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Aura Daraba et al., J Exp Food Chem 2016, 2:4(Suppl)
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Enhanced destruction of *Salmonella enterica* in carrot and berry juices by a combination of cinnamaldehyde and high pressure processing

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Statement of the Problem: In recent years several disease outbreaks were linked to unpasteurized juices contaminated with human enteric pathogens such as *Salmonella enterica* and *Escherichia coli* O157:H7 (CDC 2011; EFSA 2015). While heat pasteurization and canning can inactivate vegetative pathogens, such processes can destroy heat labile nutrients and negatively alter sensory characteristics of juices. Also growing consumer demands for foods which are nutritious, fresh-like, and devoid of synthetic preservatives, have forced juice manufacturers to explore non-thermal processes and natural antimicrobials for pathogen control in juices. The present study investigated the effect of low concentrations of cinnamaldehyde combined with high pressure processing (HPP) for killing *S. enterica* in carrot juice (CRJ) and a mixed berry juice (MBJ) at 4°C.

Methodology & Theoretical Orientation: CRJ (pH 6.25) and MBJ (pH 3.59) with added cinnamaldehyde (0.10, 0.15 and 0.25 µl/ml) were inoculated with *S. enterica* (5-strain; final concentration ~107 CFU/ml). Inoculated juices without added cinnamaldehyde served as control. Juices (4°C) were packaged in polyester pouches and pressurized (400 or 300 MPa) for 60, 90 and 120 seconds. The time between inoculation and HPP was approximately 1.5 hours. *Salmonella* survived for 42 days or more in control CRJ following HPP (400 MPa) for 30, 60, or 120 s. Addition of cinnamaldehyde to juices increased the sensitivity of *S. enterica* to HPP. Cinnamaldehyde (0.25 µl/ml) combined with 400 MPa (60 s) inactivated *S. enterica* by more than 5.5-log in CRJ. In MBJ, cinnamaldehyde (0.15 µl/ml) with a lower pressure (300 MPa for 120 s) resulted in complete inactivation (negative enrichment) and greater than a 5-log10 CFU/ml reduction of *S. enterica*.

Conclusion & Significance: The use of CA in conjunction with HPP has good potential to serve as an alternative process for heat pasteurization of juices and meet the 5-log reduction performance standard as stipulated in the juice HACCP regulations.

Biography

Aura Daraba has her expertise in Food Safety and Food Quality, use of natural antimicrobials to control pathogens, use of non-thermal food processing technologies, and implementation of HACCP in Food Industry and in Food Service Units. She has worked extensively along with Dr. Aubrey Mendonca and Dr. Angela Shaw in the use of High Pressure Processing and use of Natural Antimicrobials to control pathogens in foods.

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Notes:

Carlton W Farley, J Exp Food Chem 2016, 2:4(Suppl)
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Rapid raman detection of extra virgin olive oil adulteration

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The adulteration of pure extra virgin olive oil (EVOO) with cheaper edible oils has been a major concern for consumers for some time. Thousands of truckloads of food products are brought into the US every day, making it impossible to police every truckload using current techniques. In order to police a higher number of oils and other foods imported into the US, we must have a much faster method for detection of EMA in food products. Raman spectroscopy offers such a solution. While the current methods of testing samples taken by the Center for Border Patrol (CBP) involves sending those samples to a lab, and waiting up to three weeks for results, we show a method where each border checkpoint could be equipped with a Raman spectrometer, and with little training, measurements can be made within 5 seconds so that Border Patrol agents can test several samples from each truckload entering the US. For this study, samples are kept inside clear glass containers, while a 785 nm Raman system is used to take measurements as the Raman probe is placed against the glass container. Several types of oils at various concentrations of adulteration are used. Ratios of peak intensities are used to analyze raw data, which allows for quick, easy and accurate analysis. While conventional Raman measurements of EVOO may take as long as 2 minutes, all measurements shown here are for integration times of just 5 s. It is found that adulteration of EVOO with cheaper oils is detectable at concentrations as low as 2.5% for all oils used in this study. This is more sensitive than standard techniques, but only requires a fraction of the time to test each sample.

Biography

Carlton W Farley III has used Raman spectroscopy for detecting a variety of chemicals in the past few years, including explosives, rocket fuel propellants and EMA in food items. He completed his PhD in December 2015 at Alabama A&M University, where he began his research on “Improving EMA detection in extra virgin olive oil as well as honey, flour and baby formula”. He is currently a Research Associate at Alabama A&M University, where he trains graduate students as well as continues research on “Detection of EMA in food items”.

