

Effect of dietary Phytase and NSP-degrading enzymes in diets containing rape seed meal on broiler performance

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Introduction In comparison to 44% crude protein of soybean meal (SBM), the protein content of rapeseed meal (RSM) is about 35- 40% and has a physiologically suitable amino acid combination in animal nutrition, but RSM contains nutritionally unfavourable substances such as glucosinolates, sinapin, tannin, phytate and non starch polysaccharides (NSP) (Kocher *et al.*, 2000). Enzymes have the potential to be used in diets contain antinutritional factors that hinder nutrient availability. NSPs include cellulose, B-glucans, arabinoxylans, and pectins that may increase viscosity of digesta and cause a decrease in nutrient digestibility and performance of broiler chickens. Phytase activity from digestive secretions, some feed ingredients, resident bacteria, exogenous microorganisms, or both resident bacteria and exogenous microorganisms is present in the digestive tract of broiler chickens (Kornegay, 2001), but its efficiency at a practical level is very low. It is accepted that broilers lack sufficient levels of phytase activity to effectively hydrolyse the phytate molecule. Phytate-bound P is not well digested, so inorganic P is added to broiler diets that increased feed costs (Lescoat *et al.*, 2005). The purpose of this study was to investigate the replacement value of SBM with locally grown RSM and two types of enzymes (NSP-degrading and phytase) on performance of broiler chickens.

Materials and methods Three levels of (0.0, 25.0 and 50%) SBM protein was replaced with RSM protein and two levels of Phytase enzyme (0 and 500 FTU Phyzyme/kg, Phyzyme XP is a bacterial phytase from *Schizosacchomyces*), two levels of a dietary NSP-degrading enzyme (0, 0.17%, Grindazyme, minimum activity of 36000 U/g xylanase and 15000 U/g Beta-glucanase) were added to the diets during starter (7-21 days of age) and grower (21-42 days of age) periods. All diets had 0.5% available P and 0.95% Ca, and were isocaloric and isonitrogenous (2969 kcal/kg ME and 21.70% CP in starter; 3118.43 kcal/kg ME and 19.65% CP in grower period). 360 Ross strain chickens were used in a 2×2×3 factorial arrangement in a completely randomized design with twelve treatments, three replicates and ten birds per replicate. Feed consumption and body weight gain of chicks were recorded 4 h after the removal of feed and feed conversion ratio (FCR) calculated at end of every week. All Data were analysed by SAS (2000). Means compared by Duncan's test.

Results The results of this experiment indicated that FI, BWG and feed efficiency of broiler were significantly ($P<0.05$) decreased by increasing RSM in all period of experiment (table 1). These factors were highest in diet without RSM. The BWG and FI of broiler were significantly ($P<0.05$) increased by addition of Grindazyme, but were not affected by supplementation of Phytase in the diet. However Broiler fed diets contains phytase have numerically more FI and BWG than control diet.

Table 1 The main effects of diets contain Phytase and NSP-degrading enzyme and rapeseed meal on broiler performance

	Weigh gain (kg)			Feed intake (kg)			FCR		
	7-21	22-42	7-42	7-21	22-42	7-42	7-21	22-42	7-42
Phytase	0.50	1.31	1.81 ^a	0.79	2.60	3.39 ^a	1.56	1.99	1.87 ^a
No Phytase	0.52	1.33	1.84 ^a	0.78	2.63	3.41 ^a	1.51	1.99	1.85 ^a
SEM	0.01	0.01	0.02	0.007	0.02	0.01	0.03	0.01	0.01
Grindazyme	0.51	1.28 ^b	1.80 ^b	0.78	2.60 ^b	3.37 ^b	1.52	2.02 ^a	1.87 ^a
No Grindazyme	0.51	1.35 ^a	1.86 ^a	0.79	2.64 ^a	3.43 ^a	1.55	1.95 ^a	1.85 ^a
SEM	0.01	0.05	0.04	0.007	0.03	0.04	0.02	0.05	0.01
0% RSM	0.54 ^a	1.36 ^a	1.90 ^a	0.79 ^a	2.65 ^a	3.44 ^a	1.47 ^b	1.95 ^a	1.81 ^b
25% RSM	0.49 ^b	1.31 ^{ab}	1.80 ^b	0.78 ^b	2.62 ^{ab}	3.39 ^{ab}	1.58 ^a	2.00 ^a	1.89 ^a
50% RSM	0.51 ^b	1.28 ^b	1.78 ^b	0.79 ^{ab}	2.57 ^b	3.36 ^b	1.55 ^a	2.02 ^a	1.89 ^a
SEM	0.02	0.04	0.06	0.006	0.04	0.04	0.07	0.04	0.07

SEM: standard error of means; FCR: Feed conversion ratio; RSM: Rape seed meal

Conclusion Levels of RSM showed more adverse effects on performance. It seems addition of enzyme was an effective method to overcome the anti nutrition factor of RSM. Therefore, it may be concluded that NSP-degrading and Pytase enzymes incorporated in rapeseed meal based broiler diet could be beneficial..

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