In vivo and in vitro techniques for the assessment of the energy content of feed grains for poultry: a review

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Abstract

The focus of this paper is on the energy evaluation of foodstuffs, particularly of food grains for poultry. Apparent metabolisable energy (AME) is currently the preferred feeding system for poultry but net energy systems are future possibilities and one is currently being used in some poultry growth models. These systems take into account the efficiency with which AME is being utilised by the bird. Aspects such as AME adjusted to zero nitrogen retention and true metabolisable energy (TME) are discussed. Shortcomings of the AME system are also discussed and recent net energy systems are described briefly. The in vitro prediction of AME or TME has not shown great promise although the European Tables of Energy Values for Foodstuffs contain detailed analysis of chemical composition and AME\textsubscript{n} data allowing improved accuracy of prediction. It is suggested that data generated on Australian grains should be tested using these tables, and if successful, these tables may be useful to industry.

Near infrared reflectance analysis (NIRA) is likely to be the preferred in vitro method for predicting a range of characteristics of food grains including AME. A new method of grain evaluation developed in Canada is described and this approach, with modification, may be worth pursuing in Australia. For the in vivo method of measuring AME of grains, the classical total collection method with broiler chickens is recommended with minor changes. The use of acid-insoluble ash for estimating dry matter digestibility for subsequent determination of AME may have merit. A rapid assay appropriate to laying hens is proposed because of the known increase in AME of grains as birds age. It has been established that AME values generated using adult cockerels also apply reasonably well to hens.

Full Text