

DEPRESSION OF APPARENT METABOLISABLE ENERGY CAUSED BY POLYSACCHARIDES IN BROILER DIETS

G. ANNISON

Non-starch polysaccharides (NSP) may exhibit anti-nutritional activity when included in broiler diets at low levels (<5%). The activity, which is characterised by depression of growth and energy metabolisability, occurs when the NSP is a component of a major ingredient (ie. pentosans in rye, Antoniou et al. 1981) or when added to the diet in a purified form (Vohra and Kratzer 1964). Not all NSP possess the anti-nutritional activity and the mechanism of action of those which do is unclear. Polysaccharides, whilst very similar in structure possess a wide range of physico-chemical properties which may influence their biological activity when included in diets.

Five NSP of widely differing chemical and physical properties in a sorghum based diet were fed to 35 day old broiler chickens housed in individual cages in a classical Apparent Metabolisable Energy (AME) trial. Body weight gain, *in vivo* starch digestibility and the relative viscosity of the NSP were also measured. The results are shown in the table.

Diet	Wt.gain (g)	AME (MJ /kg DM)	Starch Digest.	Rel. vis ¹ .
A. Control Diet	449 ^a	13.58 ^a	98.0 ^e	-
B. 3% Xanthan gum	168 ^c	11.28 ^b	95.8 ^f	8.0
C. 3% Locust bean gum	224 ^c	11.57 ^b	95.8 ^f	-2
D. 3% LVMC ³	430 ^{ab}	13.25 ^a	99.1 ^e	1.6
E. 3% HVMC ³	332 ^b	13.50 ^a	99.3 ^e	2.0
F. 3% sodium alginate	455 ^a	13.29 ^a	98.6 ^e	12.0

¹. Viscosity of a 0.1% solution relative to water. ². Insoluble in distilled water and 0.1M NaOH. ³. Low and high viscosity methyl cellulose
a, b, c. Values with unlike superscripts are significantly different at P<0.01 level, e, f. at P<0.05.

A significant depression of broiler growth and AME of trial diets was caused by addition of xanthan and locust bean gums. This was not due to energy dilution as the effect was observed only in two of the five trial diets. The anti-nutritive activity was not related to the viscous nature or water binding capacity of these NSP as alginate did not have a similar effect. The anti-nutritional effect of some NSP is thus probably due to a specific interaction with some gut components rather than the result of a more general physical effect such as a change in the viscosity of the digesta.

ANTONIOU, T. MARQUARDT, R.R. and CANSFIELD, P.E (1981). *J. Ed. Agric. Chem.* **29**:1240.
VOHRA, P and KRATZER, F.H. (1964). *Poult. Sci.* **43**:1164.

Dept. of Animal Husbandry, University of Sydney, Camden, NSW 2570.