



PROJECT REVIEW

NAME: Vasilis Symeou	
INSTITUTE: Newcastle University	FULL TIME Final Year
TITLE: Reducing the excretion of phosphorus (P) from growing and finishing pig systems	
AIMS & OBJECTIVES:	
<p>The overall objective is to extend an existing pig growth model (Wellock et al., 2003), in order to be able to predict P digestion, retention and ultimately soluble and insoluble P excretion in the environment, in growing and finishing pigs of different genotypes, fed different diets. The aim is to enable the formulation of pig diets and feeding strategies that maximise P utilisation, whilst minimizing P excretion to the environment, without jeopardising the population's growth.</p>	

KEY MILESTONES:	TARGET DATE:	ACHIEVED DATE:
1. Developed a method to estimate the P requirements for different pig genotypes	Aug. 2011	Oct. 2011
2. Create a module that predicts the retention and excretion of dietary P.	Dec. 2011	Mar. 2012
3. Validate model predictions against experimental data and choose appropriate feeding scenarios (average pig model)	Mar. 2012	Jul. 2012
4. Formulate a population growth model (stochastic model)	Oct. 2012	April 2013
5. Nutritional strategies to decrease P excretion	Jun. 2013	August 2013

PROJECT REVIEW AND COMMENTARY:
<p>The model was converted into a population one so that it would be able to predict P excretion of populations of pigs (as opposed to the response of the average pig). The development of the original model into a stochastic was achieved through the use of Monte-Carlo methodology, which accounted for variation in pig genotype and diet composition. The strategies investigated using the 'population' model were: (1) changing diet composition frequently in order to match more closely pig requirements to the diet composition (phase feeding) and (2) feeding pigs according to their BW (sorting).</p> <p>The model found that than an increase in the number of phase feeding resulted in an overall decrease in the cumulative P excreted. For example, using a three phase feeding regime, instead of one phase feeding regime, resulted in an average 8% decrease in the cumulative P excreted by a group of 500 pigs. The population performance in terms of BWG increased by 2%, when using the two feeding regimes respectively. On the other hand, there was a 1, 2 and 3% decrease in the cumulative P excreted when the population was sorted according the lower 10, 20 and 30 percentile of the population, respectively, and each sub-population was fed a diet in accordance to their average digestible P requirements; there was no significant impact in terms of BWG. It was concluded that phase feeding is a more sustainable strategy than sorting, in terms of P excretion.</p>

POTENTIAL BENEFIT TO INDUSTRY:
<p>After carbohydrates and protein, P is the next most expensive nutrient in many pig feeds. A deficiency in P results in skeletal defects and a more than 15% deficiency of the pig's P requirement, results in a reduction of lean tissue growth rate (NRC, 2012). While, an excess P in pig diets contribute to environmental pollution, namely eutrophication. The development of a model to predict P excretion under different feeding scenarios in growing and finishing pig systems is to be used to improve the supply of digestible P to pigs in a manner that more closely matches their requirements and consequently reduces P excretion and feed costs. The outcomes of the project will provide recommendations to BPEX on feeding strategies that would be expected to reduce the excretion of P from growing pigs, without penalizing the pig's performance.</p>



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Notes from Seminar: