K-State Research Forum

Program Booklet

Tuesday, March 31, 2015
K-State Student Union

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Graduate Student Council
Graduate School
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Oral Session Schedules

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9:00AM – 11:45PM

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Pragathi B. Shridhar

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~~*Rachel Palinski*~~ *****WITHDREW*****

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BREAK

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Mohammad Julhasur Rahman

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Angela Vesco

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Benjamin Voelz

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Katrina N. Hanna

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Tucker L. Jones

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Ursula Kamanga

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Darin J. Knapp

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Trias Mahmudiono

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Allen Mallory

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Evan Alderman

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Ross Braun

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Gabriel Granco

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Sruthi Narayanan

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Shelly Wiggam

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~~*Mariah Woolsoncroft*~~ ***WITHDREW****

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Damith Patabadige

BREAK

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K.L. Dimuthu Weerawardene

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Mohammad Sadegh

Social Sciences/Humanities/Education 2
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1:00PM – 3:15PM

1:00 **CONGA DRUMMING: FROM AFRICA TO CUBA TO THE WORLD**
Brian Anderson

1:15 **AUTHENTICITY IN MUSIC SAMPLING: THE POLITICS OF REPRODUCTION**
Zian Butler

~~1:30 **COMPARISON OF NATURAL DYES DERIVED FROM KANSAS BLACK WALNUT, OSAGE ORANGE, AND EASTERN REDCEDAR SAWDUST ON ALUMINUM MORDANTED AND NONMORDANTED WOOL YARNS**~~
~~*Kelsie Doty*~~ *****WITHDREW*****

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Adam Hancock

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BREAK

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Ana Claudia Sant'Anna

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Jennifer Frederick

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BREAK

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Deanna Scheff

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Engineering/Math/Physical Sciences 2
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2:00PM –3:00PM

2:00 **MODEL STUDY ON EXTRACTION OF BOTH FERMENTABLE SUGARS AND NO-STRUCTURAL CARBOHYDRATE FROM SWEET SORGHUM THROUGH DIFFUSION PROCESSER**
Nana Baah Appiah-Nkansah

~~2:15~~ ~~**EFFECT OF VERTICAL MINI-FINS ON EXTERNAL CONDENSATION HEAT TRANSFER**~~
~~*Andres Martinez*~~ *****WITHDREW*****

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Muhammad Sajidur Rahman

2:30 **STRESS-STRAIN MODEL FOR CONCRETE CONFINED BY STEEL AND FIBER REINFORCED POLYMER (FRP)**
Fatemeh Shirmohammadi

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Mingxia Zhou

Interdisciplinary Research
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Yadhu Guragain

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Dilooshi Weerasooriya

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Corin White

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Group 1

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   Cameron Brown

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   Paul Busk

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   Rebecca Fusaro

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   Elizabeth Gutierrez

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   Emilee Morris

7. **I WAS WALKING WITH A GHOST: LORI'S STORY, REFRAMING DISSOCIATIVE IDENTITY DISORDER AS STRENGTH**
   Sarie Norval

8. **"WE'RE JUST TALKING" A QUALTITAIVE INQUIRY**
   D. Scott Sibley

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   Erika Smith

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    Christyne Stephenson

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    Brizio Di Donfrancesco

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    Sam Emerson

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    Katelyn Gilmore

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    Catherine Lynch

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    Curtis Maughan

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    Hojr Momeni

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    Tammi Paolilli

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    Xuan Uyen Phan Thuy

Interdisciplinary
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Ananda Bandara

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Damien Downes

23. SOY PROTEIN ADHESIVE BLENDS WITH SOY OIL BASED WATERBORNE POLYURETHANE TO IMPROVE WET STRENGTH ON WOOD
Haijing Liu

24. ROLE OF HIGH-INTENSITY-PRECONDITIONER IN PET FOOD SAFETY
Tiya Zhou

25. CHARACTERIZATION OF ORGANIC CARBON IN SOIL AGGREGATES FROM TEMPERATE CONTINUOUS CORN SYSTEM WITH CONTRASTING MANAGEMENT PRACTICES USING NEXAFS AND ^{13}C-NMR SPECTROSCOPY
Pavithra Pitumpe Arachchige

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Jacob Reeves

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~~*Aaron Balogh*~~ *****WITHDREW*****

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Trenton Colburn

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Bhagya De Silva

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Colby Teeman

Oral Presentation Abstracts

Biological Sciences

APPLICATION OF MULTIPLEX REAL-TIME PCR FOR THE DETECTION AND QUANTIFICATION OF SEVEN MAJOR *ESCHERICHIA COLI* SEROGROUPS AND THREE VIRULENCE GENES IN FECES OF FEEDLOT CATTLE

Pragathi B. Shridhar, Lance Noll, Xiaorong Shi, Natalia Cernicchiaro, David G. Renter, Jianfa Bai and T. G. Nagaraja

Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine

BACKGROUND: Shiga toxin producing *E. coli* (STEC) such as *E. coli* O157 and non-O157 *E. coli* particularly O26, O45, O103, O111, O121 and O145 serogroups are responsible for human illness outbreaks. Cattle are the major reservoir which shed these organisms in their feces. Real-time PCR for detection and quantification of seven *E. coli* serogroups and virulence genes in cattle feces is not yet well validated. **OBJECTIVES**: To determine the applicability of three multiplex quantitative PCR (mqPCR) assays for detection and quantification of seven *E. coli* serogroups and three virulence genes in cattle feces and to compare mqPCR with conventional PCR (cPCR) and culture method. **METHODS**: A total of 576 cattle fecal samples were collected from commercial feedlot during summer, 2013. DNA extracted from enriched fecal samples was subjected to cPCR and three mqPCR assays. Culture method involved immunomagnetic separation of enriched fecal samples with serogroup-specific beads and plating bead suspension onto selective media and screening colonies by PCR. Pre-enriched fecal samples were subjected to three mqPCR assays and cycle threshold values were recorded and concentrations were determined based on a standard curve. **RESULTS**: qPCR detected more positive samples than cPCR and culture method. Few samples which were negative by qPCR were positive by cPCR and culture method. Concentration of serogroups ranged from 4-7 log CFU/g feces and virulence genes ranged from 4-10 log CFU/g feces. **CONCLUSION**: The three qPCR assays are sensitive diagnostic tools for the detection and quantification of seven major *E. coli* serogroups and three virulence genes in cattle feces.

HOST RANGE FUNCTIONS OF VACCINIA VIRUS E3L AND K3L ARE MEDIATED BY SPECIES-SPECIFIC INHIBITION OF PKR

Sherry L. Haller[1], Chen Peng[1], Loubna Tazi[1], Tatiana G. Senkevich[2], Bernard Moss[2], and Stefan Rothenburg[1]

[1]*Division of Biology, College of Arts and Sciences;* [2]*Laboratory of Viral Diseases, NIAID, National Institutes of Health, Bethesda, MD*

BACKGROUND AND PURPOSE: Poxviruses exhibit wide variation in host range with some infecting a single host species, while others, such as vaccinia virus (VACV), have a broad host range and can infect multiple species. Protein kinase R (PKR) is an antiviral protein that suppresses general translation during virus infection and whose rapid evolution is attributed to its interactions with several viral inhibitors. VACV encodes two inhibitors of PKR: E3L and K3L, which both have been identified to possess host range function. **METHOD:** To determine the molecular basis for the host range function of E3L and K3L, we used a luciferase reporter transfection system in a line of HeLa cells deficient in PKR, virus infection assays and detection of PKR phosphorylation of eIF2□ to measure interactions between E3L and K3L and PKRs from different rodent and hamster species. **RESULTS:** Our results show a surprising variability in the sensitivity of PKR from closely related species to both E3L and K3L. We found that PKR from Syrian and Chinese hamsters are sensitive to inhibition by K3L, while Armenian hamster PKR is resistant to K3L but sensitive to inhibition by E3L. In addition, infections of different species' cells with VACV lacking E3L and/or K3L showed a correlation between the sensitivity of each species' PKR to E3L or K3L and replication of the VACV mutants and the phosphorylation of eIF2□. **CONCLUSION:** Our results show that the host range function of E3L and K3L can be explained by species-specific differences in the sensitivity of PKR to these VACV inhibitors.

