heating time needed to reduce trypsin inhibitor (TI) content of soybean resulted in improved ileal true digestibility (TD) of protein. Petroleum spirit-extracted dehulled soybean (TI 58.4 mg/g DM) was adjusted to 780 g/kg DM and heated alone or with either sodium metabisulphite (11.8 g/kg DM) or cysteine (15 g/kg DM) for 25, 35, 55 or 75 minutes at 95C. Reactive SH, determined by reaction with 4-vinyl pyridine and HPLC separation, was increased by C and S and decreased with heating time. Heating decreased TI 3.9 times faster in the presence of S but not of C. Each of these 12 preparations was included as the sole source of protein in diets formulated for chicks to provide 150, 200 or 250 g CP/kg diet. A diet with enzyme hydrolysed casein plus amino acids (E) as the sole source of protein at 200 g CP/kg diet was used to measure endogenous loss. Chromic oxide was the marker. The diets were offered to 3 cages of 3 chicks (E to 9 cages) ad libitum for 3 days (8 to 10 d of age). Food was removed overnight on day 10 and each cage was fed at timed intervals ad libitum on day 11 for 4 hours before euthanasia with pentobarbitone sodium given intra peritoneum. TD was calculated as 1-slope of the regression of ileal N per g diet on diet N per g diet using diet E as a zero test dietary N level together with the 3 levels of each test material. TD (mean SEM) soybean alone 0.670.029, 0.780.037, 0.790.026, 0.870.009; +C 0.720.028, 0.860.023, 0.870.014, 0.860.018; +S 0.880.021, 0.890.014, 0.890.013, 0.880.010 at 25, 35, 55, 75 minutes respectively. TD of soybean alone increased with heating time to 75 minutes. The same maximum TD was achieved in 35 minutes with added C and in 25 minutes with added S. The TD achieved with added S was slightly but not significantly greater than the maximum achieved on heating soybean alone (difference 0.0250.0160, t 1.56).

Key Words: Ileal digestibility, Sulfite, Heat

AMSA Updates Session

846 Korean Pork 101. D.E. Burson*[1], D.B. Griffin[2], and W.N. Osburn[3], [1]*University of Nebraska,* [2]*Texas A&M University,* [3]*Michigan State University.*

The changing economy and society in Korea combined with market liberalization is changing the Korean meat industry. Western style retailing is being adapted in Korea and has created a need for training. Therefore, the U.S. Meat Export Federation has established the Meat Education and Research Center (MERC) in Seoul, Korea to train butchers and meat retailers in the latest meat merchandising techniques. The National Pork Producers Council, the US Meat Export Federation, Korea, and meat scientists from the University of Nebraska, Texas A&M University and Michigan State University developed a train the trainer program, Korean Pork 101, for MERC instructors. Korean Pork 101 was designed to provide up to date information on pork quality, consistency and value. The course included topics of teaching and workshop methods, an overview of pork production in the U.S., pork quality, meat distribution and shelf life, fabrication value and merchandising, pork specifications, carcass fabrication and pork safety. The three day workshop was conducted with a series of lectures and discussion during an afternoon session and a laboratory demonstration in the evening. Approximately thirty instructors were trained and evaluations indicated that the program was valuable.

Key Words: pork, training, Korea

847 Advanced HACCP course update. N.G. Marriott*[1], [1]*Virginia Polytechnic Institute & State University.*

Since January 25, 2000 all inspected meat and poultry plants are required to have a food safety preventive program known as Hazard Analysis and Critical Control Points (HACCP). The American Meat Science Association (AMSA) and various professional members have been instrumental in the development of educational material, especially short courses, that has assisted the meat and poultry industry with the implementation of this food safety program.Regulatory requirements of HACCP plan assessment with an emphasis on verification and validation has been attributable to the International HACCP Alliance interest in the accreditation of an advanced HACCP course that will emphasize instruction about verification and HACCP plan validation. During 2000, the AMSA Continuing Education Committee accepted the challenge of the development of an advanced HACCP course to be accredited by the International HACCP Alliance. It was agreed that the content of this course would be developed by AMSA members. The AMSA Continuing Education Committee agreed upon a course content outline and one or more scientists for the development of this 2-day short course. It was decided that the course would be developed as PowerPoint presentations with appropriate handouts and supplementary materials that would be peer reviewed before the AMSA Continuing Education Committee would obtain accreditation from the International HACCP Alliance. The course content will become the property of the American Meat Science Association but available for members' use to present as a short course to the industry. More information about the course content will be discussed. Furthermore, a progress update of material development, peer review, accreditation by the International HACCP Alliance, and material availability to the American Meat Science Association membership will be provided.

Key Words: HACCP, AMSA, Course

Symposium on Concentrated Animal Feeding Operations Regarding Animal Behavior, Care, and Well Being

848 Physiological indicators of stress in domestic livestock. Donald C. Lay Jr.*, *Livestock Behavior Research Unit, Agricultural Research Service-USDA, West Lafayette, IN.*

As with most mammals, domestic livestock will experience varying degrees of both psychological and physiological stress at some time during their life. The objective quantification of these stressful states and application of appropriate measures to limit excessive exposures to stressors is imperative. Proper management of an animal's exposure to stressors will maximize animal well-being and can have beneficial effects on animal production. Although scientists have recognized the deleterious effects of stress for more than 70 years, debates and questions on physiologically assessing its presence in humans and other animals continues to challenge researchers today. Because stress can be defined simply as any physiological change from homeostasis, traditional physiological measurements have relied on quantifying these alterations to homeostasis, such as deviations in heart rate, respiration rate, body temperature, and hormone concentrations. These measurements are still highly relied upon today. It is also well recognized that when these common alterations in baseline homeostatic mechanisms are dramatically altered, an organism's life strategies such as growth, disease resistance, and reproduction can be affected. Therefore, a great deal of research has concentrated on quantifying physiological alterations in these systems, such as changes in growth and reproductive hormones, changes in populations of lymphocytes, and(or) outward signs of failure of these systems, such as low growth rates, infertility, and an increased number of diseased animals. An area of importance that has been relatively inaccessible are those changes that occur in the central nervous system. Because stress is commonly composed of both a physiological and psychological component, how the animal perceives the stress is critical to assessing its well-being. Physiological measures used thus far to assess the mental response to stress include neuronal activity and measurement of neurotransmitters. Scientists have done a good job of measuring all of these physiological alterations, unfortunately the underlying challenge that continues to confront scientists is how to define the degree of physiological change that translates into distress for the animal.

Key Words: Stress, Livestock, Well-being

849 Influence of stress on composition and quality of meat, poultry, and meat products. E. P. Berg*, *University of Missouri.*

Stress experienced by meat-producing animals prior to slaughter not only influences lean and fat deposition, but also the physicochemical components involved in conversion of muscle to meat. Stressors that