

ANTI-NUTRITIVE ACTIVITY OF WHEAT PENTOSANS

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The high non-starch polysaccharide contents of barley and rye cause a depression in the growth of broilers when these cereals are included at high levels in the ration (Hesselman et al. 1982; Antoniou et al. 1981). The apparent metabolisable energy (AME) of wheat is generally lower than maize and sorghum with occasionally very low AME values (<13 MJ/kg.DM) being recorded (Mollah et al. 1983). This depression of AME may be due to the higher levels of pentosans found in wheats compared to maize and sorghum.

Water soluble (WSP) and water insoluble pentosans (WIP) were isolated from a wheat milling by-product. The WSP preparation was 52.4% pentosans (24% glucan, 4.25% protein, 4.3% ash) and the WIP was 71.63% pentosans (7.45% protein, 4.55% glucose and 4.8% ash). The WSP and WIP were added to a sorghum based diet to give trial diets containing 0, 0.25%, 1.0% WSP and 0.25%, 1.0%, 3.0% WIP. The AME of the sorghum was determined using 5 week old broilers using individual metabolism cages in a classical trial. Weight gain of the broilers during the trial was also monitored. The results are shown in The Table.

Diet	AME of sorghum (MJ/kg DM)	Weight gain (g)	FCR.
Control	16.13 ^a	388 ^a	2.14 ^a
WIP (0.25%)	15.41 ^b	356 ^a	2.32 ^{ab}
WIP (1.00%)	15.37 ^{bC}	365 ^a	2.38 ^{ab}
WIP (3.00%)	14.50 ^D	293 ^b	2.64 ^b
WSP (0.25%)	15.79 ^{ab}	383 ^a	2.15 ^a
WSP (1.00%)	15.67 ^{ab}	369 ^a	2.17 ^a

a,b,c,d. Values with unlike superscripts are significantly different at P<0.05; C,D. at P<0.01.

The WSP had no significant anti-nutritive activity when included in the sorghum diet at the levels tested. WIP caused a depression of AME of the sorghum of 1.6MJ/kg DM when included at the highest level. The anti-nutritive effect of WIP is seen also in the weight gain and FCR values. The significant depression of weight gain is not due to energy dilution as the birds should be able to compensate for this small effect by adjusting feed intake and feed intake was not reduced in broilers on the trial diets. The highest level of WIP brought the total pentosans of the sorghum to the levels commonly found in wheat (6-8%). The AME of the sorghum in this diet was calculated to be 14.5 MJ/kg which is in the range associated with wheats. Thus the low AME values often associated with wheat are probably due to the relatively high levels of pentosans present in this cereal.

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