Food Safety

1041 The use of immunoaffinity columns for the isolation of ractopamine from edible tissues of food animals. W. L. Shelve* and D. J. Smith, USDA/ARS/Biosciences Research Laboratory, Fargo, ND.

Ractopamine (Paylean™) (RAC) is a beta-adrenergic leanness-enhancing agent recently approved for use in finishing swine. The currently available immunoaffinity column (IAC) is a simple cleanup method for RAC in muscle, liver, and kidney. RAC and ractopamine glucuronide (RAC-G) fortified tissues were homogenized in phosphate buffered saline (pH 7.2), passed through a 1 mL RAC IAC, and the IAC washed with 10% methanol to remove non-bound material. RAC and RAC-G were eluted with 50 mM glycine, pH 2.8. Recoveries of RAC and RAC-G from cattle muscle, liver, and kidney were 82.1 76.8, 87.8 1.9, and 92.5 0.4%, respectively (n=5). Recoveries of RAC and RAC-G from sheep muscle, liver, and kidney were 91.8 0.2, 91.7 0.3, and 92.7 0.6% respectively (n=5). Subsequent HPLC with fluorescence detection indicated that IAC

Key Words: Milk, Flavor, Defect

1039 Odor profile of typical Sicilian cheeses: Maiorinchino, Pecorino, Provola dei Nebrodi and Ricotta informata. S. Malli1, S. Carpio1*, E. Lavin1, G. Di Rosa1, G. Licitra1, and T.E. Acree2, 1Consorzio Ricerca Filiere Lattiero Casearia, 97100 Ragusa, Italy, 2Cornell University, Geneva, NY 14853, 3D.A.C.P.A., Catania University, 95100 Catania, Italy.

Odor-active volatiles present in cheese products may be important markers of both cheese quality and diversity. Developing methods to identify odor-active compounds and evaluate their sensory impact on artisanal cheeses will impact both quality control and authentication protocols of these cheese products. In this study, the aroma volatile profiles of four native Sicilian artisanal cheeses were assayed using Headspace Solid Phase Microextraction (HSPME) and Gas Chromatography Olfactometry (GCO dilution analysis) (Acree et al., 1984), in order to identify the odor-active compounds in the cheeses and to rank their relative odor potencies. Selected compounds with high potency were subsequently quantified in the cheese headspace using HSPME GC/MS calibrated to SPME (Deibler, 2001), static headspace and solvent injected standards. Maiorinchino, Pecorino, Provola dei Nebrodi and Ricotta informata cheeses were studied. Thirty-one different odors were detected in the cheeses by GCO analysis with 26 of these identified by GC/MS, published retention index matches (FlavorNET, Arn & Acree, 1998) and running authentic standards. SPME dilution analysis found ethyl hexanoate, ethyl butyrate, (E)-2-nonenal, methional, 1-octen-3-one, 2-nonanone, dimethyl disulfide, dimethyl trisulfide, nonanal and butyric acid as having the highest odor-potencies in the cheeses. Butyric and acetic acids were the only FVFA’s to produce odor responses in GCO analyses. Pecorino and Maiorinchino cheeses were found to have the most diversified odor profiles, which included the odor-active terpenoids α-pinene, sabine, linalool, L-carvone, citronellol and geranyl acetate. These terpenoids were not found in the Provola dei Nebrodi and Ricotta informata cheeses. Selected compounds from the list of most potent odorants were quantified via headspace analysis.

Key Words: Sicilian Cheese, HPS/SPME, GCO

1038 The effect of milkfat on the sensory threshold of three impact odorants of strawberry flavor. S. Gaddamu, N. Slaughter, K. Adhikari1, and I. Gruen, Department of Food Science, University of Missouri

