

General Posters

Use of Bioelectrical Impedance to Determine the Amount of Saleable Product in Cattle and Beef Carcasses.

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Multiple linear regression equations predicting kg of trimmed, boneless, retail product (Impall) of live cattle and hot and cold carcasses were developed from beef cattle (n=50) fed to slaughter. A four-terminal bioelectrical impedance analyzer was used to measure resistance (Rs, ohms) and reactance (Xc, ohms) on each animal and processed carcass (one side). Distance between detector terminals (Lg, cm) from live and carcass measurements and carcass temperatures (Tp, C°) at time of BIA readings were recorded. Other variables included BW (kg), hot carcass weight (HCW, kg), cold carcass weight (CCW, kg) and V.1 (Lg²/Rs). Regression equations for predicting Impall (kg of retail product) were: [11.87 + (.409 x BW) - (.335 x Lg) + (.0518 x V.1)] for live (R²=.80), [-58.83 + (.589 x HCW) - (.846 x Rs) + (1.152 x Xc) + (.142 x Lg) + (2.608 x Tp)] for hot carcass (R²=.95), and [32.15 + (.633 x CCW) + (.330 x Xc) - (.83 x Lg) + (.677 x V.1)] for cold carcass measurements (R²=.93). Correlation of Impall to yield grade was (-.496; P=.0003). Our results indicate that BIA could serve as a useful technique for ranking cattle or their carcasses based on the amount of retail-ready cuts.

Effectiveness of Selected Additives on Processing and Sensory Characteristics of Extra Lean Frankfurters.

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The effects of maximum levels of selected additives in extra lean frankfurters (<3% fat) were studied. Seven treatments, with four replications each, were studied at three time periods (0, 30 and 60 days) in a randomized complete block design. The treatments consisted of: 1) control; 2) kappa-carrageenan; 3) hydroxypropyl methylcellulose (HPMC); 4) high methoxy pectin (pectin); 5) an acid modified food starch; 6) sodium lactate; and 7) acid enzyme deheated mustard. All treatment frankfurters had higher (P<0.05) yields than the controls. The pectin product did

not develop a skin, had "0" values for skin toughness, and had an unacceptable extremely soft, smooth, pasty texture. Scanning electron micrographs also revealed that the emulsion was changed from a closely packed structure to one that had large loosely associated clumps. Pectin and HPMC products had the lowest (P<0.05) purge at 60 days. A rapid method to predict purge values after 30 days of storage, with the use of centrifugal force, with fresh product was developed. The average amount of predicted purge over all treatments after 30 days of storage was 4.7% and the average amount of actual purge after 30 days of storage was 4.6%. In general, the addition of some appropriate additive or additives to low-fat sausage products appears to be appropriate to increase processing yields, reduce cost, and help bind free water so long as the additive or additives do not adversely affect other properties of the product.

Key words: Low-fat, Sausage, Processing, Additives

The Effects of Irradiation and Storage Times on Aroma and Color of Fresh Beef Patties in Aerobic and Anaerobic Packaging.

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The effects of electron beam irradiation, aerobic and anaerobic packaging and storage times on the lean color and aroma of ground beef patties were investigated. Patties were coarse ground at 3 days postmortem, then fine ground and packaged at 3, 6 and 9 days postmortem. Patties were irradiated immediately after packaging or 3 days after packaging at 2 kGy, then stored in the display case at 4°C for 4 days. Non-irradiated controls were held under similar conditions. After 4 days of storage for each postmortem time, Hunter and sensory evaluation was performed on the controls and experimental samples. Irradiated beef patties were found to be a darker red color than controls by the sensory panel. Hunter a value scores for irradiated patties were significantly (P<.05) lower than non-irradiated controls. Irradiated and non-irradiated patties with the shortest postmortem storage times had the most desirable aroma scored. Controls had significantly (P<.05) more desirable aromas scores than irradiated patties in anaerobic packaging.

Key Words: Beef patties, Irradiation, Sensory analysis.