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Rapid analysis of aflatoxin levels found in corn

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South Carolina grows and exports products such as peanuts and corn, to various countries around the world. However, these products may contain the mold Aspergillus flavus or Aspergillus parasiticus, species of fungi which produce aflatoxin. Aflatoxins can cause damage to the lungs, kidneys, brain, and heart. Because of the harm these toxins pose, a food safety survey was administered to SC farmers to ascertain their level familiarity with aflatoxins. The results indicated that of the 190 farmers surveyed, 58% reported they never heard of it, 26% revealed they somewhat knew about it, while only 16% definitely knew about. To determine the presence of aflatoxin levels in corn, the Vicam Afla-V test reader was used. This device accurately detects the presence of aflatoxins B1, B2, G1 and G2 levels ranging from 2 ppb to 100 ppb. To analyze the corn samples, they were blended finely and weighed to 5 g. The ground samples were then inserted into an extraction tube containing 25 ml of 70% MeOH and vortexed for 2 minutes. The samples were filtered and 100 µl were placed on the Afla-V test strips. The test strips were placed into the reader and aflatoxin levels were obtained within 5 minutes. The results indicated that 3 of the 11 corn farms tested, had higher levels than the 25 ppb recommended by the USDA. Informing and educating the farmers about the seriousness of aflatoxins is paramount. Furthermore, farmers who produce crops with lower levels of aflatoxins, have a greater chance of exporting their crops in an increasingly competitive global market. Future experiments will involve testing various treatments to decrease the levels of aflatoxin associated with corn.

Biography

James B Stukes is an Associate Professor of Biology/Biology Program Coordinator in Department of Biological and Physical Sciences at S C State University. He completed his PhD in Microbiology at Atlanta University. He has served as Principal Investigator for several grants, written various publications, and presented his work at numerous conferences. He was named as University Teacher of the Year, Outstanding Young Man of America, served as a member of the Governor's Mathematics and Science Advisory Board, and Who's Who among America's Teachers. He currently serves as Co-Principal Investigator of the Evans-Allen 1890 Food Safety Research Grant funded by the USDA.

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Polycyclic aromatic hydrocarbons (PAHs) and organic pesticide residues in yellowfin tuna *(Thunnus albacares)* light and dark muscles

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The occurrence of toxic and carcinogenic contaminants in agro commodities in levels above tolerable limits have been issue of health concern globally. Of much concern is the low research output on this topical issue in developing countries especially within African continent. The aim of this study therefore, was to investigate the occurrence, profiles and levels of selected hazardous compounds: sixteen priority polycyclic aromatic hydrocarbons (PAHs) and organochlorine pesticides (OCPs) such as dichlorodiphenyltrichloroethane (DDT), benzenehexachloride (BHC) and other OCPs in commonly consumed and commercially important marine species, yellowfin tuna *(Thunnus albacares)* dark (TDM) and light (TLM) muscles. Extraction of contaminants was done with QuEChERS modified method and analysed with GC-MS/MS. Target contaminants were detected in both muscles, however, the mean concentration of total DDT was significantly higher ($p<0.05$) in TLM (229.09 ± 2.04 µg/kg ww, than in TDM (4.47 ± 1.64 µg/kg); while mean concentration of total PAHs, BHC and other OCPs were higher ($p<0.05$) in TDM (636.61 ± 36.03 µg/kg, 4.23 ± 0.54 µg/kg and 12.12 ± 2.90 µg/kg respectively) than TLM (369.41 ± 64.72 µg/kg, 1.39 ± 0.13 µg/kg and 5.36 ± 0.9 µg/kg). Concentrations of DDT, BHC and other OCPs in both muscles were below European Union (EU) maximum residue levels. However, benzo(a)pyrene, PAHs indicator, exceeded the EU recommended maximum level in both TDM and TLM. In view of the associated health hazards with these chemicals and their persistence in the environment, levels in the yellowfin tuna are of concern to consumers and warrants further investigation and monitoring.

Biography

Rufina Chukwumalume has completed her PhD from Stellenbosch University, South Africa in Food Science. She is the Head, Product Development Division under Coodrination of Technical Research Programme in Agricultural Research Council of Nigeria. She has some publications as conference proceedings and some articles under review for publications.