The in-mouth release and subsequent perception of flavor compounds changes depending on the composition of the matrix, particularly fat content, because most flavor compounds are fat-soluble. The main objective of this study was to determine the effect of milkfat on the sensory threshold of three impact odorants of strawberry flavor. Dairy mixes containing either 4% or 10% milkfat, 5% sucrose and 10% milk solids-not-fat were used as the experimental matrices to determine the threshold of ethyl-3-methyl-3-phenylglycidate, α-ionone and cis-3-hexenol. A paired difference test was performed using a panel of 22 judges to find threshold values of the three compounds. Seven concentration levels of each compound were paired with blanks. The order of serving was randomized within each pair and also among the concentration levels. Two replicates were carried out for each compound. Results were analyzed by plotting % correct response (y-axis) against the concentration of the compounds (x-axis). A logistic regression model (sigmoidal curve) was used for curve fitting and the concentration value corresponding to 66.7% correct response was calculated. The threshold concentrations for ethyl-3-methyl-3-phenylglycidate, α-ionone and cis-3-hexenol, were 360, 680 and 500 ppb, respectively, for the 4% fat mixes. For the 10% fat mixes, these values were 460, 600 and 190 ppb, respectively. The higher threshold concentration for the water-insoluble, aromatic ethyl-3-methyl-3-phenylglycidate in the 10% fat mix indicates a slower release at higher fat levels, and is explainable by the greater affinity to the lipid phase in the dairy mixes. While α-ionone is also an aromatic compound, it is slightly more water-soluble than ethyl-3-methyl-3-phenylglycidate and showed a slightly slower release in the 4% fat mix, although the difference was not very large. The higher threshold concentration of cis-3-hexenol, an aliphatic compound, which is slightly soluble in water, in the 4% fat mix indicates a slower release compared to the 10% fat mix. Chemical analyses will be performed to determine the solubility and the liquid-air partition coefficients of these flavor compounds in 4% and 10% fat emulsions to correlate to the results of the sensory threshold test.

Key Words: strawberry flavor, threshold, milkfat

1040 Effect of the utilization of an adjunct starter culture on the volatile compounds and sensory characteristics of a Spanish raw ewes’ milk cheese. María Ortigosa1, Jesus M. Izco1,2, Cristina Arizcun1, and Paloma Torre1. 1Dpto. Ciencias Medio Natural, Universidad Publica de Navarra, Spain, 2Dairy Products Technology Center, Cal Poly University, San Luis Obispo, CA.

The aim of this work is to evaluate the effect caused by the utilization of an adjunct starter culture on the volatile compounds and sensory characteristics of an ewes’ milk cheese. Three cheese batches were made, one with raw milk (batch C), another with pasteurized milk (batch P), and a third with pasteurized milk in which an added adjunct starter culture (Lb. casei + Lb. Plantarum) in addition to the commercial starter was utilized (batch F). Cheese was made according to the protocol for Roncal cheese with Denomination of Origin. Cheeses were sampled at 1, 120 and 240 days of ripening. The volatile compounds were extracted by purge and trap and analyzed by GC-MS. Cheeses aged for 120 and 240 days underwent sensory analysis by a panel of at least eight expert assessors. Eighty-six components belonging to the following chemical families were identified: hydrocarbons, fatty acids, esters, sulfur-containing compounds, ketones, aldehydes, and especially alcohols. Pasteurization decreased the quantity of some alcohols, aldehydes and ketones. Trimethylpyrazine increased in cheese made with pasteurized milk. Pyrazines formed by the heat treatment have been related to chocolate and coffee flavors in cheese. In fact, cheese P obtained higher number of sensory perceptions of this sensory descriptor grouping than the rest. Significant differences (p<0.05) for characteristic odor, aroma and flavor were recorded between 4 month-cheses from batches C and P. However, 8 month-cheses from batches C and F showed similar scores between them and higher than those obtained by batch P. This could be caused by higher concentration of some acids (2-methyl propanoic and 3-methyl butanoic) and esters (methanoic acid, methyl ester; methanoic acid, butyl ester and heptanoic acid, ethyl ester) in C and F. Pasteurization of milk has influenced the concentration of certain volatile compounds, affecting adversely the characteristic flavor of cheese. However, the utilization of Lb. casei + Lb. Plantarum as adjunct starter culture in addition to the commercial starter improves the flavor when using pasteurized milk to make this kind of cheese.

