DISCUSSION

Chairman :

The floor is open for questions on Dr. Maner's paper.

Prof. Mahadevan :

I am not trying to be patronising when I say that I have been impressed by both Dr. Maner's and Dr. Jeffers' contributions this afternoon. However, I have also had some cause for concern by the total absence of any statistical analyses of the results. Of course, one can see that a completely randomised design has been used in these experiments, but I fail to see whether the experimental results have, in fact, been subjected to statistical analysis. For instance, average daily gains in one experiment have been cited as ranging from 0.672 for one treatment to 0.748 for another. Now, without any knowledge of the within treatment and between treatment variability in the experiment, it would be impossible to determine whether these differences are real differences or might be attributable to experimental error. Perhaps Dr. Maner or Dr. Jeffers might like to comment on this.

Dr. Maner :

I purposely left many of these statistical analyses of the experiment out of the paper here because I was not trying, in this paper to give actual differences between some of these treatments. My main interest here was to demonstrate to the symposium that they can be used efficiently and economically. We used our standard diets only to compare and give an indication of how well they were performing. Some of these have been subjected to statistical analysis. I think that approximately four out of six have been subjected. Within treatment variation usually is very small; variation within groups is very small. These experiments were run over a period of 3 years and we do have some differences between experiments. For instance, the first three experiments were conducted using pigs that were produced at the Palmora Station; three of the other experiments were conducted using pigs which were reared at an altitude of 8600 feet, about 2600 metres, down on the Palmora Station which is about 1000 metres so there are differences within strains and between animals used. I appreciate your comment.

Dr. Richardson :

In your experiments, what are the economic advantages or disadvantages of using root crops as a substitute for maize? If you have the data at hand can you give us a general statement on it.

Dr. Maner :

As far as economic advantages go, I do have the data available in my brief case, but it would be easier just to give a general statement on it. In every case where we have used cassava (yuca) in our experiments we have tried to compare. We do not have good data to show the actual cost of producing cassava or yuca per hectare or per kilo. In many of our experiments where we measured the actual production, we have produced as much as 10 tons dry matter per hectare or 30 tons of wet yuca per hectare and this was with unimproved varieties, with very poor cultural practices, because we, as animal scientists, had to grow the yuca in order to utilise it. In this case we used no fertilizer and also no mechanical cultivation methods. We only used the machines to control the weeds and we got as much as 30 tons per hectare. When we compare on our experiments we have used this as a type of comparison. If we say that we get only 20 tons of yuca produced per hectare as compared to 5 tons of corn which, as you know, is above the average per year production when we get two crops produced, yuca requires about eight to ten to eleven months to produce depending upon the season. If we compare corn at 5 tons per hectare and yuca at 20 tons per hectare, which is much less than we are capable of producing, we find that our yuca diets are in the neighbourhood of 20 to 25% more economical, even considering the larger quantities of protein, than corn or sorghum diets. I think this is a fair comparison since we compared the actual cost or the actual price of corn which in Colombia we consider to be about 1200 to 1500 pesos which in dollars will be about $80 to $85 per ton. We used this figure and we come out with 270 pesos

per ton as a cost for our yuca used in our experiments. So it's more economical and I think if we use the actual production figures in realizing that varieties are available, we have seen there the varieties that produce up to 45 or 50 tons of yuca per hectare and I think there is ample leeway in considering these in animal feeds.

Mr. Williams :

Dr. Jeffers, what is the genetic status of the rats you used in this trial? Were they inbred strains?

Dr Jeffers :

I am sorry you asked that question because these experiments were conducted under such very limiting conditions that if I were to tell you what all these limiting conditions were my entire data might be thrown out entirely. We have absolutely no information on these rats. This work is extremely preliminary. Four rats per treatment. I think we would be very presumptious indeed to present any statistical information on this since the coefficients of variability were very high.

Dr. Montaldo :

I want to ask Dr. Maner how important is yuca in Colombia? I am asking this question because we have just two Colombians in Venezuela and they always refuse to give information on yuca. Yuca is used in large quantities in the feeding of livestock because I have seen much work in Labolina, San Paulo and lately a paper in Santo Domingo using it on chickens but it looks like all experiments have been going after that. We prepare in Venezuela, Maracai, dry leaves of yuca and we got a very high content of protein 20% on the dry leaves compared with 16% on alfalfa. If you are interested you can tell us about that.

Dr. Maner :

Well to try to answer your question. Yuca ranks 7th in Colombia as far as economic importance is concerned. Figures published by the Ministry of Agriculture ranks yuca as 7th in economic value. Secondly, I should say that yuca, or cassava, is not commonly used in animal feeds. We started this work approximately 2½ to 3 years ago with the idea of trying to reduce the competition for human consumption not only in Colombia but in other areas of the world. As you well know Brazil produces some 12 million short tons of yuca per year which offers tremendous potential. I am happy to say that the swine producers where we are actually working and pushing yuca as a swine feed, have just discovered yuca as a swine feed and they are planting it or seeding it in large acreages. I have said on the farm, feeding of yuca should be done by rotational seeding possibly on a monthly basis because we can seed it almost any month in Colombia and many other parts of the world. If this method is practised you can tremendously reduce the cost of swine feed.

To answer your other question, we have done one trial comparing dried yuca leaves to alfalfa and found them to be equal. In our studies we find that yuca leaves on an air dried basis which contains 7 to 8% moisture, containing approximately 17% protein does offer some potential. We also know that if you harvest leaves from yuca with a high hydrocyanic acid content you must dry them and let them stand for a number of days to help to eliminate some of the HCN toxicity.

Dr. Montaldo :

Have you compared yuca with alfalfa and is there a difference of the dry yuca leaves and alfalfa, because after being dried they lost all the acidity.?

Dr. Maner :

Yes, we have compared them on feeding trials with swine and found them to be equal.