30 days while the control (T1) was not given any supplements. The anti-stress activity of supplementation was investigated by measuring changes in the bio-markers like reduced glutathione level, superoxide dismutase activity in erythrocytes and lipid peroxidation in sheep. There was a significant ($P < 0.05$) reduction in reduced glutathione and elevation in the superoxide dismutase activity with decreased lipid peroxidation in the treatment groups (T2 and T3) compared to control (T1). In treated sheep, the heat stress was significantly ($P < 0.05$) reduced which was indicated by change in the anti-oxidant enzyme profile. It can be concluded that, supplementation of tree foliage in combination with herbal plant combated the heat stress in sheep maintained under range condition.

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Environmentally controlled housing system for high yielding dairy animals: A futuristic model in animal welfare

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Climate change can severely affect the productivity and economic viability of the Livestock Production Systems. High ambient temperature affects particularly high yielding, low disease resistant and low heat tolerant crossbred population than the indigenous livestock. Heat stress induced by change in climate also affects the reproductive performance of dairy animals compared to meat producing animals. The negative impact of temperature rise on total milk production in India has been estimated to be 1.6 million tonnes by 2020 and more than 15 million tonnes by 2050. An increase in the global temperature of only 1.5 to 2.5° C may lead to extinction of approximately 20-30% of livestock and animal species in the world. To mitigate the adverse effects of extreme weather events, technologies suitable to local conditions and modifications in housing of animals, managerial and feeding practices need to be designed for future. Environmental modifications aiming at microclimate of the animal to help alleviate heat stress problems are structural orientation, ventilation, use of cooling system along with shade is the best. An integrated approach was made in the model project on the "Environmentally Controlled Housing". It was designed for Dairying cattle at Dairy Experimental Station, College of Veterinary Science, Tirupati under Sri Venkateswara Veterinary University by giving due consideration to orientation of shed, roof projection and microenvironment of the animal by providing cooling system besides comfort to the animal and reducing the labor costs involve in feeding and management. The micro environment around the animal is modified by to increase the heat dissipation and cooling the air around the animal to reduce the heat load and stress on the animal.

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