

PREDICTION OF METABOLISABLE ENERGY OF WHEAT, MAIZE AND  
SORGHUM IN POULTRY DIETS FROM CHEMICAL COMPOSITION

Y. MOLLAH and E.F. ANNISON

The bioassay of the metabolisable energy (ME) of cereals in poultry diets is time-consuming and expensive (Sibbald 1975) but attempts to correlate ME with starch content using methods not specific for starch have proved unsatisfactory (Sibbald and Price 1976). Reasons for the relatively poor correlation between apparent starch content and ME include imprecision in the assay of starch, the possible contribution to ME of the other carbohydrate fractions in cereals, and possible interactions between carbohydrate fractions. These considerations have led us to analyse cereal carbohydrates of known ME by a fractionation scheme similar to that described earlier (Annison 1974). Starch (S) is assayed accurately after separation by the amyloglucosidase-glucose oxidase method (Davidson et al. 1978), and good estimates are obtained of the levels of the less well-defined fractions, which include soluble carbohydrates (SC), water-soluble polysaccharides (WSP), hemicellulose (H) and cellulose plus lignin (CL). Protein (Pr), lipid (Lip) and ash contents are also measured on each sample.

Composition of cereals (g/kg dry matter)

	S	SC	WSP	H	CL	Pr	Lip	Ash	Total
Wheat	612	24	11	61	34	189	28	18	977
Sorghum	707	7	4	43	19	133	38	18	969
Maize	676	21	3	69	28	108	46	20	971

Stepwise regression analysis of the ME and chemical composition of seven samples of maize, six of wheat and six of sorghum showed that ME could be predicted accurately from chemical composition only in the case of maize. The inclusion in the equation of fractions other than starch did not improve the accuracy of prediction, and the following equation was obtained:

Fat-corrected ME (KJ/kg)

$$= 0.0178 \text{ starch (g/kg)} + 0.0127 \text{ protein (g/kg)} \quad (\text{RSD} = 0.11)$$

With wheat and sorghum, ME was not well-correlated with starch content, suggesting incomplete digestion of starch in the bird.

ANNISON, E.F. (1974). In 'Energy Requirements of Poultry (9th Symp.)', p.135, editors T.R. Morris and B.M. Freeman (British Poultry Science: Edinburgh).

DAVIDSON, J., BANFIELD, C.G., DUGUID, J.G.W. and LEITCH, E.G. (1978). *J. Sci. Fd. Agric.* 29: 339.

SIBBALD, I.R. (1975). *Feedstuffs* 47(7): 22.

SIBBALD, I.R. and PRICE, K. (1976). *Can. J. Anim. Sci.* 56: 225.