SOYA MEAL—Summary of discussion

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SESSION IV A

Cochairmen Romero and Lepley opened Round Table IV-5 discussion on soya meal utilization. They were joined by Park Waldroup, University of Arkansas, who discussed the use of whole soybeans in poultry feeds. He indicated that there has been considerable interest in the possibility of utilizing whole unextracted or "full-fat" soybeans in poultry diets.

Since soybeans contain not only high-quality protein (38-42%), but are also a rich source of energy due to their high oil content (18-22%), they have the potential of supplying major amounts of both energy and protein to all types of poultry. Numerous studies have been conducted which demonstrate that properly processed whole soybeans may be used effectively.

There are advantages that have been attributed to the full-fat bean meal. First, it is a granular material that can be handled at a lower cost than fat in the feed mixing operation. Second, full-fat soya has the fat within the matrix of the feed particle rather than sprayed on the surface. This may permit higher fat content feeds to be made into satisfactory pellets. Finally, the quality of the fat is higher than that obtained from most other sources of added fat. It was concluded that heat-treated whole soybeans may be used successfully in poultry diets with no adverse effects on performance.

Manuel Cuca, University of Chapingo (Mexico), discussed energy-protein relationships for poultry. For several years, he has been conducting experiments trying to better define the poultry and energy requirements of broiler breeders raised in tropical environments. Dietary energy levels and daily feed consumption are directly related to environmental temperatures. As a result, he is recommending 15 grams of protein and 300 kilocalories of metabolizable energy per day for hens at 70% production. Experimental results show averages ranging between 278-330 kilocalories with a 15-16% protein diet.

J.L. McNaughton of the USDA Poultry Research Laboratory discussed color, trypsin inhibitor and urease activity as they affect growth of broilers. The objectives of his work are to determine the effects of processing on trypsin inhibitor and urease destruction, the effects of low levels of trypsin on broiler performance, and the development of new methods to assess soybean meal processing adequacy. He has found that urease may be destroyed faster than trypsin inhibitor at low levels and that urease may not be a good indicator of proper heat treatment in soybeans. This laboratory has preliminary data showing that color intensity may be closely correlated with protein quality.

The round table participants discussed the advantages and disadvantages of data obtained from pilot plant-prepared soybean meals, laboratory prepared meals and soybean meals collected from commercial sources. Preliminary information from the laboratory-prepared meals indicates that urease does not accurately reflect trypsin inhibitor levels at low urease levels. Color is related to meal quality. Additional research is necessary to standardize meal grind, moisture level and instrumentation to increase the usefulness of the color index in providing a rapid and simple method of predicting soybean meal quality. Additional research using commercial sources of soybean meal is needed to verify these results.

The role of gossypol in reducing the usefulness of cotton seed meal in poultry diets was discussed. The adverse nutritional effects of gossypol may be minimized if iron salts are added to the meal to inactivate the gossypol. The most limiting aspect of cottonseed meal in poultry diets, as well as many other minor oilseed meals, is the level of lysine. Cottonseed meal, sunflower meal, sesame and several other protein ingredients are poor sources of the amino acid lysine. The lysine level of soybean meal complements cereal grains in meeting the birds' requirements.

SESSION IV B

The first speaker was Ramando Shimada of the National Institute of Animal Husbandry and Research (Mexico). He reported there is a trend to weaning pigs at an earlier age in Mexico. The standard 8 weeks is being shortened to 6 weeks, and some pigs are weaned at 3 weeks. Daily sow feed ranges from 4.5 to 6.0 kg daily during lactation and 2 kg during gestation. Early weaning at 3 weeks would permit 2.6 litters per year, whereas weaning at 8 weeks permits only 1.9 litters. Nutritional research indicates that an 18-20% protein diet with 1.24% lysine is needed for early weaned pigs.

The second speaker was Juan Jose Maqueda of Elanco Products Company (Mexico). He reported on management practices and equipment used in Mexico for the early weaning of pigs. In most cases, brooders are used to provide supplemental heat. Slat floors and gestation stalls are becoming more popular. There are some flush gutter systems for manure removal. Much of the housing for older pigs is in buildings with curtained sides, which could be opened for increased ventilation.

