

Feed Formulation Could Save Millions

UNIVERSITY PARK (Centre Co.) — A new method for formulating least-cost rations could save the poultry and livestock industries million of dollars annually, according to Penn State researchers.

Dr. William Roush, associate

professor of poultry science, and Thomas D'Alfonso, a graduate student in agricultural and biological engineering, have applied a mathematical model to poultry feed formulations that is more accurate and efficient than the method feed mills use now.

"The industry uses what's known as linear programming to formulate ingredients that meet nutritional requirements at least cost," said Roush. "It's called the 'margin of safety' method, because the nutrients in ingredients are underestimated to allow for variability."

For example, Roush said, corn may have an average protein value of 8.5 percent. But from one lot to the next, it may be as low as 7 percent or as high as 10 percent.

In feed formulation using linear programming, the average nutrient value used in the calculations is corrected to ensure, within a certain probability, that the ration contains adequate protein.

The method applied by Roush

and D'Alfonso uses stochastic (nonlinear) programming, a more sophisticated formula that can account for nutrient variability.

"Stochastic programming allows variance to be included in the formulation process, so that in the long run, a ration is produced at a lower cost than with the linear program, but at the same nutrient confidence level," said D'Alfonso.

The research has significant economic implications for Pennsylvania's \$500 million poultry industry. Roush said studies have indicated that feed formulated with the stochastic model could be up to \$3 cheaper per ton. For a poultry operation using 1,500 tons of feed per week, annual savings could total more than \$230,000.

Roush said the new method also can be used to formulate feed for other types of livestock, such as cattle and swine.

"Producers can achieve these savings without affecting animal nutrition," D'Alfonso said. "We conducted a trial comparing the industry method and our method and found no difference in animal performance."

According to the researchers, the only stumbling block for the adoption of stochastic programming has been the lack of computer software capable of performing the calculations on smaller computers used by farmers and feed mills. A private company is developing such software for commercial use.

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