MATRIX METALLOPROTEASE-8 ASSAY FOR MASTITIS DIAGNOSTICS IN DAIRY CATTLE

Madumali Kalubowilage[1], Thilani Samarakoon[1], Hongwang Wang[1], Deryl Troyer[2], and Stefan Bossmann[1]
[1]*Department of Chemistry, College of Arts and Sciences;* [2]*Department of Anatomy and Physiology, College of Veterinary Medicine*

BACKGROUND AND PURPOSE: Mastitis in dairy cattle is a continuous, inflammatory reaction of the udder tissue, caused by bacteria. This is the most common and potentially fatal disease in dairy cattle in the United States. Matrix Metalloprotease-8 is mainly produced by neutrophils and associated with many inflammatory conditions. A protease assay was developed and tested for MMP-8 in the milk samples of Mastitis infected cattle. **METHOD:** The assay was prepared with dopamine coated iron/iron oxide nanoparticles, cyanine 5.5 and a tetrakis-carboxyphenyl-porphyrin (TCPP) tethered enzyme-selective peptide sequence. Upon the cleavage of oligopeptide by the enzyme, the signal from the released TCPP was monitored using fluorescence spectroscopy. Triton X-100, a non-ionic surfactant that has a hydrophilic polyethylene oxide chain, is used to obtain an enhanced fluorescence signal. Fluorescence measurements were compared with the somatic cell counts and the Dynamic Light Scattering measurements of the milk samples. RESULTS: Two sets of milk samples were tested with low somatic cell counts and high somatic cell counts. Samples with high somatic cell counts gave large fluorescence signals compared to the samples with low somatic cell counts. Addition of Triton X-100 to the sample mixture enhances the fluorescence signal. CONCLUSION: MMP-8 assay can be used to identify the milk samples with low somatic cell counts and high somatic cell counts according to the intensity of the fluorescence signal. High somatic cell count is indicative of early mastitis. The assay was successfully employed to identify early mastitis infection, when the disease is treatable.

CULTURE- AND PCR-BASED METHODS FOR DETECTION AND QUANTIFICATION OF SHIGA TOXIN-PRODUCING *ESCHERICHIA COLI* O157 IN CATTLE FECES

Lance W. Noll, Pragathi B. Shridhar, Diana M. Dewsbury, Xiaorong Shi, Natalia Cernicchiaro, David G. Renter, and T.G. Nagaraja
Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine

BACKGROUND AND PURPOSE: Shiga toxin-producing *E. coli* O157, a major foodborne pathogen, colonizes the hindgut of cattle and is shed in the feces, which serves as a source of contamination of food and water. Cattle that shed the organism at high concentration (> 1,000 cells/g), called 'super shedders', are responsible for increased transmission and contamination. Our objectives were to compare the detection of *E. coli* O157 in cattle feces by conventional PCR (cPCR), culture method and multiplex quantitative PCR (mqPCR), and compare quantification of *E. coli* O157 by mqPCR and spiral-plate method. **METHOD:**
Fecal samples (n=576) were suspended in *E. coli* broth and enriched for 6 hours at 40 C. Fecal suspensions before enrichment were subjected to mqPCR and spiral-plate methods to quantify *E. coli* O157. Fecal suspensions after enrichment were subjected to cPCR, mqPCR, and culture method to detect *E. coli* O157. **RESULTS/FINDINGS:** A higher proportion of fecal samples were positive for *E. coli* O157 by mqPCR (517/576; 89.8%) than by cPCR (315/576; 54.7%) or culture-based method (247/576; 42.9%). Fecal samples that were quantifiable for O157 by mqPCR (62/576; 10.8%) were at concentrations ≥ 10,000 cells/g of feces. Only 4.5% (26/576) of samples were positive by spiral-plate method, with the majority (17/26; 65.4%) at concentrations below 1,000 cells/g. **CONCLUSION:** Our data indicate that mqPCR is superior to cPCR and culture-based methods for the detection of *E. coli* O157 in cattle feces. However, spiral plate-method may be necessary to quantify *E. coli* O157 when present at concentrations < 10,000 cells/g in cattle feces.

WITHDREW*

DEVELOPMENT OF RIFT VALLEY FEVER VIRAL PROTEIN TARGETS FOR LUMINEX BEAD-BASED SUSPENSION ASSAY

Rachel Palinski[1], William Wilson[2], Scott McVey[2], and Raymond Rowland[1]
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BACKGROUND AND PURPOSE: Rift Valley Fever Virus (RVFV), a zoonotic virus discovered in 1931, is an important health concern in sheep, cattle and humans. Assays directed towards surveillance and differentiation of naturally infected or vaccinated animals (DIVA) are needed for detection of RVFV. We have developed a Luminex magnetic bead-based assay for the detection of RVFV antibodies towards the nucleocapsid (N), glycoprotein N (Gn), non-structural protein S (NSs) and portions of the polymerase. Furthermore, these assay targets can be improved through the development and addition of protein targets that will allow for the assay to function as a DIVA. **METHOD:** Half-protein DNA segments were amplified with PCR out of full-length DNA and cloned into the pHUE vector for bacterial expression. Purification was performed on a Ni affinity matrix and assessed via SDS-PAGE and Western Blot. Polypeptides were then coupled to polysystrene magnetic bead sets for analysis on the Luminex Magpix reader. **RESULTS/FINDINGS:** All protein segments produced products of expected sizes. Bands were visualized via SDS-PAGE gel and verified through Western blot. Immunoreactivity was assessed by comparison of MFI values to standard controls. **CONCLUSION:** Viral segments that elicit antibody responses can be incorporated into our RVFV Luminex assay for higher specificity of detection and as possible DIVA targets.

THE EFFECTS OF PREBIOTIC SUPPLEMENTATION ON PERFORMANCE AND IMMUNE RESPONSE OF HOLSTEIN CALVES DURING THE COMMINGLING PHASE

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BACKGROUND AND PURPOSE: Dairy calves are typically housed in individual hutches from birth to approximately 7 weeks of age to reduce the risk of horizontal disease transmission and for individual feeding and monitoring. Once these calves are weaned from milk, they are transferred into group-housed pens. During this "commingling" stage, calves are introduced to novel microbes from their new environment and from their peers, increasing their risk of disease. We speculate that introducing calves to beneficial microbes before they are commingled will help in their defense against the novel, potentially pathogenic microbes and minimize the risk of disease. One way we can do this is by supplementing their diet with prebiotics or yeast cell wall components that provide nutrients to the beneficial microbes in the digestive system. **METHOD:** Ninety, weaned Holstein calves were fed prebiotic supplementation A, B, or control for one week prior to commingling into groups of 3 within treatment through 49 days of age. Blood samples were taken on day 0, 14, 21, and 49 of study and assessed for innate and acquired immune function. Body weight was measured weekly and feed intake measurements and health scores taken daily. **RESULTS:** Feeding prebiotics modulated calves' neutrophil function during the commingling phase. **CONCLUSION:** Modulation of neutrophil function indicate that innate immunity is altered in calves receiving prebiotics. These findings are congruent with research conducted in other species. Thus far, data indicate prebiotics may help calf-health during commingling.