Key Words: ewe’s milk cheese, volatile components, adjunct starter culture
1044 Isolation of Clostridium botulinum (types A, B & E) in sediments from coastal areas of the north of Iran. H. R. Tavakoli*, Nutrition and Food Hygiene Dept; Faculty of Hygiene, Univ. of Baghyatollah Medical Sciences, Tehran.

Clostridium botulinum has long been recognized as an etiological agent of food borne botulism and has been shown to be distributed widely in fresh water, brackish water and marine environments. This bacterium has been reported as an important food safety hazard. The aim of this study was to obtain information about C. botulinum contamination levels in sediments in order to ascertain the risks associated with consumption and processing of fish from these waters. Two hundred and seventy samples of sediments from coastal areas of "Gilan" and "Mazandaran" states of Iran were collected and analysed. Suspension of samples were prepared and then centrifuged at 5000 RPM for 20 min. The supernatants were inoculated into 10 ml cooked meat media (C.M.M.). After incubation for 2-4 days at 30C, grown specimens were gram stained and checked microscopically. For complementary test, specimens from above mentioned media were inoculated into Egg yolk agar media containing trimethoprim and sulphanmethaxazole. After centrifugation, the supernatants were divided into three portions: one portion remaining untreated, one heated to demonstrate the labile nature of the toxin (control), and one tripipined to demonstrate the presence of inactive prototoxin. Samples (0.5 ml) were inoculated intraperitoneally into mice (182) and controlled for 4 days to detect positive samples. Polyvalent (A, B and E) and monovalent standard antitoxins were used to toxin type detection. The present study revealed that the prevalence of C. botulinum (types A, B and E) in sediments from different areas of Gilan and Mazandaran were 3.6% and 4.0% respectively, and mean prevalence of C. botulinum in sediments from north regions of Iran was 4.1%. It is also demonstrated that C. botulinum type E is predominant type seen in aquatic environments of the coastal areas of Iran. This is the first report of C. botulinum distribution in the sediments from coastal area of Iran. The potential hazards of types A, B & E is clearly indicated thus revealing a risk of extended storage of raw or mildly thermally processed sea foods and the need to protect these products from temperature abuse until their final use.

Key Words: Clostridium botulinum, Coastal areas sediments, Food safety
Campylobacter carcasses progress through the slaughtering process. A recovery method for results of this study show that direct plating onto CLA is an effective method of detection on equipment used in the processing operation. The method was based on the fact that a food service facility should not be inspected by two regulatory agencies. Local health departments were not provided with the resources necessary to deal with the added responsibility and very little work has been done to monitor the quality of soft serve products manufactured at food service establishments. Many local health agencies do not have laboratories in which food products can be analyzed and have not set up sampling and inspection procedures for the frozen dessert part of food service establishments. MDA, therefore continues to license, inspect and sample those establishments not covered by the Public Health code. In cooperation with local health departments, a soft serve risk assessment survey was conducted. The results of the sampling and survey were to be used: 1) to determine and characterize the type and baseline levels of microbiological organisms which are found in soft serve desserts, 2) assess the effectiveness of sanitation practices currently used in soft serve production and to determine if establishment practices have an impact on these levels, and 3) to justify the changes that the Michigan Department of Agriculture made to the state dairy laws.

1047 Prevalence and distribution of Campylobacter spp. in a swine slaughter and processing facility. R Pearce1, R Dudley2, F.M. Wallace2, J.E. Call2, and J.B. Luchansky2
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The objective of this study was to establish the prevalence and distribution of Campylobacter spp. in a swine slaughter and processing facility. Samples obtained over the course of three visits included composite carcass samples (30), representing 360 swine carcasses, obtained at selected points along the slaughter process, matching composite rectal samples which were collected from carcasses immediately after stunning, and 58% (35/60) of the individual colon samples were detected on equipment used in the processing operation. The results in- 

