# ILEAL ENDOGENOUS RESPONSE IN NITROGEN AND LYSINE TO DIETARY PROTEIN AND CELLULOSE IN THE CHICKEN

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**Dedicated to**

***Edina Cahyaningsih***

**ABSTRACT**

Four experiments were undertaken. The first examined the swelling properties of faeces and the storage modulus (G') or elastic properties of ileal digesta to determine whether they were suitable indices for describing feeds on the basis of digestive response. One set of feeds were, maize, barley, meat and bone meal and peas. A second set consisted of feeds of set 1 but in each case involved sorghum addition in the ratio of 1:1. The third set involved cellulose and a medicinal bulking agent, Granocol, introduced in increasing proportion. The second and fourth experiments were undertaken to quantify endogenous nitrogen (N) response (experiment 2) and endogenous lysine response (experiment 4) at the terminal ileum to increasing dietary intake of cellulose (experiment 2) and guanidinated gelatin (experiment 4). Experiment 3 explored procedures and response to the feeding of wet diets of the form that were employed in experiment 4.

In experiment 1, swelling index varied over a narrow range between 4 to 8 cc excreta/g excreta (DM). Barley and meat and bone meal differed significantly, but the addition of sorghum to each caused little change in swelling index. The addition to cellulose of Granocol over the range of ratios 5:0 to 3.5:1.5 altered swelling index but not significantly or linearly. The narrow range within which swelling index varied suggests its application is limited.

Storage modulus estimations yielded a wide range between 2.7 and 76 K Pa. Meat and bone meal plus sorghum and maize plus sorghum differed significantly from all other dietary treatments except the maize diet. The addition of Granocol to cellulose and of sorghum to the

cereals, meat and bone meal and peas produced responses that were inconsistent in both direction and magnitute. The lack of control over colloidal consistency of the liquid and solid phases of the ileal digesta suggests this form of measurement is of limited use.

In experiment 2, the concentrations of N and chromium (Cr) in the ileal digesta were consistent with the digestibility properties of the dietary components and the ratio of the components, cellulose and cornstarch comprising the test diets. The endogenous N excretion response to increasing dietary intake of cellulose was 1.15 mg N for each g intake of cellulose ($P<0.01$).

In experiment 3, the concentration of N in the ileal digesta increased with increasing concentration of gelatin in the test diets. For each gram intake of gelatin, 34 mg of ileal N was passaged ($P<0.01$). The apparent N digestibility of gelatin was estimated as 54 percent.

In experiment 4, guanidination of gelatin resulted in an 86% conversion of lysine to homoarginine. The concentration of chromium in the ileal digesta was low and diminished with increasing concentration of dietary gelatin. The estimate of the ileal excretion of N in response to increasing intake of guanidinated gelatin was extreme and untenable. The low ileal digesta cr concentrations were considered to be giving extreme and exaggerated values of digesta flow (g digesta DM/g food fed). Ileal lysine response to increasing levels of guanidinated gelatin was estimated as 34 mg lysine per g intake of guanidinated gelatin.

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**TABLE OF CONTENTS**

## LIST OF TABLES

LIST OF FIGURES