HOST-SPECIFIC INHIBITION OF RABBIT PKR BY MYXOMA VIRUS M156 AND CHARACTERIZATION OF A LOSS-OF-FUNCTION MUTATION IN AUSTRALIAN MYXOMA VIRUS ISOLATES

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BACKGROUND AND PURPOSE: PKR is an important antiviral kinase in vertebrates, which evolves rapidly due to positive selective pressure exerted by viral antagonists. Positively selected sites in the PKR kinase domain influence PKR sensitivity to the vaccinia virus (VACV) pseudosubstrate inhibitor K3. In order to explore the importance of PKR-pseudosubstrate inhibitor interactions in a well-defined host-virus system, we studied the interactions between M156, a K3 ortholog from the rabbit-specific pathogen myxoma virus (MYXV), and rabbit PKR. **METHOD AND RESULTS**: We analyzed the sensitivity of PKR to M156 inhibition in different assays. The results from the yeast and transfection assays show that M156 is an effective inhibitor of rabbit PKR but not of PKR from other mammals. These results correlate well with MYXV and VACV infection assays of HeLa cells in which the endogenous PKR was stably knocked down, and stably reconstituted with knock-down resistant human or rabbit PKR. Both human and rabbit PKR suppressed replication of a VACV strain that lacks the PKR inhibitors K3 and E3. In contrast, replication of MYXV was only suppressed by human but not rabbit PKR. Interestingly, a natural mutation in M156 (L98P), which is found in some completely sequenced MYXV field isolates from Australia, abolished the PKR inhibitory capability of M156. This loss-of-function mutation might thus contribute to the attenuation of MYXV in the field. **CONCLUSION**: In conclusion, inhibition of PKR by the MYXV pseudosubstrate inhibitor M156 is host species-specific and the efficacy of PKR inhibition by MYXV may correlate with MYXV host range and virulence.

VECTOR COMPETENCE OF HOUSE FLIES (*Musca domestica* L.) FOR NON O157 SHIGA TOXIGENIC *Escherichia coli*

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BACKGROUND AND PURPOSE: Shiga-toxin producing *Escherichia coli* (STEC) are important food-borne pathogens worldwide. Cattle are an asymptomatic reservoir of STEC and bacteria are released to the environment in cattle feces. House flies (HF) can potentially spread STEC among cattle and to the surrounding urban environment. It has been shown previously that HF carried *E. coli* O157:H7 and were able to transfer these bacteria to cattle and their feed and water. The objective of this study was to assess the vector competence of house flies for seven non-O157 STEC serotypes (O104, O26, O45, O145, O103, O121, and O111) under laboratory condition. **METHODS:** Three days old adult house flies from the laboratory colony were starved for two hours and then exposed to the inoculum (10^7 CFU/ml of PBS) of each STEC-7 with rifampicin resistance marker for 2 hours. Ten HF were then randomly selected, surface sterilized, and homogenized in PBS on day 0, 1, 3, and 6. The homogenate was spread plated on MacConkey and MacConkey + rifampicin (100mg/l). Colony forming units (CFU) on each plate were counted after overnight incubation at 37^{o}C. **RESULTS**: Preliminary bioassays indicate that HF can carry STEC for at least 6 days. Typically, the abundance of non O157 STEC decreased sharply within the first 24 hours (except O104) and then stabilized at ~10^2-10^3 CFU per fly. Replications of these bioassays are currently in progress. **CONCLUSIONS**: House flies likely play an important role in the ecology of STEC in the agricultural and possibly in the urban environment.

CROCODILEPOX VIRUS PROTEIN 157 IS AN INHIBITOR OF PROTEIN KINASE R

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BACKGROUND AND PURPOSE: Crocodilepox virus (CRV) is the sole known member of the genus *Crocodylidpoxvirus*, which belongs to the *Poxviridae* family. CRV mainly infects hatchling and juvenile crocodiles. Most poxviruses possess inhibitors of the host antiviral protein PKR, which is activated by viral double-stranded (ds) RNA formed during virus infection. CRV lacks orthologs of known poxviral PKR inhibitors and it is thus unknown how CRV can evade the antiviral effects of PKR. **METHODS:** Using database searches, we identified a CRV protein (open reading frame 157) that contains a predicted dsRNA-binding domain and analyzed the PKR-inhibitory effects of CRV-157 and CRV-157 mutants on PKR in transfection assays using a luciferase reporter. **RESULTS:** CRV-157 inhibited the activity of mouse and chicken PKR and mutations of residues that were predicted to be important for dsRNA binding abolished its ability to inhibit PKR. The dsRNA-binding domain of CRV-157 is most closely related to that found in bacterial ribonuclease III proteins and thus evolved independently from other poxvirus PKR inhibitors. **CONCLUSIONS:** The ability of CRV-157 to inhibit PKR and its independent evolution indicates that PKR inhibition might be crucial for CRV replication and that poxvirus PKR inhibitors evolved from a diverse set of ancestral genes, which constitutes an example for convergent evolution.

DETERMINING GROWTH PERFORMANCE IMPLICATIONS ON MEAT GOAT KIDS FED SOYBEAN HULL OR CORN BASED PELLETED DIETS

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BACKGROUND AND PURPOSE: The meat goat industry is rapidly expanding with limited knowledge on feeding market kids. This study investigated an alternative energy source to corn for a growing kid ration. **METHOD:** Eighty-four Boer × Spanish kids (30 kg; 8 mo) were in a randomized complete block design to determine soybean hulls effect on growth performance and blood serum mineral composition. Kids were blocked by sex and randomly assigned to either: 1) corn and soybean meal based pellet (Corn) or 2) soybean hull and soybean meal based pellet (Soyhull). Feed was delivered once daily with daily adjustments to maintain ad libitum intake of pellets and brome hay for 70 d. Body weights were recorded every 2 weeks. Daily feed samples were analyzed for DM, Ash, N, NDF, and ADF. Blood samples were taken on d0, d28, and d70 and analyzed serum for Na, K, Cl, Ca, P, and Mg. **RESULTS/FINDINGS:** Initial body weight was similar ($P = 0.24$) between treatments. Body weights remained similar ($P \geq 0.12$) between treatments for each weigh date for the entire 70-d feeding period. Overall gain and ADG were not different ($P \geq 0.18$) between treatments. Kids consuming the Soyhull diet had greater ($P \leq 0.001$) DMI than the Corn diet. Overall DMI averaged 1.37 $kg \cdot hd^{-1} \cdot d^{-1}$ for Soyhulls versus 1.06 $kg \cdot hd^{-1} \cdot d^{-1}$ for Corn. No differences ($P \geq 0.44$) were observed for serum mineral composition between treatments. **CONCLUSION:** Based on these results soybean hulls are a viable alternative feed source to corn for growing meat goats when protein requirements are met.

GONADOTROPIN RELEASING HORMONE TREATMENT OF LACTATING DAIRY COWS EXPOSED TO SUMMER HEAT STRESS BEFORE FIRST ARTIFICIAL INSEMINATION

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BACKGROUND AND PURPOSE: Steady declines in reproductive efficiency and fertility of lactating dairy cows has occurred during the past 60 years, especially during heat stressors associated with summer. Quality of oocytes produced by the ovary is environment-dependent during the time of their development, with concentration of progesterone being one important factor. We hypothesized that treating lactating dairy cows with gonadotropin releasing hormone (GnRH) before a treatment regimen to induce estrus would: (1) induce ovulation; (2) increase plasma progesterone concentration before artificial insemination; and (3) improve fertlity during summer. **METHODS:** Lactating Holstein cows (n = 990) were assigned randomly to either treatment with GnRH or no treatment 7 days before an estrus-synchronization protocol. Blood samples were collected before GnRH injection and 7 days after treatment to determine plasma progesterone concentrations. Ovulatory response to the GnRH treament was determined by transrectal ultrasonography. **RESULTS/FINDINGS:** Cows treated with GnRH had a greater ($P < 0.001$) ovulatory response than controls. Among noncycling cows, GnRH treatment increased ($P < 0.02$) plasma progesterone concentration. **CONCLUSION:** Treating cows with GnRH before a protocol that is widely used in the dairy industry to synchronize estrus increased plasma progesterone concentration before artificial insemination, and may improve reproductive efficiency of lactating dairy cows during summer months. Effect of treatment on fertility was assessed in this study and is currently being evaluated.