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Rheological properties of a Tunisian commercial ketchup

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The aim of this study was to propose a new semi-empirical model to investigate the rheological properties principally of Tunisian commercial ketchup with different botanical origin, as a thickener for sauces, ketchup type. The material consisted of natural starches: Waxy maize, corn and potato, modified with a cross-linker comprising acetic anhydride and adipic acid. Research on: Rheology, color, texture and acidity of the finished product. It was found that all the sauces in terms of rheological fluids were pseudoplastic flow from abroad. The biggest apparent viscosity was characterized by ketchup with the addition of waxy maize starch, then: With potato starch and corn. Texture profile parameters studied sauces differed slightly from the parameters of commercial ketchups, and the largest differences occurred in the hardness and adhesiveness. The use of resistant starch preparations for sauces had a positive effect on their color. Botanical origin of starch had no effect on the pH of the tested products. The proposed equation (Eq. 4), with two physical parameters κ and τ0, is in a good agreement with the experimental data and is generally better than the previous empirical equations of Ostwald-de Waele, Herschel-Bulkley and Casson.

Biography

N Ouerfelli has a PhD and Habilitation Diploma in Chemistry; he is the Head of research project in the Laboratory of Biophysics and Medical Technologies. He has published more than 45 papers in reputed journals on modeling of physicochemical properties in solution.

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Production and applications of bio-based fiber gum and Z Trim from agricultural biomass

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Bio-based fiber gums (BFGs) and Z Trim are water soluble arabinoxylan (Hemicellulose B) and water insoluble fibrous cellulose rich arabinoxylan respectively, isolated from various low value agricultural residues (corn stover, wheat straw, etc.), agricultural processing by-products (corn fiber, wheat bran, rice fiber, sorghum bran, sugar cane bagasse, etc.) and energy crops (switch grass and miscanthus) by alkaline treatment. The BFGs, isolated from different agricultural materials are purified, characterized and their functionalities are studied. They appear to have useful properties as emulsifiers, antioxidants, dietary fibers and other food ingredients. Like corn fiber gum (CFG), these polysaccharides are unique in making low viscosity solutions, even at high concentrations. Z Trims, prepared from the residues left over after BFG isolation, are also characterized and their water holding capacity, rheological behavior and ORAC values are determined. The rheological studies of these gels show that they make very viscous gels at low concentrations in water. They are completely non-digestible to humans and therefore make an excellent non-caloric food bulking agent and become helpful in replacing fat with healthy fiber and water without changing taste but improving mouth feel. Due to their high water absorbance, fiber addition, oil emulsification, and the reduction of calories, cholesterol, trans-fat and saturated fat, they become very useful ingredient in bakery products, dairy products, meats, dressing, mac and cheese etc. Understanding the functional properties of BFG and Z Trim will be beneficial from their commercialization point of view for their use in food industries.

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Brazilian fish certification program: An instrument of food safety

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Global and national aquaculture is growing rapidaly. The expasion is due to the rising of global demand for fish and byproducts, and increased awareness of the fact that aquatic resources, although renewable, are finite. Therefore, they need to be managed properly. Aquaculture's importance is an undeniable fact, but intensive and disorganized practices can lead to a variety of problems. Product quality can be cited as one of them, for the possibility of contamination by pesticides and microbiological agents. In this context, the past few years have seen many efforts to answer public perceptions and market requirements. Food security standarts were increased and international commerce regulations became more strict. Many countries have created policies and regulations. Markets acknowledge that certification is the way to assure that aquaculture products are safe to consume and come from farms that adopt sustainable management practices. In Brasil, the National Institute of Metrology, Quality and Technology (Inmetro) has been developing the Brazilian Fish Certification Program (PCPB). This program aims at fostering and collaborating to the sustainable development of the sector through the increase of fish value added and competitiveness, contributing to the country's financial development.

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Properties of hydrothermally treated maize starch with stearic acid

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Starch is a common food ingredient widely used in the food industry. The current consumer reluctance trend is towards clean label starches. Hydrothermal treatment of starch can increase the relative crystallinity of starches. Wet heat processing of starch with fatty acid can promote the formation of amylose lipid complexes. Both treatments can modify starches for 'clean labelling'. This study determines the effects of hydrothermal treatment in combination of fatty acid on the functional properties of maize starch. This study was carried out with stearic acid (0 and 1.5 %) and hydrothermal treatment (110°C for 16 hours for maize starch with 20% moisture, 55 C for 24 hours for maize starch with 70% moisture and no hydrothermal treatment). The pasting properties, textural properties, thermal properties, x-ray diffraction, *in vitro* starch digestibility of the treated starches were determined. Hydrothermal treatment in combination with stearic acid reduced the breakdown and setback viscosities compared to stearic acid and hydrothermal treatment alone. Hydrothermal treatment of maize starch with stearic acid further increased the relative crystallinity of pasted starches and this decreased the *in vitro* starch digestibility. Stearic acid reduced retrogradation and resulted in non-gelling pastes. The same effect was observed with hydrothermally treated maize starch with stearic acid. Hydrothermal treatment of maize starch with stearic acid resulted in starch that is non-gelling, increased thermal stability, increased crystallinity, and reduced *in vitro* digestibility.