Key Words: Campylobacter, Swine, Prevalence

1048 Evaluation of bacteriophage DC22 for control of Escherichia coli O157:H7. S.J. Bach1, T.A. McAllister1, D.M. Veira2, V.P.J. Gannon1, and R.A. Halley1
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The effectiveness of DC22, an Escherichia coli O157:H7-specific bacteriophag, for controlling E. coli O157:H7 was investigated in vitro, using the Rumen Simulation Technique (Rusitec) and in vivo, with experimentally inoculated wethers. In Exp. 1, fermentations were established in eight Rusitec vessels using ruminal inoculum confirmed negative for E. coli O157:H7. Each vessel was inoculated with 106 CFU/mL of E. coli O157:H7 strain 3081, then 8 h later with 107 PFU/CFU of DC22 or an equivalent amount of SM buffer as a control (n = 4). Both E. coli O157:H7 and phage DC22 were enumerated 4 and 12 h after inoculation of DC22, and daily thereafter for 7 d. In the DC22-treated vessels, E. coli O157:H7 was eliminated within 4 h of challenge, whereas the bacterium persisted in the control vessels for up to 168 h (P < 0.05). In Exp. 2, 12 wethers were inoculated orally with 108 CFU of E. coli O157:H7 strain E318N, then 2 d later, with 106 PFU/CFU of DC22 or an equivalent amount of SM buffer (n = 6). Fecal samples were collected for enumeration of E. coli O157:H7 and DC22 following inoculation and following DC22 challenge, then daily for 8 d, then twice weekly for 3 wk. Treatment with DC22 did not affect (P > 0.05) levels of E. coli O157:H7 shed by the wethers during the 30-d period. Levels of DC22 recovered from feces decreased rapidly following inoculation, suggesting the phage did not replicate lytically in the ovine gut. Although 105 PFU of DC22/CFU of E. coli O157:H7 was adequate for eliminating E. coli O157:H7 in the Rusitec (P < 0.05), this dose did not effect maintenance of the phage in the gastrointestinal tract of the wethers in levels sufficient to cause lysis of E. coli O157:H7. Non-specific adsorption of DC22 may have reduced its availability to lyse E. coli O157:H7. Bacteriophage DC22 was not effective for controlling fecal shedding of E. coli O157:H7 by sheep.

Key Words: Bacteriophage, E. coli O157:H7, Sheep


The Pathogen Reduction Program of the U.S. Department of Agriculture Food Safety and Inspection Service recommends antimicrobial treatments including herb extracts to reduce or inactivate pathogenic bacteria in foods. However, they have never been used as antimicrobial agents. Therefore, the objective of this study was to evaluate the effect of GB and OX on the survival and growth of Escherichia coli O157:H7 and Salmonella agona in BHI broth. Prior to media sterilization select concentrations of GB and OX extracts were added separately into the broths. E. coli O157:H7 (360-94), and two strains of Salmonella agona (F5567, H6115) were inoculated to provide a final inoculum level of 2.5x10^8 CFU/ml. Samples were incubated at 37°C for 6 hours. Samples were withdrawn every 2 hours and surface plated on EM agar and TSBYE agar for the enumeration of E. coli and Salmonella, respectively. Results showed that the addition of 1.25% GB and 0.1% OX significantly inhibited the growth of pathogenic bacteria (P < 0.05). During the 6 hours storage period, populations of bacteria increased by 6.0 log CFU/ml in control samples while bacterial populations in treated samples only increased by 2.0 log CFU/ml. These results indicate the potential applicability of GB and OX as antimicrobials in foods.

Key Words: Salmonella agona, Ginkgo biloba, Origanox

Physiology

1050 Postpartum suppression of ovarian activity with a Deslorelin implant enhanced uterine involution in lactating dairy cows. F.T. Silvestre1, A. C. M. Arteche2, S. Kamimura1, A. C. M. Arteche1, S.M. Pancarci1, T. Trigg2, and W.W. Thatcher1
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Ovarian follicular activity, presence of a CL and uterine involution were evaluated for cows treated with a non-degradable Deslorelin (DES) implant (5 mg; n = 10) or a control group (n = 9) that did not receive an implant. All cows were assigned randomly to treatments on 6-25-2001 and received DES implants between 1d to 4d postpartum (PP). Cows