REFERENCE GROUP THEORY AND EMERGING ADULTS' SEXUAL BEHAVIORS

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BACKGROUND AND PURPOSE: Americans are exposed to varying and often conflicting messages about sex. Previous scholarship has revealed religious ideologies, parents, the media, and peers to be significant sources of information for American teens about sex and sexuality. Through the framework of reference group theory, the current study examined whether religious leaders, parents/caregivers, or peers act as a more communicative source of information about sex for emerging adults. Further, it was assessed to what degree religiosity is still a reliable predictor for previous sexual behaviors. **METHOD:** By accounting for perceptions of relational closeness with each referent group, the analysis had 116 participants from a large Midwestern university complete a cross-sectional survey. **RESULTS/FINDINGS:** Significance was found with religious leaders and peers – with religious leaders being the most significant – while religiosity still stands as a salient influence on emerging adults' sexual behaviors. **CONCLUSION:** The findings support reference group theory and assist in clarifying who young adults perceive to receive the most messages about sex and to what extent their sexual behaviors match those message sources.

FACTORS ASSOCIATED WITH EMOTIONAL AND BEHAVIORAL RESPONSES TO AMBIGUOUS SOCIAL INTERACTIONS IN WHICH REJECTION MAY (OR MAY NOT) BE PERCEIVED

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BACKGROUND AND PURPOSE: The present study was designed as an extension of a prior investigation (Barnett, Nichols, Sonnentag, & Wadian, 2013) that focused on individual difference variables associated with adolescents' responses to ambiguous teases. In this prior investigation, adolescents' negative experiences with and negative attitudes toward teases were found to predict negative emotional and behavioral responses to ambiguous teases. The purpose of the present study was to examine the extent to which undergraduates' experiences with and attitudes relevant to rejection may be associated with their emotional and behavioral responses to social situations in which rejection *could* be inferred. **METHOD:** A total of 201 undergraduate students completed questionnaires that assessed their experiences with, and attitudes relevant to, being rejected. Next, each participant read six scenarios that described various situations that could be interpreted as interpersonal rejection. Following each scenario, the undergraduates completed a questionnaire that assessed their emotional response to the hypothetical situation and their behavioral responses to the individual in the situation. **RESULTS:** A series of correlations and path analyses revealed that the participants' experiences with rejection (and, to a lesser extent, their rejection-relevant attitudes) were associated with a negative emotional response to the ambiguous situations which, in turn, was associated with negative behavioral responses to the other individual in those situations. **CONCLUSION:** The results suggest that when another individual's interpersonal behavior has an uncertain intent, undergraduates' prior experiences with rejection may be especially important in determining the extent to which they feel and act as if they have been rejected.

ALCOHOL CONSUMPTION AND STD'S AMONG COLLEGE STUDENTS

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BACKGROUNG AND PURPOSE: Alcohol consumption and the risk of sexually transmitted diseases (STDs) are two social and health problems that impact young adults (CDC, 2013). Moreover, alcohol consumption is a global problem which accounts for 3.3 million deaths yearly due to the net effect of harmful use of alcohol (WHO, 2014). **PURPOSE**: The current study examined the risk perceptions of alcohol consumption and STDs among college students and the extent to which they perceive themselves as capable of preventing the two health problems. **METHOD:** A sample of 105 undergraduate and graduate students aged 18-25years was randomly selected from various departments and colleges to participate in the 17-item survey, which was administered through Qualtrics, a confidential K-State online survey system. Key variables based on the social cognitive theory included: environmental factors, self-efficacy toward alcohol consumption and STD's, perceived knowledge about STDs and alcohol, risk perception toward alcohol and STDs and demographics. **RESULTS:** High perceived efficacy for alcohol consumption among participants were found with no significant difference between male and female drinking habits but a significant difference in their perceptions of being able to control their alcohol intake ($p = .05$). Majority of students were less knowledgeable about STDs and about 75% of females compared to 24.49% males indicated confidence about carrying a condom on a date and using them to prevent STD infection. **CONCLUSION:** Results indicate individuals have the ability to control their alcohol intake, but lack literacy about alcohol and STDs. Accordingly, increasing STD education among college students in the context of alcohol consumption is needed.

FAMILY-OF-ORIGIN, RELATIONSHIP SELF-REGULATION, AND ATTACHMENT IN MARITAL RELAITONSHIPS

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BACKGROUND AND PURPOSE: Relationship maintenance skills are specific behaviors and abilities in marital relationships that help couples maintain stable and healthy marriages over time. Couples often pursue marital therapy because of problems with their relationship maintenance processes. Family background experiences of each partner contribute to the way couples use these maintenance skills, whether positively or negatively. Thus, it is important to understand factors that impact the way family background experiences contribute to relationship maintenance processes. With this knowledge, therapists can intervene and help couples develop health relationship maintenance processes. The purpose of our study is to explore the impact that emotional intimacy (attachment) behaviors between spouses impacts the relationship between negative family background experiences and couple relationship maintenance skills. **METHOD:** We analyzed survey data from 261 heterosexual married couples in a statistical method known as Actor Partner Interdependence Modeling, which allowed us to examine spouses individually and as partnerships in order to enrich our understanding of both the individual processes and couple dynamics involved in these processes. **RESULTS/FINDINGS:** Spouses who reported negative family background experiences demonstrated poorer relationship maintenance skills and lower emotional intimacy behaviors in their marriages. However, if spouses reported negative family background experiences, but also reported high levels of emotional intimacy (attachment) behaviors in their marriages, their relationship maintenance skills were not negatively affected. **CONCLUSION:** Therapists may want to consider using attachment-based treatments focused on emotional intimacy to address couple issues relating to relationship maintenance skills. We have included an appropriate treatment approach that fits with our findings in our discussion.

HOUSEHOLD DIETARY DIVERSITY AND CHILD STUNTING IN EAST JAVA, INDONESIA

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BACKGROUND AND PURPOSE: Nearly one third of children under five in the developing world are stunted. Stunted children with poor nutrient intake are at risk of irreversible cognitive impairment. To reduce child stunting, the World Health Organization has highlighted the importance of providing a supportive nutritional environment including a diverse diet during the first 1,000 days of life. The purpose of this study was to determine the relationship between dietary diversity and child stunting in Indonesian context. **METHOD:** Dietary diversity was assessed using maternal-reported checklist of 12 food groups summed as Household Dietary Diversity Score (HDDS). Stunting was defined as <-2.0 height-for-age Z-score (HAZ) by WHO-Anthro 2005. Trained interviewers administered the HDDS to 768 households with children aged <5 years in East Java, Indonesia. Logistic regression models were constructed to test the association between HDDS and child stunting. **RESULTS/FINDINGS:** Results showed that the prevalence of child stunting was 39.4% and consumption of dairy products, fruit, and meat/poultry were limited. The unadjusted model revealed that higher HDDS scores were associated with lower likelihood of child stunting (OR=0.885; 95%CI=0.799–0.980). This relationship remained significant after adjustment with family size, maternal literacy, food expenditure, breastfeeding status, total energy intake, and protein intake (OR=0.892; 95%CI=0.802–0.993). **CONCLUSION:** These results, from an Indonesian context, confirm the widely observed protective relationship between dietary diversity and child stunting. Hence, population interventions should focus on promoting food groups currently lacking in the maternal and child diet, including those rich in growth-promoting nutrients such as dairy, meat, and poultry.

