

IMPROVEMENT IN BROILER PERFORMANCE AT HIGH TEMPERATURES BY SODIUM BICARBONATE
SUPPLEMENTATION OF DIET OR DRINKING WATER

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At moderate temperatures broiler chickens require an optimum dietary electrolyte balance [Na + K - Cl] of approximately 250 mEq/kg (Mongin, 1980; Johnson and Karunajeewa, 1985). This allows for maximum growth and food utilization presumably because the bird's metabolism is not hampered by having to cope with an acid-base disturbance.

At high ambient temperatures broiler growth is reduced, mainly through a reduction in food intake. At these temperatures body heat is regulated by evaporative cooling but the associated hyperventilation results in respiratory alkalosis. Fixter et al. (1987) have reported that the optimum dietary electrolyte balance increases to 350 mEq/kg or more when broilers are exposed to high fluctuating (25°-35°C) temperatures. This can be achieved by using dietary supplements of NaHCO₃. The present study was conducted to evaluate the use of drinking water as a method of administering NaHCO₃ since the mineral content of drinking water can influence broiler performance (Balnave, 1989).

Eighteen replicates of six, 3-week-old male broilers were fed one of two diets at either 21°C or 30°C constant temperature. Six replicates on each diet were given tap water and fed either the diet (T1) or the diet supplemented with 16.8 g NaHCO₃/kg (T2). The remaining six replicates at each temperature received the diet and tap water supplemented with 5.6 g NaHCO₃/l in the hot environment and 8.4 g NaHCO₃/l in the cold environment (T3), the different concentrations allowing for differences in water intake at the two temperatures. The data were analysed by analysis of variance and the results relating to electrolyte balance are shown in the Table.

Treatment	Liveweight gain (g/bird)		Food intake (g/bird)	
	30°C	21°C	30°C	21°C
T1	1158	1356	2307	2800
T2	1221	1341	2420	2713
T3	1231	1359	2414	2728
SEM (55df)	16.3*		27.7**	

* P<0.05, ** P<0.01

The results show that supplementation of either the diet or the drinking water with NaHCO₃ significantly improved food intake and liveweight gain at 30°C but not 21°C.

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