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The potential health implications of the consumption of thermally oxidized cooking oils

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Cooking oils are integral part of human diet as they are used in almost all type of culinary practices. They serve as sources of lipid with significant nutritive value and health benefits which can be attributed to their fatty acid compositions and biological antioxidants. However, cooking oils are usually subjected to thermal oxidation which occurs when fresh cooking oil is heated at high temperatures during various food preparations. Repeated use of cooking oils in the commercial food industry is also common to maximize profit. Thermal oxidation of edible oils had attracted great attention of nutritionist and researchers given the deteriorative effect such as generation of very cytotoxic compounds, loss of carotenoid, phenolics and vitamins thus reducing the overall antioxidant properties of the oils. Furthermore, several *in vivo* studies had suggested that consumption of thermally oxidized cooking oils might not be healthy as it might negatively influence the lipid profile [increased low density lipoprotein (LDL), decreased high density lipoprotein (HDL) and elevated cholesterol level], haematological system [alteration in concentration of heamoglobin (Hb), packed cell volume (PCV), white blood cell (WBC) count, neutrophil and lymphocyte counts], kidney function and induce lipid peroxidation and oxidative stress which have been associated with the pathogenesis of various degenerative diseases. Therefore, thermal oxidation seems not to provide any health benefit, as it deteriorates cooking oils and the consumption of the oils may predispose consumers to various disease conditions that may ensue from free radical generation, thereby having deleterious effect on human health.

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Functional compounds of Chlorella hydrolysates fermented by probiotics

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Chlorella, rich in proteins, peptides, chlorophyll, vitamins and minerals, is a good material for the production of functional foods. However, the rigid cell wall cannot be easily digested and release the nutrients, which consequently lowered its nutritional value. To rupture the cell walls, *Chlorella* was hydrolyzed with 10% of cellulase (150 U/g) and 1% of protease (10000 U/g) at 50oC. The hydrolysate was further fermented with *Lactobacillus plantarum* subsp. BCRC 10069 or *Lactobacillus johnsonii* BCRC 17010 at 37oC for 24 hr. The chlorophyll (chlorophyll a+b), anthocyanins and lutein in the samples after 24 hr fermentation by *L. plantarum* subsp. BCRC 10069 or *L. johnsonii* BCRC 17010 increased from 6.18 to 41.58 and 22.93 μg/mL, from 0.291 to 0.779 and 0.808 μmol/g and from 0.284 to 2.107 and 1.398 mg/100 mg, respectively. The total protein content decreased from 213.13 to 128.78 mg/g, while the peptides, free amino acids contains increased from 62.52 to 227.68 and 197.63 mg/g, from 10.19 to 17.91 and 23.65 mg/g, respectively. Essential amino acids increased significantly from 5.04 to 10.88 and 5.17 mg/g. Arginine, aspartic acid, leucine, methionine and phenylalanine also increased significantly after LAB fermentation. These data suggested that hydrolysis and fermentation have high potential to improve the functionality of *Chlorella*.

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Consumer attitude and motivations towards food quality certifications

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Food quality and safety have received growing attention in many developing countries including Vietnam due to several reasons including the overuse and misuse of pesticides in agriculture and the presence of harmful chemicals in food. In the context of these serious problems in the Vietnamese domestic market, it is vital to explore how consumers think and behave towards food certifications. Thus, this study examines consumer attitude towards food quality certifications in the selected urban areas in the South of Vietnam employing face-to-face consumer surveys with 500 respondents. Results showed that consumers' knowledge of food quality terms was relatively low. Less than half of the respondents indicated to know the meaning of sustainability, GAP and organic food. Consumers' familiarity with the food certifications (e.g. GAP, HACCP and organic) was also low. This study focuses on the differences in the consumer perceptions towards rice and vegetables. Regression results showed that consumer attitude towards quality foods was affected by different motivations such as perceived importance of environmental consequences, perceived fairness of prices for farmers, food certification familiarity, perceived importance of healthy eating (in the case of rice), and food safety concern (in the case of vegetables). The food safety aspect of certified vegetables should be emphasized during marketing activities of quality certifications. Furthermore, the awareness and knowledge of consumers towards food quality certifications as well as sustainable agricultural practices should be publicly enhanced.