A META-ANALYTIC CROSS CULTURAL COMPARISON OF RISK MARKERS FOR MALE PERPETRATION OF INTIMATE PARTNER VIOLENCE

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BACKGROUND AND PURPOSE: Over the past few decades, there has been a movement towards identifying risk markers of intimate partner violence (IPV) to encourage preventative interventions (e.g., Stith, 2008; Schafer, Caetano, & Cunradi, 2004). The majority of IPV research originates from the United States (U.S.) and has neglected to examine cultural influences on IPV risk markers. Cultures around the world have differing values and beliefs about relating to others, and these differences may affect which factors are related to IPV. **METHOD:** Over 13,000 research articles from 1969-2012 were gathered using research search engines and keyword searches. Articles had to be in English and have male perpetration of IPV as the outcome. The articles were subjected to exclusion criteria resulting in 903 effect sizes (ES) from 303 studies. Hofstede's individualism scale (Hofstede and Minkov, 2010) was used to group countries as individualistic or collectivistic. Because the U.S. accounted for the majority of individualistic studies three groups were made: U.S., international individualistic, and collectivistic. **RESULTS/FINDINGS:** Emotional abuse was the strongest of eleven risk markers (r =.51). Overall, all risk markers had significant associations with male perpetration of IPV. Collectivistic and U.S. groups had similar ES, while the U.S. had larger ES than the international individualistic countries. Multiple risk markers significantly differed between groups such as emotional abuse ($Q^b(2) = 11.79$, $p < .001$). **CONCLUSION:** Culture appears to play a role in determining the strength of IPV risk markers; more research outside the U.S. is needed in order to further elucidate impact of culture on assessing risk and preventing IPV.

USING STORYBOOKS TO IMPROVE YOUNG CHILDREN'S ATTITUDES TOWARD OBESE PEERS: ROLE OF STORYBOOK CHARACTER'S POPULARITY AND CHILDREN'S POPULARITY

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BACKGROUND AND PURPOSE: The present study was designed as a replication and extension of a prior investigation (Wadian, Barnett, & Sonnentag, 2013) that demonstrated that children's negative anticipated response to a hypothetical obese peer can be effectively mitigated by reading them a storybook in which an unstigmatized boy interacts with the obese peer. **METHOD:** A total of 146 third- and fourth-grade students were asked to complete a measure assessing their attitudes toward obese peers (and other peers with undesirable characteristics) before and one week after being read a storybook that described a relatively popular (or unpopular) boy (named Dan) interacting with an obese boy (named Mitch). The children's popularity was assessed using a sociometric rating form completed by all of the children in each classroom who had parental permission to participate. **RESULTS AND CONCLUSION:** The children anticipated responding more favorably to Obese-Mitch after Dan was described as having associated with him, thereby replicating the destigmatization by association effect found in our prior study. Further, regression analyses revealed that the more similar in popularity the children were to Dan, (a) the more favorably they anticipated responding to Obese-Mitch (especially in the Unpopular-Dan condition) and (b) the more the children displayed a positive change in their general attitudes toward obese peers (in the Popular-Dan condition only). The latter finding is consistent with research indicating that perceiving oneself as similar to an individual who befriends a stigmatized out-group member may contribute to having more favorable attitudes toward members of that stigmatized group.

INFLUENCE OF NITROGEN FERTILIZER SOURCE AND RATE ON BUFFALOGRASS DIVOT RECOVERY

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BACKGROUND AND PURPOSE: Buffalograss [*Buchloe dactyloides* (Nutt.) Engelm] is a low maintenance turfgrass that utilizes less water compared to other common turfgrass species, often making buffalograss desirable for use in golf courses fairways. However, due to its slow growth habit there is concern for divot recovery when injured from a golfer's club impacting the turfgrass during a swing. Limited research has been conducted to explore the influence of fertility on divot recovery in buffalograss golf course fairways. The objective of this study was to determine if nitrogen sources and rates influenced divot recovery in buffalograss. **METHOD:** Research trials were initiated in 2014 at the Rocky Ford Research Center (RF) in Manhattan, KS and Council Grove Country Club (CG) in Council Grove, KS. Three divots were installed per plot using a modified edger. Treatments were arranged in a two × four factorial, randomized complete block design with four replications. Factors consisted of two nitrogen sources; a quick release (46-0-0) urea and a (43-0-0) 120 day controlled release polymer coated urea and four nitrogen rates; 0, 1, 2, and 3lb N/1,000ft^2. Digital image analysis and percent visual recovery data for each individual divot was collected weekly. **RESULTS AND CONCLUSION:** Data indicated that both slow and quick release nitrogen sources, regardless of application rate, increased speed of buffalograss divot recovery compared to 0lb N/1000ft^2 treatments. These results will provide golf course superintendents with the best nitrogen management strategy for use of buffalograss on golf course fairways.

ENHANCING WINTER AESTHETICS OF ZOYSIAGRASS WITH COLORANTS

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BACKGROUND AND PURPOSE: Zoysiagrass (*Zoysia japonica*) is a warm-season (C4) turfgrass that requires less water and fewer cultural inputs than cool-season (C3) grasses, but its widespread use by homeowners may be limited because of its brown color during winter dormancy in Kansas. Turf colorants are an option for improving zoysiagrass color during dormancy. Our objective was to evaluate colorants applied in autumn at three application volumes on persistence of color through the dormancy period. **METHOD:** Field studies were conducted in Manhattan and Haysville, KS from October 2013 to May 2014 on dormant 'Chisholm' zoysiagrass. The colorants Green Lawnger, Endurant, and Wintergreen Plus were applied in October in solutions with water at 80, 160, or 240 gallons per acre (GPA) at a 1:6 dilution (colorant:water). **RESULTS/FINDINGS:** Intensity and duration of acceptable color (i.e., a rating $\geq$ 6) of each colorant product increased with application volume. In general, applications at 80 GPA provided acceptable color for 8 to 14 weeks after treatment (WAT); 160 GPA provided acceptable color for 10 to 20 WAT; and 240 GPA provided acceptable color for 16 to 26 WAT. Compared to tall fescue (C3 control), zoysiagrass treated with colorants had significantly higher color ratings between 8 and 24 WAT at 80 GPA; 6 to 26 WAT at 160 GPA; and 4 to 26 WAT at 240 GPA. Green Lawnger and Endurant resulted in a dark-green turf color, whereas Wintergreen Plus resulted in a blue-green color. **CONCLUSION:** Intensity and duration of acceptable color of zoysiagrass can be enhanced by increasing application volume of colorants.

HOW SUGARCANE ETHANOL EXPANSION IMPACTS THE BRAZILIAN CERRADO LAND USE: INTENSIFICATION OR EXTENSIFICATION?

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BACKGROUND AND PURPOSE: The Brazilian Cerrado is a global biodiversity hot-spot due to its rich and endemic biodiversity and to the conversion of Cerrado to agricultural use. Nevertheless, the region has witnessed the expansion of sugarcane to produce ethanol. Since 2005, 40 new ethanol mills started to operate in the region, increasing sugarcane producing area from 0.3 million ha to 1.2 million ha of land in 2012. The rapid development of sugarcane in the region has promoted a discussion over the impact of sugarcane production on land use in the Cerrado. If on the one hand, researchers are concerned that sugarcane expansion is driving non-cropland into production ("extensification" response) with potentially severe impacts on the local environment. On the other hand, researchers argue that sugarcane is expanding due to crop shifts ("intensification" response). The purpose of this paper is to examine the intensification or extensification of sugarcane production due to the increase in the ethanol production. **METHOD:** To achieve this goal, we analyze the evolution of sugarcane producing areas in the states of Goiás and Mato Grosso do Sul, for the period of 2005 to 2012. Our analysis employs a spatial regression model considering how land use response in each area is influenced by the distance to mills, agricultural factors, and infrastructure. **RESULTS AND CONCLUSION:** Our preliminary results indicate that sugarcane expansion has promoted both intensification and extensification by converting cropland and pasture. The examination of land use response will support the discussion over the impact of sugarcane indicating which response has a higher probability to occur.

