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by

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# THESIS

## PHYSICAL ASPECTS OF NON-RUMINANT NUTRITION

Nutritionally adequate diets fed to pigs can be expected to yield varied responses due to differences in physical attributes, feeding and processing methods, choice of ingredients, and other factors. The independent and interrelated effects of such dietary characteristics are of special interest where control of feed intake by self-fed pigs is a matter of prime economic importance. The experiment described in this thesis provides evidence that rate of gain, efficiency of feed conversion and carcass quality can be markedly influenced by texture and nature of fibrous ingredients, pelleting, antibiotic supplementation and sex of the pig.

A swine feeding experiment, of a  $3 \times 2^5$  factorial arrangement, was conducted with finishing rations to assess the effects of several types of fibrous diluents, feeding frequencies, fiber moduli, pelleting, antibiotic supplementation and sex. The response criteria included weight gains, feed intakes, protein and energy digestibility coefficients, carcass traits and chemical and physical measurements on the ingesta from various segments of the gastro-intestinal tract. Assays on the ingesta included specific gravity, lignin and proximate principle components as well as physical characteristics of the ingestal fluid.

Differences in daily feed intake existed between the major treatments except for the antibiotic supplementation. However, only within pelleting and sex comparisons were these changes effective in influencing growth rate. Altered feed utilization, associated with differences in protein and energy digestibility coefficients, occurred within fibrous diluent and antibiotic supplementation comparisons. Fibrous diluent type, module, and antibiotic response were inter-related.

Carcass quality paralleled changes in nutrient digestibility and feed intake. The degree of finish, as influenced by types of fibrous diluent and feeding frequencies, was closely associated with carcass yield. Other factors influencing carcass yield included differences in intestinal fill, postulated tissue hydration differences associated with the source of fibrous diluent, and changes of visceral weight induced by antibiotic supplementation and fibrous diluents.

Characteristics of the ingesta were more reliable indicators of treatment effects than were ingestal fluids. Gastric bulk reflected original ration differences; however, with the exception of changes induced by fibrous diluent, these effects failed to persist in the intestine.

## PUBLICATIONS

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## BIOGRAPHICAL

- 1931 - Born July 17 at Wayne, Alberta.
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