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Drug residues in foods of animal origin: Perceptions and concerns of consumers in northwestern Ethiopia

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Statement of the Problem: Veterinary drugs play a crucial role in improving the yield of food producing animals. Yet, these drugs get the chance to distribute in most tissues of animals, making the presence of drug residues in the derived food products inevitable. Various health concerns arise as a result of drug residues that are above permissible amounts. In this regard, the perceptions and concerns of consumers will have significant impact on their consumption of animal products. This study is intended to assess consumer's perception and concern towards veterinary drug residues in animal derived foodstuffs they use.

Methodology: A cross-sectional study was conducted using self-administered structured questionnaire on a convenient sample of academic staff at the University of Gondar, northwestern Ethiopia.

Results: Majority of the 65 respondents who were included in the analysis (60, 92.3%) were male who reported consuming animal products and 39 (60.0%) were younger than 30 year old. Less than half (25, 38.5%) reported experiencing health problems as a result of consumption of animal products. 34 (52.3%) respondents had moderate to very strong level of concern about animal drug residues. However, the highest number of respondents expressed concerns about microbiological contamination (56, 86.2%) and pesticide residues (46, 70.8%) in animal products. The main reasons for concern were potential toxicities (27, 41.5%), antimicrobial resistance (25, 38.5%) and potential risk of cancer (23, 35.3%). Respondents have reported changing their animal product consumption behaviors as a result of their concerns. Spearman correlation analysis showed that concerns were significantly associated with reported changes in behavior ($p<0.01$).

Conclusion & Significance: Consumers have concerns about the health effects of veterinary drug residues and other contaminants to the extent that they change their behavior. Studies on the extent of the problem in animal products and effective regulatory interventions are recommended.

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Effects of whey protein isolate based coating enriched with *Zingiber officinale* and *Matricaria recutita* essential oils on color parameters of rainbow trout

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The present study investigated the effect of whey protein isolate (WPI) coating enriched with essential oils (ginger and chamomile) on color parameters of rainbow trout (*Oncorhynchus mykiss*) fillets in refrigerated storage (4 C). Fish samples were divided into six groups; C1 (control, without edible films), C2 (whey protein isolate coating solution without essential oils), C3 (whey protein isolate coating enriched with 0.2% [v/v] ginger EO added), C4 (whey protein isolate coating enriched with 0.2% [v/v] chamomile EO added), C5 (whey protein isolate coating enriched with 0.2% [v/v] combine essential oils ginger and chamomile) and C6 (whey protein isolate coating enriched with 0.4% [v/v] combine essential oils ginger and chamomile). The colour parameters for the colour change were quantified by the Hunter L (whiteness/darkness), a (redness/greenness) and b (yellowness/blueness) system. There were significant differences ($p<0.05$) for L*, a*and b* of rainbow trout over the storage periods.

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Effects of the central nervous system on food intake and body weight

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The central neural networks organize the interactions among stressors, body, food intake and brain. Furthermore, stress and emotional brain network affect eating behaviour that can lead to obesity. Especially, some food components have various effects such as depression, anxiety, sleep, appetite on central nervous system. The brain and the central nervous system produced a great number of peptides and steroids through their actions on the hypothalamus. Hypothalamus plays a vital role that control food intake and body weight. Leptin and some other hormones have functions as anti-obesity factor by regulating the balance between energy uptake and consumption via the receptors in the hypothalamus. Leptin deficiency can result in health problems such as obesity, diabetes and infertility. It is known that the central nervous system manages the condition of appetite and satiety; hypothalamus is the central junction point for brain in the communication of brain with the body; and leptin hormone plays an effective role in the intake of food. In this review, the central nervous system, functions of hypothalamus and leptin, its effects on food intake will be discussed in the light of literature.

