

APRI FACTS

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WHOLE WHEAT FOR LAYING HENS

INTRODUCTION

The practice of diluting broiler diets with unprocessed whole wheat has become quite popular. Studies evaluating whole wheat feeding of laying hens is however limited. Enzymes are currently being used in poultry diets which contain wheat to aid in digestion. Wheat contains arabinoxylans which are linked to other cell wall components and are able to absorb up to ten times their weight as water. Therefore, wet litter is often associated with wheat. At levels greater than 20%, enzyme supplementation is often recommended (Leeson and Summers 1997). Research from Holland has indicated that broilers fed whole wheat have more muscular and heavier gizzards than conventional-fed birds. Feed may pass slower through a better developed gizzard and thereby result in better feed utilization. Similar to whole wheat, coarsely ground feed particles may have a similar effect.

TRIAL

The effects of whole wheat dilution, enzyme supplementation and ration texture were studied. Corn and wheat were the primary grains. These grains were ground with either a 5 mm or a 7 mm screen. Diets were diluted with 0% or 20% whole wheat. Diets were supplemented at levels of 0% or 0.1% with a commercial enzyme preparation containing xylanase. For diets diluted with 20% whole wheat, the dietary levels of limestone, oyster shell, vitamin/mineral premix and enzyme were increased in the mixed portion of the ration to compensate for dilution when whole wheat was added. The dietary treatments were fed to White Leghorns from 20 through to 64 weeks of age.

RESULTS

From 20 through to 60 weeks, birds fed diets with and without whole wheat had similar: egg production, and feed efficiency.

Through to 64 weeks of age, birds fed diets with and without whole wheat had similar: feed consumption, body weights, egg specific gravities, albumen heights and Haugh units.

Through to 64 weeks of age, birds fed diets with and without enzyme supplementation had similar: egg specific gravities, albumen heights and Haugh units.

Enzyme supplementation resulted in significant differences in: hen-day egg production (Table 1), feed consumption (Table 1) and feed efficiency (Table 1).

Table 1. Effect of Enzyme Supplementation on Feed Consumption (g/bird), Hen-Day Production (%) and Feed Efficiency (g feed/ g eggs)

	Enzyme Supplementation		
	-	+	SEM
Feed Consumption			
29-32 wks	112.6 ^b	115.4 ^a	0.9
Hen-Day Production			
45-48 wks	88.4 ^a	83.6 ^b	1.3
49-52 wks	86.1 ^a	82.0 ^b	1.3
Feed Efficiency			
53-56 wks	2.2 ^b	2.4 ^a	0.04
57-60 wks	2.3 ^b	2.4 ^a	0.04

a, b means within the same row with different letters differ significantly ($P \leq 0.05$)

Birds consumed significantly more feed (Table 1) from 29-32 weeks of age when the diet was supplemented with the enzyme.

From 45-52 weeks of age, birds produced significantly fewer eggs (Table 1) when the diet was supplemented with enzyme.

From 53-60 weeks of age, the birds were less efficient (Table 1) when the enzyme was included in the diet.

Through to 64 weeks of age, birds fed diets of different texture had similar: feed efficiency, egg specific gravities, albumen heights and Haugh units.

Different particle sizes resulted in significant differences in hen-day egg production for the 53-56 week period. Birds fed the coarse particles produced significantly fewer eggs (Table 2).

Table 2. Effect of Particle Size on Hen-Day Production (%)

	Particle Size		SEM
	Regular	Coarse	
53-56 wks	85.3 _a	80.5 _b	1.3

a, b means within the same row with different letters differ significantly (P≤0.05)

Egg production (Table 3) was reduced significantly from 61-64 weeks of age when the diets diluted with whole wheat contained coarsely ground grains.

Table 3. Effect of Whole Wheat and Particle Size on Hen-Day Production (%)

	Whole Wheat	Texture		SEM
		Regular	Coarse	
61-64 wks	0%	77.2 _{ab}	78.5 _{ab}	1.9
	20%	82.2 _a	74.8 _b	

a, b means within the same row with different letters differ significantly (P≤0.05)

From 25-64 weeks of age, the whole wheat diluted diets were less expensive than the non-diluted diets (Table 4).

Table 4. Comparative Cost of Diets

Diet (age)	Whole Wheat			
	0%		20%	
	Enzyme			
	-	+	-	+
19-24 wks	260	265	260	265
25-40 wks	257	264	253	260
41-50 wks	266	276	261	267
51-64 wks	278	285	268	274

INDUSTRY IMPACT

Due to the similar responses in egg production, feed efficiency and egg quality, results suggest that laying hen diets may be diluted up to 20% with whole wheat if diets are adjusted for minerals and vitamins. Depending on the current market price of whole wheat, optimizing its use through dilution could result in increased returns for egg producers by reduced feed costs. Supplementing the diets with a commercial enzyme containing xylanase did not improve productive performance. Results from this trial also suggest that feeding coarsely ground grains may have a detrimental effect on the productive performance of laying hens.

REFERENCE

Leeson, S. and Summers, J.D. 1997. Commercial Poultry Nutrition. 2nd ed. University Books, Guelph, ON.

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