Resting, Hot-fat Trimming and Carcass Chilling Method Effects on Pork Quality.

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Market pigs (n = 120, mean weight = 123 kg) were slaughtered at a commercial plant to determine the effects of preslaughter resting of pigs (0, 1, 2, or 3 h), hot-fat trimming (HFT) of carcasses, and carcass chilling method [conventional chilling (CC) at 20°C for 24 h vs. accelerated chilling (AC) in a -30°C freezer for 50 min and then at 20°C] on muscle quality and shrinkages. Mean skin temperature and internal ham temperature decreased as resting time increased (P = .001). Pigs rested 2 or 3 h had higher (P = .001) initial muscle pH and lower purge losses from loins than those rested less than 2 h. AC carcasses had a higher muscle pH from 3.5 to 24 h postmortem than CC carcasses (P = .003). AC improved muscle color, texture, firmness, marbling and L* values of both hams and loins and firmness of chops in retail display (P < .05) but increased purge losses and decreased tenderness of loins compared to CC. HFT increased bound water and improved muscle color, texture and firmness of cured hams (P < .02). Soluble protein content of HFT carcasses was higher (P < .05) than that of non-HFT carcasses if pigs were rested 0 or 3 h but not if rested 1 or 2 h. These data show that resting of pigs, HFT and AC of carcasses in concert or separately are effective means of improving pork quality of thickly muscled pigs.

Key words: Resting, Hot-Fat Trimming, Accelerated chilling

Relationship of Feeding a High-concentrate Diet to Cull Cows For Up To 56 Days on Performance, Carcass Traits and Beef Palatability.

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Objectives of this study were to determine how performance, carcass trait and beef palatability characteristics of cull cows changed over time when cull cows were fed a high-concentrate diet for 0 to 56 days. Thirty-six cull cows with body condition scores of five or less were randomly assigned to groups to be fed a concentrate diet for 0 (n=8), 14 (n=7), 28 (n=7), 42 (n=7) or 56 (n=7) days. Carcass data were collected and one side of each cow was fabricated into boneless (0.64 cm fat thickness) subprimals, "lean trim," fat and bone. Live weight and average daily gain of cull cows increased (P<0.05) with increased time-on-feed. Hot carcass weight, dressing percent, muscling score, ribeye area, fat thickness, adjusted USDA Yield Grade and firmness of the ribeye increased (P<0.05) in cow carcasses with increased time-on-feed. Skeletal maturity and fat color scores decreased

(P<0.05) in cow carcasses with increasing time-on-feed. Marbling score or lean maturity score in cow carcasses did not change (P>0.05) with increased time-on-feed. Weights of fat-free lean, fat and bone fabricated from cow carcasses increased (P<0.05) with increased time-on-feed, but the percent of fat trimmed from carcasses to fabricate subprimals with 0.64 cm external fat did not change (P>0.05) during feeding. Overall tenderness improved (P<0.05) in cow steaks after 28 days while juiciness, muscle fiber tenderness, connective tissue amount, the amount of soluble collagen in the *longissimus* muscle and shear force values in cow steaks were similar (P>0.05) over the 56 day feeding period. The salvage value of cull cows fed a high-concentrate diet for up to 56 days prior to slaughter improved because weight was added to cow carcasses without making the carcasses too fat, and the overall tenderness of steaks from cow carcasses improved when cows were fed for >28 days.

Key Words: Beef, Carcass, Cow

Effects of Various Starches on the Characteristics of Fat-free Bologna.

