

## FAT DEPOSITION IN BROILER CHICKENS

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To achieve a greater monetary return in the commercial broiler chicken industry, birds are typically fed high nutrient density diets and selected for market weight at an early physiological age. This practice results in carcasses with excessive quantities of fat, particularly in the abdominal, gizzard and visceral regions. To meet consumer demand, much of this fat is removed and as a byproduct is substantially lower in value than lean tissue. Greater understanding of the biochemical and cellular aspects of fat metabolism in the chicken may lead to reduced deposition of fat resulting in an increased retail yield, economy of feed costs and resultant profitability to the producer. An experiment is in progress to investigate the cellular basis for fat deposition in broiler chickens. Preliminary results are presented in this paper.

The chickens used were from a commercial strain with a high average growth rate (2.6 kg at 9 weeks). The birds were grown on pre-starter for 37 days and then changed to a finishing diet for the remainder of the experiment. Both diets were commercial formulations supplied by Allied Stockfeeds. Body composition was measured on 10 g ground samples of the whole chicken after removal of the feathers. The methodology of adipose cell counting has been described (Hood and Allen, 1977) and involves the fixation of adipose tissue with  $\text{OsO}_4$ , isolation of the fixed adipose cells and their quantitation with a Coulter electronic particle sizer. The results presented are for the first 17 weeks of a continuing experiment.

Percentage body fat increased from 10% at 3 weeks to 29.5% (males 27%; females 34%) at 14 weeks of age. There was a concomitant increase in the weight of the abdominal fat pad. However at a constant percentage body fat, male birds had a larger deposit of fat in the abdominal region. Up to 17 weeks of age, growth of the abdominal fat pad was due to both hyperplasia and hypertrophy of adipose cells. Although hyperplasia of adipose cells was still active in all birds studied there was a significant correlation coefficient ( $r = 0.94$ ;  $P < .001$ ) between the weight of the abdominal fat pad and the average volume of the adipose cells present.

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