EVALUATION OF SECONDARY AND MICRONUTRIENT FOR SOYBEAN PRODUCTION IN KANSAS

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Background and objectives: Secondary and micronutrients are being increasingly studied for their potential to contribute to yield increase. The purpose of this study was to evaluate soybean response to secondary and micronutrient fertilizer application to maximize yields. **Methodology:** A randomized complete block design was established with four replications, at five locations during 2013 and five locations in 2014. Treatments consisted of micronutrient fertilizers as individual nutrient for B, Cu, Mn, S and Zn, in addition to a mix of these nutrients using two different placements (dry broadcast and liquid band). Soil samples were collected prior to planting and after harvest. Soybean trifoliates were collected at R2-R3 stage and analyzed for the micronutrients evaluated in this study. At harvest, nutrient concentration was analyzed in the seed and yield was calculated at 13% moisture. **Results and conclusion:** No significant difference was found in yields between treatments by location and across locations. Results from tissue and grain analysis showed significant treatment effect on Zn concentration across locations. Soil test changes were observed with fertilizer application. However, no clear difference between individual nutrients and blend of nutrients. Tissue sample analysis show a significant effect of fertilizer application for Cu, Mn, and Zn. Seed sample only show a significant effect for Zn.

COMPOSITIONAL CHANGES IN MEMBRANE LIPID PROFILE THAT ARE ASSOCIATED WITH HIGH TEMPERATURE TOLERANCE IN WHEAT

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BACKGROUND AND PURPOSE: High temperature is a major environmental factor that limits wheat productivity. Climate models predict greater increases in night-time temperatures than in daytime temperatures. Cell membranes are one of the prime targets of high temperature stress in plants. The objectives of this study were to quantify the effects of high daytime and night-time temperatures during flowering on membrane lipid profile and to identify the lipids that are associated with high temperature tolerance in wheat genotypes. **METHOD:** Winter wheat genotypes (Ventnor, heat tolerant and Karl 92, heat susceptible) were grown at optimum temperatures (25/15°C, maximum/minimum) until the onset of flowering. Thereafter, plants were exposed to high night-time (25/24°C), high daytime (35/15°C), high daytime and night-time (35/24°C), or optimum temperatures for 12 days. Membrane lipids were quantified on days 1, 6, and 12 during the stress period and day 4 during the recovery period. **RESULTS:** High temperatures resulted in significant changes in the amount of plastidic and extra-plastidic lipid species and lipids with oxidized acyl chains. High temperature resulted in a decrease in the degree of unsaturation in the lipid profile due to an increase in the amount of less unsaturated lipids and a decrease in the amount of more unsaturated lipids. The heat tolerance of Ventnor was associated with increased amounts of sterol glycosides and acylated sterol glycosides and decreased amounts of highly unsaturated plastidic and extraplastidic glycerolipids. **CONCLUSION:** This study suggests that compositional changes in lipid profile in response to high temperature stress contribute to heat tolerance, and provides potential biomarkers for heat tolerance.

PHYSIOLOGICAL RESPONSES OF SOUTH AFRICAN TREE SEEDLINGS TO DROUGHT AND NIGHTTIME FREEZING

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BACKGROUND: In southern Africa, the distribution of Mopane and *Acacia-Combretum* savannas are determined by strong latitudinal gradients in temperature and water availability. However, the physiological mechanisms constraining these distributions are currently unknown. Our goal was to characterize differences in drought and cold tolerance among Mopane seedlings and coexisting woody species. **METHODS:** *Colophospermum mopane, Combretum apiculatum, Acacia nigrescens* and *Cassia abbreviata* seedlings were grown in a greenhouse under well-watered and water-stressed conditions. Nine-month-old seedlings were then transferred to an environmental growth chamber and exposed to three consecutive nighttime freezing events where the temperature in the chamber was slowly reduced to -5°C each night. Physiological traits were measured on each individual before and after each freezing event, and following a one-week recovery period. **RESULTS:** We found significant differences in response to water-stress and freezing among species. In general, *C. mopane* was more drought-tolerant but also more cold-intolerant compared to the other species. Nighttime freezing reduced photosynthetic rates similarly across all species and water treatments, but *A. nigrescens* and *C. abbreviata* almost fully recovered after one week. Conversely, *C. mopane* photosynthetic rates did not recover after one week and this was associated with a greater loss in leaf hydraulic conductivity and leaf water potential compared to other species. Thus, cold-intolerance of *C. mopane* is likely associated with freezing-induced loss of hydraulic function. **CONCLUSION:** These results provide mechanistic evidence describing *C. mopane*'s historic distribution in warmer, drier regions, and can be used in landscape models predicting savanna community compositional changes in the future.

FERTILIZER PLACEMENT AND TILLAGE INTERACTION IN CORN AND SOYBEAN PRODUCTION

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BACKGROUND AND PURPOSE: Different tillage systems can affect the availability of phosphorus (P) in the soil. The objective of this study was to evaluate the effects and interaction of fertilizer placement, tillage, and varieties/hybrids for corn and soybean. **METHOD:** The experiment was established at two locations in Kansas in 2014. The experimental design was a factorial in a randomized complete block with four replications. Three fertilizer treatments were combined with two tillage systems and two varieties/hybrids of soybean and corn selected based on contrasting root systems. Plant tissue samples were collected during the vegetative and reproductive stages to evaluate P concentration, P uptake and dry matter. **RESULTS/FINDINGS:** Significant differences were found in the parameters by locations for corn and less consistent effects on soybean across locations. For corn, the interaction of no till/deep band/ for hybrid P1151AM showed the highest P uptake and dry matter at V-10 growth stage. **CONCLUSION:** All the parameters evaluated in this study were affected by the fertilizer placement, tillage system and variety/hybrid in both soybean and corn over the growing season.

PATCH-BURN GRAZING PROMOTES POLLINATOR DIVERSITY IN FLINT HILLS RANGELANDS

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BACKGROUND AND PURPOSE: North American rangelands are managed primarily for livestock production, yet they have enormous potential to conserve native biodiversity while maintaining livestock productivity. Although pollinators are critical to the maintenance of healthy rangelands, livestock production, ecosystem services, and economies, they are a group of wildlife of greatest conservation concern that would benefit directly from changes in current rangeland management practices. Patch-burn grazing is a rangeland management practice that maintains cattle production metrics while increasing wildlife habitat heterogeneity. **METHODS**: This study examines the response of native pollinator species richness and abundance in cattle pastures throughout the Flint Hills ecoregion to traditional rangeland management practices as compared to patch-burn grazing. **RESULTS AND CONCLUSIONS**: Results indicate a twofold increase in relative pollinator abundance in patch-burn grazing pastures as compared to annually burned and grazed pastures, which is driven by increases in both native bee and butterfly abundance (ps <0.05). Additionally, there is a threefold increase in native bee species richness in patch-burn grazing pastures, as well as a twofold increase in butterfly species richness (ps <0.05). Three grass skippers of greatest conservation concern are only found in patch-burn grazing pastures, and regal fritillary abundance is substantially higher in patch-burn grazing pastures. Lastly, patch-burn grazing has more spatially explicit patches of habitat heterogeneity as measured by vegetative structure and plant species composition (ps <0.05). These findings indicate that patch-burn grazing has significant potential to conserve and restore one of North America's most threatened taxonomic groups of wildlife, native grassland pollinators, with one it's most dominant land-use enterprises, cattle grazing.

