

WHEAT:MAIZE INTERACTIONS IN THE BIOASSAY OF METABOLISABLE ENERGY
IN POULTRY DIETS IN RELATION TO THE DIGESTIBILITY OF STARCH

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The lack of correlation between the starch content and the metabolisable energy (ME) of wheat (Mollah and Annison 1981) suggested impaired starch digestibility in some samples and, indeed, examination of the ileal contents of birds fed wheats of relatively low ME revealed incomplete starch digestion. When maize was included in the diets, however, starch digestibility was similar to that observed on maize-based diets. A similar effect was observed when oat hulls were added to wheat-based diets, each of which contained sodium caseinate (133 g/kg) and appropriate levels of minerals and vitamins. The results of digestibility studies with four groups of six birds, aged 6 weeks, and fed varying proportions of cereals and oat hulls, are shown below.

	Cereal Content of Diets (g/kg)			N-corrected ME of Wheat (MJ/kgDM)		Ileal Digestibility			
	Maize	Wheat	Oat Hulls	Mean	± SD	Starch (%)		Hemicellulose (%)	
				Mean	± SD	Mean	± SD	Mean	± SD
1	800	-	-	-	-	99	0.3	39	3.1
2	400	400	-	13.5	0.41	98	0.6	28	2.4
3	-	800	-	11.8	0.30	79	1.5	8	1.4
4	-	750	50	13.5	0.36	98	0.2	14	1.7

Starch concentrations in diets, and in the lyophilised contents of the lower half of the ileum, were determined by the amyloglucosidase-glucose oxidase method, and hemicellulose levels by a fractionation procedure outlined earlier (Mollah and Annison 1981).

Maize and wheat both contain about 70 g/kg of hemicellulose (Mollah and Annison 1981) but the digestibility data show that maize hemicellulose is considerably more digestible than wheat hemicellulose. The addition of only 50 g/kg of oat hulls (hemicellulose content 400 g/kg) to the diet raised the ileal digestibility of dietary hemicellulose from 8 to 14 per cent, indicating that almost all of the hemicellulose fraction in oat hulls was digested in the small intestine. In further work a preparation of hemicellulose isolated from oat hulls proved to be as effective as oat hulls or maize in raising the ileal digestibility of starch in wheats of low ME when added to wheat rations at the level of 20 g/kg.

The breakdown of hemicellulose in the alimentary tract is entirely due to the microflora of the gut, and it is possible that hemicellulose fermentation is necessary for the maintenance of a favourable intestinal microflora for the optimum digestion of starch.

MOLLAH, Y. and ANNISON, E.F. (1981). Proc. Nutr. Soc. Aust. 6: 137.