

# Effect of soluble non starch polysaccharide degrading enzyme supplements on nutrient efficiency of young broiler chickens fed wheat with different viscosities and triticale

H. Kermanshahi, M.D. Shakouri

Department of Animal Science, Ferdowsi University of Mashhad, P.O. Box 91775-1163, Mashhad, Iran

**Introduction** Although wheat is an important ingredient in poultry diets, a large variability of the nutritive quality of wheat especially in its AME value is reported. A negative correlation between the lower AME in wheat or other cereal grains like barley, rye and triticale and their amount of soluble non-starch polysaccharides (NSP) has been found in birds (Annison, 1990). A positive correlation between the amount of NSP in grains and the viscosity of the gut is also reported (Van der klis *et al.*, 1995). High viscosity of the gut reduces the performance of the birds. Detrimental effect of NSP can be decreased by adding NSP degrading enzymes in the diet (Annison, 1992). Therefore the objective of this experiment was to study the viscosity of different wheat cultivars and triticale and the effect of NSP degrading enzyme supplements in young broiler chickens.

**Materials and Methods** To an *in vitro* experiment, different varieties of wheat were tested and the highest (flaat) and lowest (ghods) viscosities were selected. 288 day-old Arian broiler chickens were kept on cages and four grains (two wheat varieties, Flaata, and Ghods; triticale and corn) with (+) or without (-) a dietary NSP degrading enzyme supplement (Endofeed W) were added to a basal diet with 60% of each grain and fed to broiler chickens from 1-21 days of age. Feed and water provided *ad libitum*. To measure the nutrient digestibility of the experimental diets, an indigestible marker (chromic oxide) was used and feces samples were collected from 18-21 days of the experiment. Experimental design was CRD with a 4\*2 factorial arrangement with 6 replicates per treatment. Data were analyzed using the general linear model procedure of SAS (1986).

**Results** Apparent metabolizable energy corrected for nitrogen (AME<sub>n</sub>), apparent lipid digestibility (ALD), apparent crude carbohydrate digestibility (ACCD) and nitrogen retention (NR) are shown in table. AME<sub>n</sub> in all treatments except in corn diet affected by enzyme supplement (P<.01). ALD and ACCD of all treatments were significantly improved by adding enzyme (P<.01). This improvement in Flaata with the highest viscosity was highest. NR was also improved when enzyme added to each grain (P<.01).

**Table** Effects of dietary treatments on AME<sub>n</sub> (kcal/kg) and nutrient digestibilities (%) in broiler chickens from 18-21 days of age (dry matter basis)

P values	±SEM	Experimental diets with 60% of each grain								
		Corn		Triticale		Ghods		Flaata		
		+	-	+	-	+	-	+	-	
<.01	31.3	3276 <sup>ef</sup>	3211 <sup>f</sup>	3455 <sup>bc</sup>	3344 <sup>de</sup>	3500 <sup>b</sup>	3393 <sup>cd</sup>	3664 <sup>cde</sup>	3354 <sup>a</sup>	AME <sub>n</sub>
<.01	0.63	80.1 <sup>a</sup>	76.6 <sup>bc</sup>	76.0 <sup>c</sup>	69.6 <sup>d</sup>	74.6 <sup>c</sup>	70.9 <sup>d</sup>	78.2 <sup>ab</sup>	65.5 <sup>e</sup>	ALD
<.01	0.21	84.7 <sup>a</sup>	83.6 <sup>b</sup>	81.1 <sup>d</sup>	79.5 <sup>f</sup>	83.5 <sup>b</sup>	82.1 <sup>c</sup>	83.3 <sup>b</sup>	80.4 <sup>e</sup>	ACCD
NS	0.38	68.3	65.4	66.6	61.4	64.7	61.3	70.2	66.4	NR

P values for enzyme and diet effects were significantly different (P<.01). AME<sub>n</sub>, apparent metabolizable energy corrected for nitrogen; ALD, apparent lipid digestibility; ACCD, apparent crude carbohydrate digestibility; NR, nitrogen retention. +, with enzyme; -, without enzyme. The values in each row with different superscripts are significantly different (P<.01).

**Conclusions** Under the conditions of this experiment, it was concluded that addition of NSP degrading enzyme to diets containing wheat and triticale increases their AME<sub>n</sub>, ACCD and especially ALD. The highest improvement can be achieved for those with the highest *in vitro* viscosity (Flaata and triticale). Therefore, the extract viscosity of the wheat and triticale would be a suitable index for predicting the nutritive value of such grains.

**Acknowledgement** Financial support of Ferdowsi University of Mashhad, Iran is greatly acknowledged.

## References

- Annison, G. 1991. Relationship between the levels of soluble non-starch polysaccharides and the apparent metabolizable energy of wheats assayed in broiler chickens. *J. Agric. Food Chem.* **39**: 1252-1256.
- Annison, G. 1992. Commercial enzyme supplementation of wheat-based diets raises ileal glucanase activities and improves apparent metabolizable energy, starch and pentosan digestibilities in broiler chickens. *Anim. Feed Sci. Technol.* **38**:105-121.
- SAS Institute, 1986. SAS User's Guide. Ver. 6. SAS Institute Inc., Cary, NC.
- Van der Klis, J. D., Kwakernaak, C. and Dewit, W. 1995. Effects of endoxylanase addition to wheat-based diets on physico-chemical chyme conditions and mineral absorption in broilers. *Anim. Feed Sci. Technol.* **51**: 15-27.