

## EFFECTS OF POTASSIUM CHLORIDE AND FASTING ON BROILER PERFORMANCE DURING SUMMER

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### Story in Brief

A study utilizing 1120 broilers was conducted to evaluate the effects of fasting and potassium chloride supplementation on the performance of broilers reared on floor pens during naturally occurring summer conditions. Daily 12-hour feed withdrawal for the four week duration of the experiment reduced total feed consumption but did not significantly depress body weight gain. Addition potassium chloride had no effect in feed consumption or body weight gain. Broiler body temperature was reduced and survival enhanced by the fasting and potassium chloride treatments.

(Key Words: Fasting, Potassium Chloride, Summer Stress, Survival.)

### INTRODUCTION

Floor pen studies provide an experimental method which permits simultaneous comparison of groups of birds on various treatments. Similar data on production efficiency may be obtained from large field experiments but require much greater expenditure. In contrast, less expensive laboratory experiments provide only limited data on production efficiency under commercial conditions.

The broilers' capacity to tolerate high temperatures can be enhanced by feed restriction (McCormick et al., 1979; Smith and Teeter, 1987a). Food in the digestive tract during periods of hyperthermia influences the rate of change in body temperature and affect survival. A depression in growth rate is observed when post brooding temperatures exceed 75 F. It has been theorized that this decline is a direct result of the reduced feed intake (Squibb et al., 1959). Reduced consumption of a complete diet implies a reduction in intake of proteins and other nutrients, which independent of fluctuating animal nutrient replacements, could account for the growth rate depression. Although fasting increases survival because the reduction in food intake reduces body temperature, the expected decline in growth may offset the benefits of increased survival. Environmental chamber studies have demonstrated body weight gain of broilers to be unaffected by the fasting exercise (Smith and Teeter, 1987a), however, floor pen studies under more producer-oriented conditions are needed to confirm or refute these findings. Body weight gain of heat stressed broilers has been reported to increase with potassium chloride supplementation (Teeter and Smith, 1986; Smith and Teeter, 1987b) while potassium chloride and fasting have been shown to have additive effect on survival (Smith and Teeter, 1987c).

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The objective of this study was to evaluate the effects of feed withdrawal and potassium chloride supplementation on the performance of pen-reared broilers subjected to naturally occurring heat stress.

#### MATERIALS AND METHODS

Commercial broiler chicks were raised on a common rice hull covered floor pen and fed a corn-soybean meal based diet until they reached four weeks of age. On day 28, 1120 birds were randomly allocated to 32 pens within a floor-pen house and assigned to four treatments of 8 replicates each in a randomized block design. A growing-finishing diet (Table 1) was fed for the duration of the trial. Treatments evaluated were full feed with no water additive, .48% KCl in water, tap water with birds fasted for 12 hours and a combination of fasting and KCl. Birds on the fasted treatments had their feed removed at 0600 hours and replaced at 1800 hours daily. During the 56 day experimental period the high ambient temperature ranged from 88 F to 102 F while relative humidity varied from 66% to 95%. On day 54, four samples of litter from each pen were collected, composited and moisture content determined. Body temperature was determined on five birds per pen on day 55, when the ambient temperature was 95 F. Feed and water consumption were monitored and totals calculated at experiment termination. On day 56, feed weigh-back was determined by removing feed from each block of pens before proceeding to the next block. Birds were group weighed by pen and final body weight recorded.

#### RESULTS AND DISCUSSION

Live weight at eight weeks, feed consumption and feed efficiency values are shown in (Table 2). There was a trend for the birds receiving potassium chloride and for fasted birds to weigh less than control birds although the differences was not significant. Both feed withdrawal and potassium chloride supplementation reduced total feed consumed. Feed efficiency was improved for the fasted birds and for those that were fasted as well as supplemented with potassium chloride. Total water consumption was increased by potassium chloride but not fasting (Table 3), while body temperature was decreased by both

Table 1. Composition of basal diet.

Ingredient	Percent
Ground Corn	56.80
Soybean Meal	36.00
Tallow	3.00
Dicalcium Phosphate	2.35
Calcium Carbonate	.90
Salt	.50
Vitamin Mix	.25
Trace Mineral Mix	.10
DL-Methionine	.10

<sup>1</sup>Diet calculated to contain .89% K, .22% Na and .34% Cl

**Table 2. Body weight, feed consumption and feed efficiency of broilers.**

	Avg. Wt At Eight Weeks (g)	Avg. Feed Consumed (g)	Gain/Fed
Control	2920 <sup>a</sup>	6733 <sup>a</sup>	.43 <sup>b</sup>
KCl	2858 <sup>a</sup>	6363 <sup>b</sup>	.45 <sup>b</sup>
Fasted	2859 <sup>a</sup>	5895 <sup>c</sup>	.48 <sup>a</sup>
KCl + Fasted	2659 <sup>b</sup>	5356 <sup>d</sup>	.49 <sup>a</sup>

abc. Means in columns with unlike superscripts differ ( $P < .05$ )

**Table 3. Water consumption, body temperature and survival of heat stressed broilers.**

	Water Cons. (l)	Body Temp. (C)	Survival (%)
Control	17.6 <sup>b</sup>	109.6 <sup>a</sup>	85.4 <sup>c</sup>
KCl	20.3 <sup>a</sup>	108.1 <sup>c</sup>	90.4 <sup>bc</sup>
Fasted	18.1 <sup>b</sup>	108.7 <sup>b</sup>	95.4 <sup>ab</sup>
KCl + Fasted	19.4 <sup>a</sup>	107.8 <sup>d</sup>	98.2 <sup>a</sup>

abcd. Means in columns with unlike superscripts differ ( $P < .05$ )

treatments. Control birds experienced 15% mortality as a result of the high environmental temperature but the addition of potassium chloride to the drinking water and feed withdrawal resulted in an increase in the number surviving to market by 7 to 14% (Table 3).

The usual result of heat stress imposition is lowered production. Data reported here indicates that feed and water management during the summer can offset the detrimental effects of heat stress. Feed removal during the heat of the day and the encouragement of increased water consumption serve to reduce body temperature by decreasing the total heat load being experienced by the bird. An increase in survival and consequently an increase in the total number of birds reaching market will counter any slight body weight reduction attributed to the fasting exercise.

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