VARIABILITY IN STARCH DIGESTIBILITY IN BROILERS FED HIGH-WHEAT DIETS

A.M.Rogel*, E.F.Annison*, D.Balnave* and W.L.Bryden*

An apparent metabolisable energy (AME) survey of wheats from the 1978 Australian harvest showed that when wheat, at a concentration of 800 g/kg, was included in diets for 6-week old broilers a significant ($r^2 = 0.828$) relationship was observed between the AME of the wheats and their starch digestibility (Mollah et al., 1983). Seven of the 22 cultivars examined had a starch digestibility coefficient of 0.90 or less.

The survey was repeated using 38 wheats from the 1984 Australian harvest. In this case 11 wheats were found to have a starch digestibility coefficient of 0.90 or less. A significant relationship was again observed between starch digestibility and AME which was described by the relationship Y = 45.703 + 3.585X where Y = % starch digestibility and X = AME (MJ/kg wheat dry matter). The coefficient of determination $r^2 = 0.846$. The AME values from the 1984 wheats were lower than those observed in 1978 because of lower levels of starch in the wheat grains. When the mean starch digestibility of a wheat was low variability among the four replicates of six birds was high. With one wheat the starch digestibility coefficient ranged from 0.745 to 0.963.

A study was also conducted to determine the individual variability, and thus the number of replicates required to show statistical differences, in the AME of wheats. Thirty 6-week-old male broilers were individually housed and randomly assigned to pelleted diets containing maize or one of two test wheats at a concentration of 820 g/kg diet. Bartlett's test was used to test for homogeneity of variance, and since variability was much higher among birds fed wheat than among those fed maize, Snedecor's approximate test for equality of means was conducted. The weighted mean square error from this test was used to determine iteratively the number of replicates needed to detect given true differences between means for similar experiments (Sokal and Rohlf, 1969).

These calculations showed that 10 or more birds would be needed for each feedstuff to detect a 10% difference between means with 80% certainty at a 5% level of significance. To detect a 7.5% difference in treatment means 18 or more birds would be needed, and to detect a 5% difference at least 40 birds would be required.

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* Department of Animal Husbandry, University of Sydney, Camden, New South Wales, 2570