

ANTIBIOTICS AND VITAMIN B₁₂

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I can readily finish one-half of my talk here today by saving only a few words. I will eliminate this half by saying that as far as we are concerned, Vitamin B₁₂ does not present us with a problem. It has been well-established that the intrinsic and extrinsic factors are linked with Vitamin B₁₂ and that the animal body is dependent to a great extent upon this vitamin. As long as a source of Vitamin B₁₂, such as in tankage, is incorporated in the ration of the monogastric animal, we will have a normal carcass, other things being equal.

Now, let us talk for a few minutes on the subject of antibiotics. Since penicillin, streptomycin, terramycin and aureomycin have come on the market, many others have been manufactured. Some of these are: neomycin, achromycin, chloromycetin, erythromycin, carbomycin, cinnamycin, magnamycin, ascasin, globicin, subtilin, remocidin and a few more. In the manufacture or fermentation of the antibiotic pharmaceuticals, the residue, so to speak, is available to the livestock industry as an animal feed. However, only a few of these antibiotics just mentioned have been experimented with in swine production. What I am trying to say here is that our institutions are going to be asked in the future to experiment with these and other by-products.

Not only the manufacturers of antibiotics, but also many industries are turning to the experiment stations to see if we can utilize their by-products so that they may have commercial value. During the past year or so, the animal feed department of the packers has been the most profitable of their by-product departments. As meat investigators, we must meet this challenge of so-called "medicated feeds." After the swine and nutrition men of your institution have fed these so-called stimulatory substances in their ration, you have the task of investigating their effects upon the carcass. There have been many theories proposed concerning the mode of action of antibiotics. A few of these are as follows:

1. Stimulation of the intestinal synthesis of vitamins by bacteria;
2. Reduction of the total number of microflora in the intestinal tract, but leaving the beneficial bacteria to prosper;
3. Inhibition of the pathogenic or toxic microorganisms;
4. Growth-promoting action;
5. A protein-sparing action when fed on lower levels of protein;
6. Play a role in the Krebs's Cycle;
7. An increase in the extra-cellular and/or the interstitial water.

This last mode of action which has yet to be proven experimentally seems to be a pet theory of some of our physiologists. They claim that water weighs 8.33 pounds per gallon and that this could easily account for the 10-20% increase in rate of growth.

However, we must not jump to conclusions as to these theories of modes of action of antibiotics. Sherlock Holmes had an excellent motto for his theories: "I have no data yet. It is a capital mistake to theorize before one has data. Insensibly, one begins to twist facts to suit theories, instead of theories to suit facts."

Antibiotics have been on the market and have been universally incorporated in the formula feeds of the commercial feed manufacturers for the past few years. I do not propose to review the literature here today. However, the pharmaceutical companies can supply you with excellent annotated bibliographies on antibiotics and Vitamin B12. Yet, one is discouraged when he reviews the literature to find many experiments reporting the results from feeding antibiotics plus Vitamin B12 without any carcass data. This past academic year, David Mackintosh sent a circular letter to all of the experiment stations seeking information as to the nature of their experimental work. After going through the responses, I tabulated exactly 12 swine experiments dealing with the feeding of antibiotics and only five reported that carcass work is being or will be done.

It seems that as meat investigators, we should endeavor to collect carcass data pertinent to the feeding of antibiotics or any other new feed substance. Not only should we do applied research such as carcass cutouts, measurements, and so forth, but we should do some fundamental research with respect to the histological, bacteriological, hematological and biochemical aspects of the effects upon the carcass. In this way, we can develop an over-all picture and then as Sherlock Holmes said: "twist the theories to suit the facts."

Now, some of you may say: "Where is the money coming from?" You may have to do as David Mackintosh and I did; we got the hematology of the blood at the time of slaughter and histological work of bones, glands and tissues done on 12 experimental hogs for exactly six pork tenderloins. And that is not all - we have the use of the bacteriological laboratory and supplies for exactly one picnic. It takes the cooperation of many of our departments to carry out research in the field of meat investigations.

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MR. KLINE: We need to do a lot of work at home to get our nutritionists, our meats laboratory, and the animal breeding boys tied in closer together rather than to have the meats laboratory set off apart by itself as a service department.

Our next topic is one that is relatively new. Mr. Wheeler, of the University of Illinois, is going to present a paper on hormones as they affect pork carcass characteristics and quality.

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