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Churning efficiency, physicochemical properties and microbial safety of butter made from camel milk alone and blending it with goat

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The study was conducted to evaluate the churning efficiency of butter making from camel milk by blending it with goat milk; the physicochemical properties and microbiological safety of butter made from camel milk alone and at different blending levels were assessed. The experiment was laid out in completely randomized design with five treatments, i.e., T1 (100% camel milk), T2 (75% camel and 25% goat milk), T3 (50% camel and 50% goat milk), T4 (25% camel and 75% goat milk) and T5 (100% goat milk). The milk samples were analyzed for their physicochemical properties and microbiological quality. The fat, total solids and titratable acidity of T1 was significantly ($P<0.001$) lower than T5 but T1 had significantly ($P<0.001$) higher pH value than T3, T4 and T5. There was no significant ($P>0.001$) difference in specific gravity between T1, T2, T3, T4 and T5. The total bacteria count (TBC) of T1 was significantly ($P<0.001$) higher than TBC of T2, T3, T4 and T5. The coliform count (CC) of T5 was significantly ($P<0.001$) higher than CC of the other milk samples and no significant ($P>0.001$) difference was observed in CC between T1, T2, T3 and T4. The churning efficiency, physicochemical properties and microbiological quality of the butter samples were analyzed following standard procedures. The fermentation time (11.3 days), churning time (121.7 min) and churning temperature (280C) of T1 were significantly ($P<0.001$) higher than the other milk samples. However, T1 had significantly ($P<0.001$) lower churning pH (4.13) and butter yield (49.3 g/liter) than the other samples. T3 and T4 had significantly ($P<0.001$) higher butter yield than the other milk samples. The fermentation time, churning time and churning temperature of T5 were significantly ($P<0.001$) shorter/lower than the rest and T5 required significantly ($P<0.001$) higher churning pH than the other milk samples. The moisture content (39.2%), melting range (42.±10C) and acid degree value (8.72% oleic acid) for T1 was significantly ($P<0.001$) higher than the other butter samples and T1 had significantly ($P<0.001$) lower fat content (56.8%) than the other samples. The coliform count (CC), *Enterobacteriaceae* count (EBC), lipolytic bacteria count (LBC) and yeast and moulds count (YMC) of T1 was significantly ($P<0.001$) higher than the other butter samples. The CC, EC and total bacteria count (TBC) of T5 was significantly ($P<0.001$) higher than T2, T3 and T4 and it had significantly ($P<0.001$) lower TBC than the others. The results showed that blending camel milk with goat milk improved fermentation and churning time and yield of butter from camel milk. Although butter can be made from pure camel milk, it took longer churning time and fermentation time. Thus, research is needed in order to reduce the churning time and improve the yield of butter made from pure camel milk by manipulating the operating parameters viz., pH of the milk, churning temperature, method of churning and volume of milk in the churn.

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Capillary electrophoresis is essential for microsatellite marker based detection and quantification of adulteration of basmati rice

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Rice is a staple and widely grown crop endowed with rich genetic diversity. As it is difficult to differentiate seeds of various rice varieties based on visual observation accurately, the harvested seeds and subsequent processed products are highly prone to adulteration with look-alike and low quality seeds by the dishonest traders. To protect the interests of importing countries and consumers, several methods have been employed over the last few decades for unambiguous discrimination of cultivars, accurate quantification of the adulterants, and for determination of cultivated geographical area. With recent advances in biotechnology, DNA based techniques evolved rapidly and proved successful over conventional non-DNA based methods to purge the problem of adulteration at commercial level. Microsatellite markers are employed for genotyping of basmati varieties and assaying purity of market samples. However, employment of diverse electrophoresis techniques across laboratories has resulted in inconsistent allele sizes, creating doubts about the suitability of the assay. This study evaluated agarose gel electrophoresis, slab gel electrophoresis, and capillary electrophoresis techniques for their efficiency in the detection and quantification of adulteration in basmati samples. Comparative analysis across eight microsatellite loci in 12 rice varieties demonstrated that the capillary electrophoresis method showed less error (0.73 bp) in the estimation of allele sizes compared to slab gel (1.59 bp) and agarose gel (8.03 bp) electrophoretic methods. Capillary electrophoresis showed greater reproducibility (<0.5 bp deviation) compared to slab gel (1bp) and agarose (>3 bp) based methods. Capillary electrophoresis was significantly superior in quantification of the adulterant, with a mean error of 3.91% in comparison to slab gel (6.09%). Lack of accuracy and consistency of the slab gel and agarose electrophoretic methods warrants the employment of capillary electrophoresis for Basmati rice purity assays.