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An evaluation of ten starches to determine their effects on various characteristics of fat-free bologna (FFB) was conducted. Base raw materials of lean pork knuckles (1.2 to 1.5% fat) and turkey scapula meat (about 0.7% fat) were blended with various starches (7.62% of total formula), other condiments and emulsified in a bowl chopper. The batter was stuffed into casings and held at about 3 C until cooked. The product was placed in a preheated smokehouse (60 C) and step cooked until an internal temperature of 76.6 C was reached and held 20 min. The bologna was then chilled to about 1 C, sliced, vacuum packaged, and stored in the dark (2 to 3 C), until the respective analyses were conducted at 7, 14 and 60 d. The design was a completely random design (CRD), with four replications per treatment and was analyzed using ANOVA and the Student-Newman Keuls test (SNK) was used for mean separations. All FFB products met regulatory compliance for fat-free products. All starch containing products displayed less purge (P<.05) than the controls while other attributes (color, fracturability, hardness, coeshiveness, gumminess, juiciness, firmness, and chemical composition) were affected in different ways by different starches. Yet other attributes (batter viscosity, final yields, cooler shrink, cooked product diameter, flavor, texture, and overall satisfaction) were not affected (P>.05) by the various starches.

Key words: Fat-Free, Bologna, Sausage, Processing

Applying Essential Oil and Oleoresin of Black Pepper from Supercritical Carbon Dioxide Extraction in Ground Pork.

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Piperine and monoterpenes have been found to be chief constituents of black pepper exhibiting the antioxidant properties. Due to high in purity and piperine recovery, essential oil (EO) and oleoresin extracted at 10 MPa and 28 MPa (60 C) from black pepper with supercritical carbon dioxide (SF-CO₂) were compared to commercial samples to determine their antioxidant activity. Ground pork with 1.6% salt was mixed with ground black pepper (control), three different EOs and oleoresins at the levels of 0.4%, 0.0043% and 0.0216% respectively, then cooked and stored at 4 C for 8 days. During storage for 0, 2, 4, 6 and 8 days, five g of each treatment was analyzed for volatile components, 2-thiobarbituric acid (TBA) values and evaluated for warmed-over flavor (WOF) intensity. Cooked ground pork mixed with SF-CO₂ oleoresin showed lower increases in pentanal, hexanal and benzaldehyde levels and TBA values during storage for up to 8 days compared to commercial oleoresins. SF-CO₂ EO was less consistent in reducing aldehydes or TBA values after 2 days compared to conventional EO samples. The control sample exhibited the least increase in aldehyde levels and TBA value after storage for 4 days. Low WOF intensity for control, SF-CO₂ oleoresin and commercial EO indicated that they were most acceptable for up to 8 days. In practice, SF-CO₂ oleoresin would be suitable for seasoning meat and meat products in comparison to conventional prepared or extracts.

Key Words: Black pepper, SF-CO₂, Antioxidant

Effect of Added Restaurant Grease to Swine Diets on Carcass Characteristics and Meat Quality Attributes.

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A study was conducted to determine the effect of adding restaurant grease to swine diets on: (1) swine performance; (2) carcass quality; (3) the saturated:unsaturated fatty acid ratio of adipose tissue and *longissimus dorsi* muscle, and (4) rancidity of fresh pork and cooked pork chops after storage. Seventy-two crossbred pigs with an initial weight of 50 kg were fed corn-soybean meal based diets containing 0, 2.5, 5.0, and 7.5% added restaurant grease. Pigs were fed to an average final weight of 110 kg. There was a linear ($P < .04$) improvement in growth performance with the addition of restaurant grease. The addition of restaurant grease to swine diets did not have an effect ($P > .05$) on average backfat, tenth rib fat, *longissimus dorsi* area, muscle score, USDA grade, or percent lean. The dietary addition of up to 7.5% restaurant grease had a linear effect ($P < .002$) on carcass weight and a cubic effect ($P < .0002$) on fat firmness. There was no trend indicating an increase in oxidative rancidity as a result of the dietary addition of restaurant grease. No effects ($P > .05$) were noted on any of the sensory traits studied. The addition of 5.0% and 7.5% restaurant grease to the diet decreased the total saturated:unsaturated fatty acid ratio in both lean and subcutaneous fat. The cholesterol level of lean was not affected ($P > .05$) by the dietary addition of restaurant grease. Therefore, the addition of up to 7.5% restaurant grease to swine diets had no detrimental affect on meat quality.

Key Words: Swine, Restaurant grease, Carcass characteristics.