

Starch Blocker Evaluation Using Laying Hens

C. F. Hanson¹, F. N. Owens²
and R. G. Teeter³

Story in Brief

Special Legume Protein Concentrate (starch blocker) was added to the diet of ten adult laying hens in an attempt to reduce starch digestibility. The material was fed at a level advertised to totally inhibit the digestion of starch in this diet. Feed intake, weight gain, digestibility of dry matter, organic matter and starch were unchanged by addition of starch blocker to the diet. Rate of passage through the intestinal tract was increased a mean of 67 percent by feeding this material.

Introduction

Starch blockers, composed of proteins isolated from kidney beans, are reported to inhibit amylase activity, reducing starch digestion in laboratory tests. Promoted as a dieting aid for humans, starch blockers have received limited testing in controlled animal studies. Compounds which block amylase activity are present in kidney beans and wheat. They might also occur in other foods and feeds, thus are deserving of attention by nutritionists. The objective of this experiment was to determine the influence of starch blockers on feed intake, digestion and passage rate in laying hens.

Materials and Methods

One ground starch blocker tablet (Nature's Bounty, Inc., Bohemia, NY) which supposedly blocks digestion of 100 g of starch was added to each 150 g of poultry feed which contained 88.9 per cent dry matter and 32 percent starch. This diet and a control with no added starch blocker were available ad libitum for 10 days to 10 individually caged laying hens (5 per diet) averaging 1600 g. Total excreta were collected during the final 5 days. After the first period, hens were switched to opposite diets and the process repeated. Feed and excreta were dried, ground and analyzed for organic matter and starch. Apparent digestibilities were calculated. Passage rate was estimated as time from oral dosing of ferric oxide until appearance of the marker in feces.

Results and Discussion

Measuring starch in feces of most species is not an adequate index of digestion in the small intestine due to bacterial action in the large intestine. Fermentation capacity in the large intestine of humans and various other species is

¹Graduate Assistant, Human Nutrition ²Professor, Animal Science ³Assistant Professor, Animal Science

considerable. However, with birds, this fermentation is limited. Addition of starch blocker to the diet for laying hens did not significantly alter feed intake, weight gain, dry matter content of feces, or apparent digestibilities of dry matter, organic matter and starch (Table 1). On the average, hens fed starch blocker gained slightly more weight than those not receiving starch blocker. However, weight changes of birds on a treatment differed markedly. During the period on starch blockers, hens ranged from gaining 20.3 g/day to losing 7.7 g/day, whereas on the control diet, the range was from 17 g/day to -11 g/day. Passage rate was increased by 67 percent with addition of this feed additive.

Starch digestion can be limited in various species by (1) passage time, (2) enzyme activity, (3) particle size and other factors. For instance, carnivores supposedly have less ability to digest non-galatinized starch than do poultry and most other domestic animals. Failure of starch blockers to reduce starch digestion in this experiment, despite their use at levels sufficient to block more than twice the amount of starch in the diet, questions the value of starch blockers as a dieting aid for humans. A recent study with humans with a dosage claimed adequate to block digestion of three times the amount of starch consumed also resulted in no detectable effect on digestion of starch (Bo-Linn et al., 1982).

Reasons for the faster rate of passage with the starch blocker remain to be determined. But, in humans, a faster rate of passage could flush slowly digested nutrients to the large intestine for fermentation and subsequent digestive discomfort as bacteria in the large intestine rapidly utilize the starch and produce gas.

Table 1. Influence of starch blocker on digestive measurements.

	Diet	
	Control	Starch blocker
Feed intake, g/day	98.7	100.2
Weight gain, g/day	0.39	2.94
Feces, DM %	24.6	26.9
Apparent digestibility, %		
Dry matter	73.5	71.7
Organic matter	78.4	76.9
Starch	98.7	98.7
Passage rate, min.	386 ^b	258 ^b

^{a,b}Means in a row with different superscripts differ ($P < .05$).

Literature Cited

Bo-Linn, G. W., et al. 1982. *New England Journal of Medicine* 307:1413.