

EXECUTIVE SUMMARY

MEASUREMENT OF THE RESPONSE OF BROILERS TO DIETARY AMINO ACIDS, AS MEASURED IN CAGES AND FLOOR PENS

R M Gous
Animal and Poultry Science
University of Natal

Statement of objectives:

Broiler genotypes that are available to commercial producers today are very different from those of 20 years ago, yet the amino acid requirements recommended for today's broilers are no different from those in the 1970's and 80's. Simulation models have shown that the quantities of amino acids in broiler feeds required to grow these broilers at their potential are very different from the levels recommended and used by nutritionists today. This constitutes a considerable wastage of protein, as the simulation results actually suggest that, apart from the lysine content in the early growing period, amino acid concentrations being used at present are in excess of what is necessary. This is because broilers are growing faster, and their food intake is considerably higher at an age compared with the broilers of 20 years ago. Although amino acid response experiments have previously been conducted on broilers in South Africa, these experiments were not adequate, in that carcass analyses were not conducted on the broilers, resulting in insufficient information for comprehensive interpretations of the results to be possible. Such research needs to be done to clarify these issues, but the research would yield even more useful information if it were conducted both in floor pens and in cages.

In 2000, on the basis of the above argument, the PRT agreed to finance a new project to be conducted by the University of Natal, to measure the response of broilers to lysine and methionine & cysteine in cages and in floor pens. The trials concerned with this project are currently in progress. Simultaneous to the start of these trials was the announcement by a company in the USA, which manufactures synthetic amino acids, that they are to produce synthetic threonine, on an industrial scale, as they have ascertained that threonine is the third most-limiting amino acid in the feeds for broiler chickens. This will be the first time that this amino acid will be available to feed compounders at an affordable price, and will enable pig and poultry producers in some circumstances to reduce the rate of inclusion of protein in the feed. Synthetic threonine, like synthetic lysine and methionine, will be of benefit in reducing the need for protein in pig and poultry feeds. It is therefore a most opportune time to measure the response of broiler chickens to threonine, to ensure that the best possible information on threonine is available to feed compounders in South Africa.

We have in the past received funding from the PRT to conduct amino acid response trials with pigs, and one of these trials was with threonine. A reprint of a paper that was published this year on the subject is attached. The threonine response trial with broilers will therefore complete the exercise with this amino acid.

Report of progress:

The trials on this subject that are being financed by the PRT are in progress at present. Response trials in the starter period involving lysine and methionine&cysteine have both just been completed, and the initial results of body weight gains and feed intakes have confirmed that the trials were successful, in that a range of responses, from very poor to the maximum possible, were obtained, and an internal test during the trial confirmed that the diets were limiting in the amino acid under test. Carcasses of chickens sampled at the beginning and the end of each trial are being prepared for analysis of water, protein, lipid and ash, and these analyses are due to be completed within the next three months.

A methionine & cysteine response trial in the finisher (22 to 35d of age) period will commence on the 9th August, when the broilers currently in the broiler research unit reach 22d of age. A lysine response trial will follow after the methionine trial has been completed. Carcasses from these trials will need to be processed and analysed, and this will take up much of the rest of this year to complete.

Further analyses and research activities:

The results of the response trials being conducted this year will be compared with those obtained by Dr R MacLachlan in 1982 to determine the extent to which broilers have changed in the past 20 years in their responses to these amino acids. Also, the responses will enable us to determine the efficiency of utilisation of the amino acids for growth of protein, thereby improving our ability to make the most efficient use possible of dietary protein sources available in South Africa.

The threonine response trials, if funded by the PRT, will be conducted in 2002 and will follow the same protocols as described for the trials being conducted this year. A trial in the starter period (7 – 21d of age) will be conducted in cages, and a finisher trial (22 – 35d of age) will be conducted in floor pens. Carcasses will be sampled to determine the growth of body protein and lipid, these being essential measurements in a response experiment involving amino acids.

Publication:

The results of the trials will be written up immediately the carcass analyses have been completed, and the papers will include a comparison with the earlier (1982) work done here, as well as giving an indication of the extent to which the simulation model that we have developed would have been able to predict the results obtained. These papers will be submitted to British Poultry Science for publication. I will also make the information available at a conference of the World's Poultry Science Association.