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University of Illinois Poultry Research Farm

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Parkland College “A with Honors” Service Project Report
University of Illinois Poultry Research Farm
Luke Zimmerman, Fall 2016

Throughout the 2016 fall semester, I had the opportunity to assist in several research trials conducted at the University of Illinois’ Poultry Research Farm. Research focuses included feedstuff amino acid utilization, evaluation of new feed enzymes, and the effect of high protein soybean meal on chick feed efficiency. During this time, I have gained valuable hands on experience and secured a solid foothold in the University of Illinois division of poultry research.

In the first trial, cecectomized roosters were used to determine the available amino acids in select feed products. The trial was conducted for a large agricultural cooperative. The thirty feed samples analyzed were provided by the research sponsor. The research began with fasting the trial roosters to empty their digestive tracts. Then, a feeding tube was used to insert the correlating feed sample into the crop, a blind sac in the foregut of the rooster. A majority of my involvement in this trial took place at this point. Dr. Carl Parsons, several graduate students, and I inserted the feeding samples with the feeding tube. The roosters were held in an upright position and the tube was gently inserted into the crop. Throughout the process, the base of the neck was palpated to ensure the correct placement of feeding tube into the crop. After the feeding took place, the tube was removed. If significant feed matter remained on the outside of the tube, it was segregated and deducted off of the initial mass of inserted feedstuffs. The roosters were returned to the appropriate cages and their excreta (feces plus urine) were collected for the next 48 hours. At the end of the trial, the excreta were dried and sent to the lab for amino acid profiling.



The second trial conducted at the poultry farm focused on the effectiveness of some new feed enzymes on feed efficiency in chicks. The science behind the enzyme was to increase nutrient availability. In a standard diet, only a select percentage of phosphorus and other nutrients are available for digestion. By including enzymes, the activation energies required in the digestion process are lowered and a larger percentage of the nutrient may be digested by the animal.

Feed rations were formulated around the enzyme densities requested by the sponsor. Chicks were housed in batteries under a controlled environment as seen in figure one. Over a two-week time period, three rations were fed to designated groups of chicks. Each day, samples of excreta was collected and analyzed for the presence of a marker included in the original feed ration. Each level of the battery had its own excreta collection tray, allowing the output of each



group of chicks to be matched with a given input. Figure 2 illuminates the process of collecting excreta to be analyzed. In addition to marker concentration, the sponsor will sometimes request for the Metabolizable Energy of the feces to be analyzed. This

allows the producer to understand the percentage of energy which was not utilized by the bird. Although this was not completed in this trial, the standard procedure would involve drying the feces and utilizing a bomb calorimeter.

At the end of the trial, a final weight of the birds was taken in order to calculate net gain over the trial period. Figure 3

shows this process taking place and the weight of the bird being recorded. With respect to the sponsoring company, the result of the trial will be withheld from this report. However, this experience taught me how advanced statistics



apply to a real-life trial. An alpha value of 0.05 was used in this trial. Based on the conditions which are met by the trial arrangement, a statistical test is chosen which produces a p-value based on the given research data. The p-value is then compared to the alpha value and the results of the experiment solidified. If the p-value is greater than the given alpha, the null hypothesis is supported. If the alternative occurs and the p-value is less than the given alpha, the



alternative hypothesis is supported by the experimental data.

In the third research trial, the effect of high protein soybean meal versus standard protein soybean meal was analyzed in regard to chick feed efficiency. My main contribution to this trial run involved mixing the two main feed diets utilized. The formulation of the diets was provided



by the sponsoring industry company.

Based off of the formula, the University of Illinois Feed mill provided a Basal mix. This consisted of the maximum amount of common macro ingredients in both trial formulas. Then, when custom mixing the rations on the farm, the difference of each ingredient between

the two formulas was added to create the trial specific diets. Micro ingredients such as synthetic amino acids were weighed out separately and added to the mixer shown in Figure 5. After all of the ingredients were added, the mixer was allowed to mix for roughly ten minutes. Upon its completion, the feed was dropped out the bottom into a labeled tote for use later in the trial.

In each of the trials I was part of at the University of Illinois Poultry Research Farm, I was provided with a unique learning experience to further me in my academic pursuits. With this experience under my belt I have a greater understanding of research farm operations as well as the physiology of the bird as a production animal. This project has opened a door of opportunity for me throughout my undergraduate degree. As the industry moves towards antibiotic-free production, the health and balance of microflora in the gut of the monogastric animal has become increasingly important. After the completion of this project, the way is open

to conduct undergraduate research focused on the gut health of monogastric. I am grateful toward Dr. Carl Parsons for meeting with me and allowing me to take part in this unique experience. I look forward to fulfilling my potential in academic research and taking my place in the poultry industry.