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Fatty acids profile of meat from local poultry population of *Gallus gallus* species of Benin reared under free range and improved breeding systems

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The current study aims to determine the fatty acids profile of indigenous chicken's meat of Benin (Fulani and Sahoue ecotypes) in relation with the breeding mode and the type of muscle. Two groups of 52 chickens of each ecotype were reared respectively under traditional and improved breeding systems until 28 weeks old and then slaughtered. Breast and thigh were used for fat extraction and fatty acids profile analysis. It appears that the predominant fatty acids were palmitic and stearic (18:0) acids as saturated fatty acid (SFA), oleic acid as monounsaturated fatty acid (MUFA), and linoleic acid (LA) and arachidonic acid as polyunsaturated fatty acid (PUFA). Palmitic acid, oleic acid and arachidonic acid were the most abundant. The highest SFA and PUFA concentrations were found respectively in Fulani and Sahoue ecotypes (P<0.05). The n-3 PUFA content was lower than n-6 PUFA in all ecotypes with the highest n-3 PUFA content (5.66%; P<0.05) found in Fulani chickens. The weakest ratio n-6/n-3 PUFA was also found in Fulani chickens. The fatty acid composition was also affected by production system and muscle type. The n-3 PUFA was abundant in free range (5.01%) than in confinement breeding system (4.82%). The ratio n-6/n-3 fatty acid was similar in both breeding systems (P 0.05). The ratio PUFA/SFA was higher in meat from free range system than confinement system (P<0.05). The breast meat showed higher n-3 PUFA concentration and lower ratio n-6 PUFA /n-3 PUFA than thigh meat (P<0.001). Overall, the breast meat ensuring additional health benefit for consumers than thigh meat. Furthermore, organic free range system increases omega 3 fatty acids concentration.

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Surveillance of food safety compliance of Hong Kong street food

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Hong Kong's food truck scheme is in full swing to launch. Food and environmental safety is one of the measures requires attentions. This study is a pilot surveillance of food microbial safety of both licensed and mobile vendors selling Chinese ready-to-eat snack foods. The hygiene compliance of vendors was also assessed. Nine types of 32 samples of cantonese snacks were selected for comparison with a final focus on one traditional snack, the steamed rice cake with red beans called Put Chai Ko (PCK). PCK is usually sold at room temperature and served with bamboo sticks but some shops would sell it steam fresh. 16 vending sites including supermarkets, street markets and snack stores were visited. Aerobic counts, yeast and mould, coliform, salmonella as well as *Staphylococcus aureus* detections were carried out. Salmonella was not detected in all samples. Coagulase positive *Staphylococcus aureus* were found in six (three out of six from PCK) of the 14 samples sold at room temperature. One was in an unacceptable range of total CFU>10^5. The rest were only satisfactory. The checklist ran observations on personal hygiene, premises hygiene, food safety control, food storage, cleaning and sanitization as well as waste disposals. Maximum score was 25. The highest score obtained was only 20. Three stores were below average and two of these were selling PCK. Most of the non-compliances were on food processing, sanitization and waste disposal. In conclusion, though no food poisoning outbreaks happened, risk of food safety hazard existed in these stores, especially among street vendors. Attention needed in the traditional practice of food selling and that food handlers might not have sufficient knowledge to properly handle food products.

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Effect of Jatropha curcas L. press-cake and inorganic NP fertilizers on productivity of potato *(Solanum tuberosum L.)* and soil properties

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Low soil fertility is a major constraint to potato production in Ethiopia. A field experiment was conducted at rare research farm, main campus of Haramaya University in Ethiopia, during the main growing season of 2011 under supplementary irrigation to evaluate the effects of *Jatropha curcas* L. press-cake and inorganic NP fertilizers on the productivity of potato (*Solanum tuberosum* L.) and soil properties. The treatments consisted of four rates of *Jatropha* press-cake (0, 2, 4 and 6 t ha-1) and five rates of combined mineral N and P (0+0; 0+46; 50+0; 50+46; 100+92 kg N+P, respectively, ha-1) fertilizers. The experiment was laid out as a randomized complete block design (RCBD) in a factorial arrangement and replicated three times. Well sprouted medium-sized potato tubers of a potato variety named Badhasa were planted on 30th May, 2011 at the spacing of 75 cm between rows and 30 cm between plants accommodating approximately 44, 444 seed pieces ha-1. The plot sizes were 3.75 mx3.9 m. The distance between plots and blocks was maintained at 1 and 2 m, respectively. All agronomic and soil data were collected and analysis of variance was done. The results indicated that Jatropha press-cake along with mineral fertilizer significantly enhanced potato tuber yields and soil OM. Thus, from the results of the study, it could be deduced that 2 t Jatropha press-cake ha-1 resulted in an optimum total tuber yield.

