

(n = 27). This suggests nonadopters of iPod technology are typically categorized as field-dependent learners and adopters are more likely to be field-independent learners. Adopters scored approximately 85 points higher on the combined quantitative and analytical sections of the GRE with adopters recording a mean score of 972.96 and nonadopters scoring 887.65. Educators should look to use iPod-enabled courses as another method of delivering course content to students who prefer to receive it in that manner. Nonadopters should be identified and provided additional chances to adopt through informing them about the attributes of the innovation or providing other options more suited to their learning style. Continued research on the most effective delivery method as well as continued research on identifying barriers to adoption may also influence research on other classroom technologies.

Key Words: iPod, education, graduate course

245 Bilingual modules for online education in poultry processing, further processing and food safety in the United States and Latin America. M. X. Sánchez-Plata*, *Department of Poultry Science, Texas A&M University, College Station.*

Several initiatives have been implemented to facilitate training in poultry processing beyond the traditional classroom settings. Texas A&M University has developed and successfully offered a Masters of Agriculture online-only degree in poultry science. This program was established with the purpose of reaching audiences that are currently involved in

the poultry industry with the willingness to enrich their professional development with an advanced degree without having to allocate a 2 to 3 year period for their academic work. So far, up to 5 students have completed or are in their final stages of completing their requirements for degree completion in this student-driven program. Overall, the program has received positive evaluations and alumni participating have indicated their willingness to recommend it to future participants. The next stage in diversifying the reach of TAMU programs includes the implementation of a series of online training modules in the fields of poultry processing, further processing and food safety to complement distance education initiatives. Bilingual modules have been developed in English and Spanish to facilitate the instruction of English-speaking poultry workers as well as Hispanic line workers and supervisors that are currently estimated to account for up to 75% of the workforce operating in some poultry facilities. Personal communications indicate that the language barrier has, at times, been the source of problems in some facilities in respect to processing efficiency and food safety initiatives. Therefore, strong emphasis is placed in presenting the materials in both languages so that in addition to receiving bilingual processing and food safety training, Hispanic workers are exposed to the proper English terms used to describe course contents in this adult educational effort. This is expected to familiarize employees with the English words used during regular operations and potentially facilitate the work of English-only speaking supervisors and plant managers. A discussion of the program targets and objectives will be provided.

Key Words: online training, distance education, bilingual

Symposium: PSE Syndrome in Poultry

246 Potential ways to manage PSE poultry meat at the processing plant. S. Barbut*, *University of Guelph, Guelph, ON, Canada.*

As indicated in several publications appearing over the past 10 years, the proportion of the so called pale, soft, and exudative (PSE) poultry (chickens, turkeys) meat can range from 5 to 30%. These values usually depend on factors such as the season, stress prior to slaughter, genetics of the flock, as well as the cut off point used by each plant to characterize the PSE meat. The fact that genetics plays a big role and would require a long term solution is agreeable by most researchers (to be discussed in the other presentations). However, at the moment a processor should be aware of the PSE problem and ways to handle the meat with minimal economical loss. Using the meat as is, especially in large whole muscle products can result in significant yield and textural problems. Therefore, identify the PSE meat (i.e, the current poultry grading system is not designed to evaluate meat quality characteristics) and either treating the meat separately with the addition of texture and/or moisture modifying ingredients is one general option. The use of nonmeat proteins (e.g., soy, dairy), complex carbohydrates (regular and modified starches), hydrocolloid gums (carrageenan) will be presented. Another option is cutting the PSE meat into smaller portions and blending it with regular meat prior to further processing can work if not too much PSE meat is present.

Other research in the red meat area will also be highlighted and ideas concerning potential solutions, at the processor level, will be further discussed.

Key Words: PSE, poultry, meat

247 Research developments in pale, soft, exudative turkey meat in North America. C. Z. Alvarado*¹ and C. M. Owens², ¹*Texas Tech University, Lubbock,* ²*University of Arkansas, Fayetteville.*

In the past 10 to 15 years, the North American turkey industry has been challenged with the pale, soft and exudative (PSE) meat which results in meat that is pale in color, forms soft gels, and has low water holding capacity. There is a large further processing market in the turkey industry and the incorporation of PSE meat into these products results in quality defects and loss of yield, both of which result in economic loss. Research has been conducted to characterize the meat, investigate causes of the poor quality meat, and develop remediation techniques to improve meat quality. Meat with PSE characteristics generally has an accelerated rate of metabolism. The resulting abnormally low pH at an early postmortem time when the carcass temperature is still warm causes denaturation of the muscle proteins responsible for the muscle color, water holding capacity, and texture. Because of this, turkey meat can be prone to developing PSE characteristics when carcasses are inadequately chilled during processing. Genetics and antemortem stress can also influence the development of PSE meat. Genetic differences, that may result in more susceptibility to PSE meat development, have been reported between random-bred and commercial turkeys; however, more research is needed to link these differences to meat quality. Antemortem stress has a major influence on turkey meat quality; it has been shown that the incidence of PSE meat generally increases when birds are subjected to elevated environmental temperatures as observed in research and industry heat stress conditions. While there have been mixed results on remediation techniques of PSE meat, there is potential for using functional ingredients to improve product quality. Sorting

product may provide greater opportunity in improving product quality. Research characterizing PSE meat indicates a strong relationship between meat color and other quality characteristics. Therefore, sorting meat can help to reduce the amount of PSE meat going into whole muscle further processed products, the products most impacted by PSE meat. Though there has been much research on PSE turkey meat, more research is still needed to fully understand the condition.

Key Words: PSE, turkey, meat

248 PSE conditions in poultry: The European perspective. M. Petracci* and M. Bianchi, *Alma Mater Studiorum—University of Bologna, Department of Food Science, Cesena, Italy.*

Over the past 15 yr, the European processing industry has gradually increased the availability of poultry meat in a large variety of processed

ready-meals following what occurred few years before in North America. This shift toward further processed products has underscored the necessity for higher standards in poultry meat in order to improve sensory characteristics and functional properties. In parallel to this market change, the consciousness of the PSE-like meat issue has extensively grown. In poultry, PSE-like meat can be generally considered meat having low ultimate pH, pale color and poor functional properties (i.e., low water-holding capacity). In the last 10 yr, some studies have been undertaken in Europe to both characterize and evaluate the overall incidence of PSE-like chicken and turkey breast meat. According to these studies, the occurrence of PSE-like meat can be up to 40% within a flock. Several key factors have been identified and their effects have been analyzed, including genetics, season, ante-mortem factors and slaughtering conditions.

Key Words: poultry, PSE, Europe