WITHDREW*

THE EFFECTS OF CUTTING HEIGHT AND PLANT MATURITY ON YIELD AND NUTRITIONAL VALUE OF SMOOTH BROME FORAGE OVER A TWO YEAR PERIOD

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BACKGROUND AND PURPOSE: A brome pasture was divided into 27 plots (3.05m×4.57m) in a completely randomized design to determine the effect of cutting height (2.54cm, 7.62cm, or 12.7cm) and plant maturity (boot, bloom, seed) on yield and nutritional value. **METHOD:** A strip of forage (0.91m×3.05m) was harvested from each plot and weighed to determine yield. A sample from each strip was collected, dried, and ground then analyzed for DM, Ash, NDF, ADF, and N. **RESULTS:** Both years, yield was greater ($P \leq 0.01$) when brome was cut at 2.54cm. In year 1, cutting height had no effect on nutrition. In year 2, NDF tended ($P=0.06$) to increase as cutting height was reduced. Yield was greatest ($P<0.05$) for brome that was in seed stage. In both years, dry matter content was greatest ($P \leq 0.01$) in seed stage. In year 1, ash content was similar between boot and bloom with both having a greater ($P=0.002$) ash content than seed. In year 2, ash content was higher in seed and boot while being lower in bloom. Both years, NDF and ADF increased with plant maturity, with seed and bloom having a greater ($P<0.01$) fiber content than boot. Crude protein was greatest ($P<0.01$) in boot, bloom, than seed. **CONCLUSION:** More mature brome produced greater yields; however nutritional value was decreased with increasing maturity. Cutting brome at a reduced cutting height in a younger stage of maturity can lead to better yields, but may lead to an increase in fiber content with consecutive years of reduced cutting height.

INSIGHTS INTO COLBALT OXIDE WATER OXIDATION CATALYSTS: PROMOTING A FUTURE BASED ON HYDROGEN FUEL

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BACKGROUND AND PURPOSE: Hydrogen is considered to be a cleaner and sustainable energy alternative for the present carbon based petroleum fuels. If the electricity is generated in a renewable fashion, water electrocatalysis is an efficient way of hydrogen production. The current problem with this is that it uses rare and expensive materials like Pt as electrodes, which makes large-scale deployment seemingly very expensive. Earth abundant transition metal oxides for this purpose have been reported in many occasions as alternatives for these expensive metals. Among them, cobalt oxide, which was recently investigated by Nocera *et al*., has attracted much interest because of its stability, ease of preparation, and its efficiency at neutral pH. This catalyst is proposed to consist of cubane shaped motifs. Very recently, many other catalyst complexes with cobalt cubane motifs have also been reported. **METHOD:** We have investigated the cobalt oxide catalysts theoretically with two molecular cluster models based on suggested experimental structures: a dimer with two cobalt atoms and a cubane motif formed from a dimer of dimers. Hybrid density functional theory was employed to calculate all the possible reaction mechanisms. **RESULTS/FINDINGS:** The lowest energy reaction pathway from the dimer proceeds through a geminal dehydrogenation of a μ-hydroxo moiety. However, the reaction on the cubane core involved a nucleophilic attack of a solvent water molecule to a Co(V)-O surface radical group. **CONCLUSION:** We believe this knowledge is helpful for experimentalists to further enhance and promote the cobalt oxide water oxidation catalyst as a next generation commercially viable electrocatalyst for hydrogen production.

MOLECULAR DYNAMIC SIMULATIONS OF GLYCEROL AND ETHYLENEGLYCOL SYSTEMS

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BACKGROUND AND PURPOSE: Studying the properties of lipids is very important due to their vital role in biological systems. The overall goal of this research is to develop the molecular parameters which accurately describe the structure and the behavior of lipids using computer simulation studies. Here, our approach is to develop parameters for individual components of lipid molecules and then combine these together to provide an overall representation of lipid structure. In this study, our approach to develop parameters for common lipid head groups, ethylene glycol, and glycerol is presented. **METHOD:** Molecular parameters for glycerol-water and ethylene glycol-water mixtures at different compositions are optimized to reproduce the experimental data. In particular, we use the Kirk wood-Buff theory to relate the structure and the thermodynamic properties of the system. **RESULTS AND CONCLUSIONS:** Solvent mixtures reasonably reproduce the experimental data. Therefore, we can use these models to obtain properties and information that are not available in literature, while accurately modeling lipid structure. It is concluded that molecular dynamic simulations, combined with Kirkwood-Buff theory, provide an excellent approach to study the properties of solvent mixtures.

POSTTRANSLATIONAL SENSOR FOR ARGINASE DETECTION

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BACKGROUND AND PURPOSE: It is mandatory to detect all cancers at the earliest possible stages in order to save a maximum of lives. Immunosuppression is one of the hallmarks of aggressive cancers. The enzyme arginase is overexpressed in cancer patients, resulting in immunosuppression. Although this effect is systemic, it is especially pronounced in the active tumor regions. Arginase converts L-arginine to L-ornithine and urea**.** Apart from its role in hepatic urea cycle, arginase plays a major role in the immune system. Arginase- mediated L-arginine destruction is able to suppress T cell immune responses, resulting to inflammation-associated immunosuppression. **METHOD**: We have designed two nanoplatforms for arginase detection. Both feature a central dopamine-coated iron/iron oxide nanoparticle to which cyanine 7.0 or cyanine 7.5 were tethered via amide bonds. In both nanoplatforms, cyanine 5.5 is linked to the N-terminal of the peptide sequence GRRRRRRRG. Arginine (R) reacts to ornithine (O) in the presence of arginase. According to our calculations, GRRRRRRRG and GOOOOOOOG differ in their oligopeptide dynamics. **RESULTS:** In the presence of arginase, and dependent on arginase concentration, we have observed a fluorescence increase of both nanoplatforms. This permits the detection of active arginasein blood serum and tissue samples within an hour. **CONCLUSION:** This is – to the best of our knowledge – the first example of a "post-translational" enzyme sensor, in which the tether is chemically modified and not cleaved by an enzyme, resulting in a modified mobility of the tether. It is noteworthy that the nanoplatforms do not show a fluorescence increase when incubated with NO-reductase, an enzyme indicative of immunoactivation, which also uses arginase as substrate.

HIGH THROUGHPUT MICROFLUIDIC CHIP FOR SINGLE CELL ANALYSIS

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BACKGROUND AND PURPOSE: Efficient fluid transport in microfluidics is key for developing high throughput single cell analysis. Most cell transport is handled using pressure/vacuum driven flow making small, reproducible changes in flow rates, however, is difficult. Previous reports of single cell analysis have also generally been low throughput, analyzing only 20-40 cells/h. **METHOD:** In order to improve the throughput, we have integrated set of micropumps into microfluidic devices using multilayer soft lithographic techniques. The micropumps were integrated with the fluidic channels to transport single cells throughout the microfluidic channel network. **RESULTS AND CONCLUSION**: These pumps are simple, low cost, durable, easy to fabricate and bio-compatible. Multilayer softlithographic chips can increase analysis rate to ~1000 cells/h. They provide precise control of the flow rate and produce continuous flows up to 9.2nL/s. The devices were used to automatically transport, lyse, inject and electrophoretically separate cells loaded with Oregon green (OG) and 6-carboxyfluorescein (6-CFDA).