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High rice imports as a threat to food security and a hindrance to sustainable rice production in Ghana

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Statement of the Problem: There is an observable trend of increased rice imports in Ghana to satisfy domestic consumption of the growing population annually. Many, if not all, the commercial rice farms that were established in the late 1960s and early 1970s have collapsed due to weak rice sub-sector policy. The main objective of this study is to analyse the extent to which Ghana depends on rice import to satisfy domestic food needs and how it affects domestic rice production. The study employed a case study by combining both quantitative and qualitative methods. The quantitative part of this study used secondary data from the databases of the Food and Agriculture Organization of the United Nations, the Ministry of Food and Agriculture, the United States Department of Agriculture, Index Mundi and other sources. A ten year domestic rice production, imports and consumption data were studied.

Findings: It was observed that, rice imports in Ghana outweigh its domestic production level; Ghana has a rice production deficit of 188 thousand metric tonnes. Also Government expenditure on rice imports stood at 500 million US dollars in 2014, which represented a 72.2% increase from 2005.

Conclusion & Significance: It was concluded that Ghana is food insecure in terms of rice consumption. Therefore, any decision by the leading rice exporting countries to ban or reduce the quantity of rice supply to Ghana may cause food shortage and hunger. It was therefore recommended that the government should allocate a quota to rice imports instead of increasing import tariff, more resources should also be allocated to domestic rice production to expand the current production levels and special incentives should be allocated to the youths to attract them into rice farming.

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Online HPLC analysis of antioxidant activity in tea extracts for study on Chinese drinking-tea habits

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China is the one of birthplace of tea culture and the processing of tea or the drinking method of tea are both tea's native habitats. Tea is featured by their health beneficial, refreshing and thirst quenching effects. However, people's tea-drinking habits changed as the times. Drinking tea with a scientific way is a worthy and usefule problem to us from the past to the present. This study seeks to explore the different antioxidant activity of five kinds of tea by pouring hot water into tea many times which is based on people's tea-drinking habits. The result showed that antioxidant substance of green tea is significantly higher than in white tea, oolong tea, black tea and dark tea by online ABTS+ test, on the other hand, the antioxidant activity of the tea extracts was decreased with the increasing times of making tea. In the end, the main antioxidant substances of tea were quantitatively determinate by LCMS. The major findings suggested that: Both tea had powerful antioxidant capacity; green tea showed the higher antioxidant capacity than others and; four times of pouring hot water into tea was enough to drink by evaluation of antioxidant capacity of tea extracts. This study is usefule for drinking tea in a scientific way.

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Prevalence of fungi and mycotoxins in cocoa beans from cocoa producing areas of Ogun state, Nigeria

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Dried cocoa beans are susceptible to spoilage by filamentous fungi with consequent mycotoxins production which has significant effects on public health and hence food safety. In this study, the prevalence of fungi and mycotoxins in dried cocoa beans in Ogun state Nigeria as basis for quality and safety assessment for international trade was evaluated. Cocoa samples were randomly collected from (75 registered cocoa stores) the cocoa producing areas (Yewa, Ijebu and Egba) in the state and the storage conditions were noted. Fungi were isolated, counted and pure isolates were obtained which were characterized and identified using molecular methods. Also, aflatoxin and ochratoxin were extracted from the cocoa samples with suitable solvents and quantified using enzyme-linked immunosorbent assay. The results showed that the fungi count of the cocoa beans samples from all sampling areas were significantly different (P 0.05). The highest count of 2.0x106 cfu/g, and the least count of 0.2 x106 cfu/g were found in cocoa samples from (Yewa area and Egba area respectively). The dominant species of fungi isolated and identified from the cocoa samples were *A. fumigatus, Penicillium notatum, A. niger, Fusarium verticillioides, and A. flavus with Aspergillus* species as the most prevalent species. *A. oryzae* and *A. nidulans* were also identified from some of the samples while the phylogenetic analysis of the fungi sequences and their evolutionary traits revealed the genetic diversity of DNA composition among the *Aspergillus* strains that were isolated. The total aflatoxin concentration found in the cocoa samples ranges between 17.5 and 20.5 ppb while the total ochratoxin concentrations were between 15.0 and 11.9 ppb. The study established the presence of toxigenic fungi as well as their toxins (aflatoxin and ochratoxin) in cocoa beans from cocoa producing areas in Ogun state Nigeria.

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