

ANSC 324

Spring, 2007

EXAM 2

100 Points

NAME: **KEY** Lab section: _____

Instructions:

Make sure that you take time to carefully read each question, and then answer the question appropriately. Answers to essay questions do not necessarily have to be long, but answers need to be complete. Make sure that you pace yourself so that you are able to complete the exam. Don't get stuck on any one question. If you don't know the answer to a question, continue to the next question and come back to the one that you are uncertain about at the end. *Please write legibly and show all of your work. Good Luck!!!*

- 1) Mineral digestibility is calculated based on the disappearance of a given mineral between the feed and the feces. However, this is not very accurate when calculating amino acid digestibilities. Why not? (8 pts.)

Amino acids are absorbed in the small intestine. Unabsorbed amino acids that enter the large intestine are often utilized by microorganisms in the large intestine. Therefore, amino acids present in the feces are a combination of unabsorbed amino acids from the feed, microbial proteins, and endogenously lost amino acids/proteins. Therefore, the composition of fecal amino acids is different from the composition entering the large intestine and therefore, is not an accurate means of measuring amino acid digestibility.

- 2) How are amino acid digestibilities normally calculated? There are 2 methods. What is the difference between the two, and how are they calculated (provide the equations)? (8 pts.)

1) Apparent Ileal Digestibility (AID): endogenous losses are not accounted for

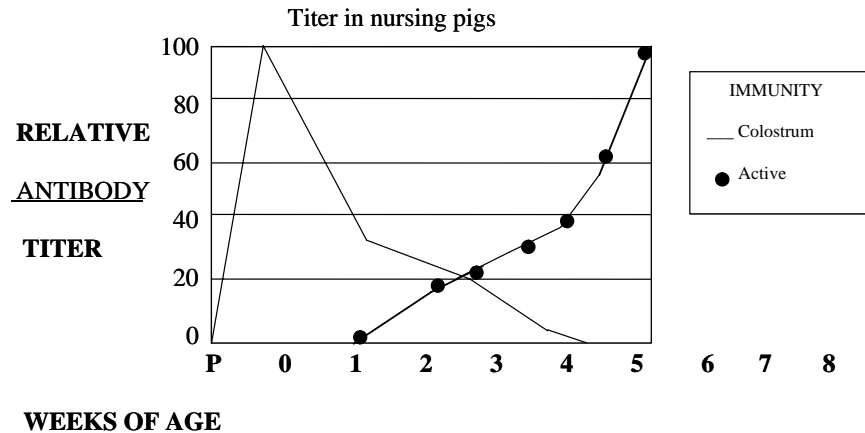
$$AID = ([Amino\ Acid]_{Feed} - [Amino\ Acid]_{Digesta}) / [Amino\ Acid]_{Feed} \times 100$$

2) True Ileal Digestibility (TID): accounts for endogenous losses

$$TID = ([Amino\ Acid]_{Feed} - [Amino\ Acid]_{Digesta} + [Amino\ Acid]_{Endogenous}) / [Amino\ Acid]_{Feed} \times 100$$

- 3) Draw a graph of the relative antibody titers provided by colostrum and by active immunity from parturition to 5 wk of age (4 pts.).

**BABY PIG
IMMUNE DEVELOPMENT**



- 1) What is AAFCO (4 pts.)?

American Association of Feed Control Officials

- 2) Clearly state the hypothesis that you are testing in the chick experiment. Provide 2-3 sentences explaining your justification for arriving at this hypothesis (4 pts.).

- 3) As a general rule of thumb, if feed is observed outside of the feeder, then at least 10 % of the feed being fed is being wasted (4 pt.).
- 4) On average, legumes contain approximately 14-16 % CP, and grasses contain approximately 7-10 % CP.

- 5) During the summer months, when the environmental temperature is very warm, would it be more beneficial to increase the fat or fiber content of grower-finisher pig diets? Why (8 pts.)?

In the summer, it would be beneficial to add fat to the diet, because there is less heat produced from the digestion of fat compared to fiber.

- 6) What is meant by “phase feeding” and why is it beneficial to phase feed (8 pts.)?

Phase feeding refers to the practice of adjusting the animals' diets as their requirements change. So, for example as a pig grows, the nutrient requirements as a percentage of the diet decrease. Therefore, diets are routinely changed every 2-4 weeks to adjust the diet to meet these changing requirements. The advantage is that this by frequently adjusting the diet, the requirements can be more closely met, minimizing over-formulation, reducing cost, and reducing nutrient excretion.