The last speaker in this round table was Ron Moen of Neotec (USA). He discussed progress on a new instrument by Neotec that analyzes samples of cereal grains, oilseeds and feed mixtures for protein, fiber, fat and moisture. The results using the Neotec instrument are similar to company, commercial or reference laboratories. The big advantage of this system is that all four analyses can be done in about two minutes. This technology is new and has a very promising future.

The question/answer portion of this round table was very enlightening. Barr was asked whether scours in calves fed soya protein are considered infections or nutritional disorders. He indicated that diet may change the small intestine villi and thus impair absorption. In this case, the scours would be nutritional. Research has shown that fiber in the form of soya hulls mixed in all milk replacers has beneficial effects in reducing the instances of scours. Some scours may be caused by bacteria and/or viruses.

Barr has asked whether the nutritional status of early weaned calves could affect subsequent production. He indicated that from their experience, subsequent production of calves and pigs changed to soya diets has not been

adversely affected, provided the animal was not stunted during early growth.

Barr was also asked whether available lysine is affected by heat treatment. He indicated that available lysine and nitrogen solubility are not necessarily correlated. Heat treatment denatures protein and lowers nitrogen solubility and if the treatment is severe, lysine availability may be lowered.

Waldroup was asked whether there is a relationship between quality of energy in broiler diets (measured by the saturated/unsaturated acid ratio) and production results at a particular energy level. He replied that the first concern is that the fat contains no abnormal residues (insecticides, PCBs, etc.). The next concern is nonfat impurities and moisture. Research suggests the best ratio of unsaponifiable to saponifiable fats is about 1:4. This level seems to give maximum absorption. A difference of 50 calories per pound of diet only changes the feeding period to a given weight level by about one day.

Reid was asked whether there is any information on the effects of humidity at higher ambient temperatures on production. He replied that Arizona humidity is very low. However, summer temperatures run 105-110 F. Hens will tolerate this high temperature. High humidity lowers feed intake and extra fat helps prevent production slumps. Most fat sources will run about 7.8 kilocalories per gram. Some have been reported as low as 6.8.

Maqueda was asked what was the optimum temperature for baby pigs. He indicated 28 C, first day; 26 C, second day; 24 C, third day; and 20-22 C, third day through weaning.

Shimada was asked about the recommended floor space for young pigs. He replied that until weaning, eight pigs could occupy 2.1 sq m. After weaning, the space requirement is 0.2 sq m per pig.

Moen was asked whether it was possible to reduce the nutrient variability found in feed ingredients. He answered that variability will probably continue to exist. The objective of their research is to obtain a quick estimate so that adjustments in feed formulations may be made to account for this variation.

SESSION IV C

The first presentation by George Barr, Land O' Lakes (USA), was entitled "Raising a Healthy Calf." He indicated that high-quality feed ingredients are needed in calf milk replacers. Most research emphasis has been on carbohydrates and protein. Minerals and vitamins are added in excess. Increasing the protein level will increase growth; however, 22% protein has been recognized as an optimal level. Milk protein is the most acceptable protein source. Processed soya products have been substituted for milk protein with satisfactory results. Gains will be increased and scours decreased when fat levels are increased to 25%. Saturated fats, with higher levels of oleic acid, seem to be better utilized by the young calf. Dry calf starters improve dry matter intake. Calf starters with 12-16% protein seem to be the most acceptable. Adequate levels of dietary fiber help rumen development and improve calf growth.

Management is very important in producing healthy calves. Disinfecting navels and being sure the calf gets 1-2 ℓ of colostrum within hours of birth increases the chances of living. Antibiotics improve performance even when bacteria become resistant. Lactobacillous acidophilus preparations have been beneficial. Vaccinating with dead or live virus may be used to help control problem viral infections.

Breeds of large calves should receive approximately 0.17-0.23 kg of dry milk replacer plus water twice a day. The ideal environmental temperature for the young calf is about 16 C. Weaning should be undertaken when the calf is 4-5 weeks of age and consuming calf starters daily. Minimum air exchange in the calf barn should be at least 4 times per hour. Close observation for indications of health problems is probably the most important management practice in disease prevention.

The second speaker was Russ Bussman of Computone (USA). He discussed a system for the multiblending of feed ingredients. The technique employs combining all formulas and recommending least-cost solutions. The system allocates scarce ingredients into the total feed production, or maximizes the use of excess ingredients in the total feed production to maximize profits.