

Electrolysed reduced water decreases reactive oxygen species-induced oxidative damage to skeletal muscle and improves performance in broiler chickens exposed to medium-term chronic heat stress.

ABSTRACT

1. The present study was designed to achieve a reduction of reactive oxygen species (ROS)-induced oxidative damage to skeletal muscle and to improve the performance of broiler chickens exposed to chronic heat stress. 2. Chickens were given a control diet with normal drinking water, or diets supplemented with cashew nut shell liquid (CNSL) or grape seed extract (GSE), or a control diet with electrolysed reduced water (ERW) for 19 d after hatch. Thereafter, chickens were exposed to a temperature of either 34°C continuously for a period of 5 d, or maintained at 24°C, on the same diets. 3. The control broilers exposed to 34°C showed decreased weight gain and feed consumption and slightly increased ROS production and malondialdehyde (MDA) concentrations in skeletal muscle. The chickens exposed to 34°C and supplemented with ERW showed significantly improved growth performance and lower ROS production and MDA contents in tissues than control broilers exposed to 34°C. Following heat exposure, CNSL chickens performed better with respect to weight gain and feed consumption, but still showed elevated ROS production and skeletal muscle oxidative damage. GSE chickens did not exhibit improved performance or reduced skeletal muscle oxidative damage. 4. In conclusion, this study suggests that ERW could partially inhibit ROS-induced oxidative damage to skeletal muscle and improve growth performance in broiler chickens under medium-term chronic heat treatment.

Keyword: Chicken; Reactive oxygen species; Control diet; Heat stress.