- 7) What does SEW stand for, and what are the advantages and disadvantages? How can some of the disadvantages be overcome? (8 pts.)

SEW- Segregated Early Weaning

Advantages

Can break certain disease cycles

May allow producers to get sows bred back sooner, resulting in more pigs/sow/year

Shortens the length of time the pigs are on the sow, which reduces the possibility of crushing

Disadvantages

Early weaning means removing pigs at a very young age, and with a very fragile immune system

If pigs are weaned too early, there may not have been enough time for uterine involution, and therefore sows may not breed back on their first estrus post-weaning

Requires intensive management

Over-coming Disadvantages

Off-site nursery

Higher priced ingredients in the diet (Milk based products, plasma, fish meal, etc.)

Biosecurity

- 8) Grinding feed reduces particle size. What effect does this have on nutrient digestibility? Are there any concerns with small particle size? (8 pts.)

Decreasing particle size increases nutrient digestibility. However, if ground too small (400 microns or less) increases incidence of ulcers have been reported in pigs. Also, small particles are more prone to packing in storage bins, feed trucks and feeders.

- 9) Nitrogen and phosphorus are the nutrients of greatest environmental concern when animal manure is applied to the land. What are the concerns and what can be done nutritionally to overcome these concerns? (8 pts.)

Nitrogen is very water soluble, and therefore can run-off in heavy rain or erosion events, ultimately contaminating U.S. waterways. In addition, N, particularly when excreted in the urine can volatilize as ammonia gas, polluting the atmosphere. Minimizing the N content of the diet by lowering dietary CP levels and increasing the use of synthetic amino acids will help to reduce N excretion. The use of dietary fiber may help to repartition N excretion from the urine to the feces. The use of dietary acidifiers may acidify the urine, reducing the volatilization of N to ammonia. Finally, incorporation of N into the soil by injecting it, rather than topically applying manure will minimize ammonia N losses.

Sixty to 80% of the phosphorus in plant ingredients typically used in nonruminant diets is bound as phytate P. Phytate P is unavailable to nonruminants, and is therefore excreted. This results in a disproportionate amount of P relative to N in manure for crop needs. As a result, when animal manure is applied to meet the N needs of the crop, P is over applied. Excess P can run-off or be lost through erosion events, ultimately leading to eutrophication of our waterways. Adding the enzyme Phytase to the diet of nonruminants, results in the release of much of this phytate P, allowing the animal to utilize this P. Therefore, less inorganic P needs to be added to the diet, resulting in a reduction in P excretion.

- 10) Concerns have been raised over the feeding of high protein diets to dogs and the possible relationship with kidney disease. Most data suggests that high protein diets **do not** cause kidney disease. In fact, older dogs may need to be fed higher levels of dietary protein. Discuss the role of the kidney when high levels of protein are fed and why higher levels of protein may be beneficial in older dogs. (8 pts.)

Excess dietary protein, which is absorbed, may be excreted in the urine, via the kidney, as urea. However, excess protein has not been shown to cause kidney disease, although high dietary protein is detrimental in the presence of kidney disease. In older dogs, there are actually indications that higher dietary protein is required because of changes in the basal metabolic rate in older dogs. Maintenance energy requirements are reduced ~20% in older dogs. Therefore, dogs need less feed to meet their energy requirements. As a result, increasing the protein density of the diet has been shown to increase lean mass and decrease fat mass in older dogs.

11) Compare and contrast dietary needs of dogs compared to cats. (8 pts.)

Cats are strict carnivores, which means that they have a much higher dietary CP requirement and a lower carbohydrate requirement. They also do not experience a reduction in maintenance energy requirements as they age, as seen in dogs. The feline liver is always in a gluconeogenic state, unlike in dogs which can down-regulate gluconeogenesis to spare lean tissue

12) What is colic? (4 pts.)

Abdominal pain, that can lead to a twisting of the intestines.

- 13) Amino acid requirements for swine are often expressed as a ratio relative to Lys. This allows for an easier comparison of the amino acid profile in a given feed ingredient relative to the need of that animal. Given the information below, complete the table by calculating the Met and Trp content of this feedstuff (4 pts.).

	% of Ingredient	% of Lys
Lys	.95	100
Met	.31	32.2
Thr	.61	64.2
Trp	.17	17.8