IDENTIFICATION OF SERPIN 2 COMPLEX BINDING PARTNERS IN ANOPHELES GAMBIAE BY IMMUNOAFFINITY CHROMATOGRAPHY AND MASS SPECTROMETRY

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The Serpin complexes that help to regulate the melanization cascades in the *Anopheles gambiae* mosquito are not very well understood but are important due to their connection to the regulation of the mosquitos' immune system. **BACKGROUND AND PURPOSE:** These proteins are found in concentrations of ~ 0.1ng/nL in mosquito hemolymph. While the protein concentrations are rather high, the sample volume, (i.e. the volume of hemolymph in a mosquito) is only ~7 nL. These small volumes are very difficult to handle analytically without significant dilution. As such we have been developing a series of novel sample preparation techniques to minimize the dilution. These techniques include using magnetic bead immunoaffinity chromatography as opposed to large scale agarose resin columns. Also included are an optimization of the sample collection, antibody crosslinking, and sample washing procedures that are enhanced for high resolution mass spectrometry. **METHOD:** The complexes in which serpin 2 participates as a binding partner were initially separated by magnetic bead immunoaffinity chromatography using polyclonal antibodies to serpin 2. The eluted fraction from this experiment was subjected to trypsin digest and then analyzed by LC/MS. **RESULTS:** Peptides and proteins in the sample were identified using SEQUEST® and MASCOT®. Several possible binding partners to Serpin 2 were tentatively determined. Biological studies are currently underway to confirm the binding interactions. **CONCLUSION:** These results have implications in the control of the malaria parasite due to the fact that understanding the immune system of the mosquito that is the vecor of the parasite may lead to novel methods to better control the disease.

POSSIBLE MECHANISMS OF WATER OXIDATION PROCESS ON SMALL PURE AND Ca-DOPED MnO_2 COMPLEXES: A QUANTUM CHEMICAL STUDY

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BACKGROUND AND PURPOSE: The oxidation of water represents an important step in natural photosynthesis, which is catalyzed by the natural water splitting catalyst: the oxygen-evolving complex (OEC) in photosystem II (PSII). The OEC consists of four manganese ions and a calcium ion held together by five bridging oxygens. The development of synthetic catalysts based on manganese-oxide complexes is desirable since it was chosen by nature. Moreover, Mn is an earth abundant element that is inexpensive and largely non-toxic. The doping of manganese oxide complexes with calcium has become popular to mimic the natural water splitting catalyst. **METHOD:** Herein, density functional theory (DFT) calculations were performed to study water oxidation processes on fully saturated $Ca_xMn_{2-x}O_{4-x}$ (x=0,1) complexes. All calculations were performed at the PBE/ATZP level of theory and the geometrical structures and reaction energies of pure and Ca-doped systems were compared. In a catalytic cycle, four proton–coupled electron transfer (PCET) reactions, a molecular oxygen evolving reaction and two water adsorption reactions were considered. **RESULTS:** The overall energy required for the dehydrogenation process is higher than that of the oxygen generation step, whereas water adsorption is exothermic regardless of the composition of the catalyst. Compared to the pure Mn_2O_4 system, the highest reaction energy of the Ca-doped system is lower. **CONCLUSION:** The results suggest that the Ca-doped dimer model is an effective catalyst for the water oxidation as compared to the pure Mn-dimer model.

SYNTHESIS AND CHARACTERIZATION OF HYPERBRANCHED CADMIUM CHALCOGENIDES NANOMATERIALS

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BACKGROUND AND PURPOSE: Quantum dots are small semiconductor crystals with properties between those of bulk semiconductors and small molecules. These unique properties are desirable for solar energy collection and storage. For instance, quantum dots absorb more light and they are more stable vs. organic dyes. Branched nanomaterials can have better electron-hole pair charge separation, vs. quantum dots, because of their asymmetric structures and greater surface area. This can lead to better transfer of the exited electrons, however, their synthesis is a complicated multi-step process. In this study, hyperbranched cadmium chalcogenides (S, Se)were synthesized in one step using microwave irradiation. **Experimental:** Typically, a solution of microwave-absorbing sulfide and selenide precursors, cadmium precursor and coordinating solvent are combined in a vial. The mixture is heated to 250 ºC in a microwave reactor for 40 minutes resultingin an orange precipitate, which is isolated by centrifugation. **Results:** The uniform hyperbranched CdSeS nanoparticles were characterized using UV-Vis absorption, X-ray diffraction, and tunneling electron microscopy (TEM).The spectra and TEM imagesindicate the particles do not have a single crystal domain, instead they appear to have formed from smaller nanocrystals fused together, possibly due to oriented attachment. **Conclusion:** Understanding the exact mechanism of formation of these materials can help access other hyperbranched nanomaterials with different materials in the core and arms. These materials often show even better charge separation and will be better for solar cells.

CONGA DRUMMING: FROM AFRICA TO CUBA TO THE WORLD

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BACKGROUND AND PURPOSE: In the last century, congas have emerged from obscurity in Cuba to being recognized by audiences around the world as a legitimate percussion instrument. Even though many people now know what congas, far fewer people have examined how the drums came to have a presence in everything from pop music to elementary classrooms. **METHOD:** Through examination of the drums themselves, listening to recordings, and consulting scholarly periodicals and literature, this research delves into the roots of conga drumming, dating back to African drums that are the ancestors of conga drums. It traces the history of congas through slavery in Cuba and technical innovation to arrive at the drums used today. The research also examines the players of the congas, known as congueros, and their contributions to the style and music that is known as Afro-Cuban. **RESULTS/FINDINGS:** A clear line of influence can be followed from Havana and music in the streets to colleges around the country establishing hand drumming majors and recognizing the musical validity of percussion that was barely a century ago banned from being played by former slaves. **CONCLUSION:** By recognizing the history and innovation of these instruments, musicians and listeners can better appreciate the music they hear, the instruments they play, and the hard work and innovation that has occurred to make these instruments known to the world today.

AUTHENTICITY IN MUSIC SAMPLING: THE POLITICS OF REPRODUCTION

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BACKGROUND AND PURPOSE: The debate this essay explores is music sampling. This debate is active because sampled music borrows copyrighted material and it alters the content of an original production. It is my argument that music, specifically music sampling, just like other art forms, once produced, should be available for further interpretation. Artists that use sampling in order to generate new songs should be attributed as having created new and authentic forms of music without being accused of plagiarism, thievery, or taken to court in order to abide by old established copyright laws. **RESEARCH:** Outside articles help to bridge the conversation that exists in cultural studies in regards to music sampling and the implications of limiting creativity with copyright laws. **FUTURE IMPLICATIONS:** Sampling is not a thing of the past and it will most likely continue for a long time. Such contemporary artists like Kanye West have further popularized this genre; specially with his album "My Beautiful Dark Twisted Fantasy," which many consider to have perfected sampling techniques in the music industry. This generation should make it a goal to erase the boundaries that were created at a time where the world was only starting to crawl in regards to digital and technological advances. **CONCLUSION:** Copyright laws should not punish artists for borrowing musical performances available in the industry influx, since harsher laws and punishments in any institution tends to limit innovations.

WITHDREW*

COMPARISON OF NATURAL DYES DERIVED FROM KANSAS BLACK WALNUT, OSAGE ORANGE, AND EASTERN REDCEDAR SAWDUST ON ALUMINUM MORDANTED AND NONMORDANTED WOOL YARNS

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Background and Purpose: Timber sawmill waste from native Kansas trees has potential as a value added source of natural dye colorant. The purpose of this research was to compare the colorfastness of dyes derived from Kansas black walnut (*Juglans Nigra*), Osage orange (*Maclura pomifera*), and eastern redcedar (*Juniperus virginiana*) mill waste on wool yarn with and without a mordant treatment of aluminum potassium sulfate (APS). Data from this study was used towards the scientific exploration of natural dyes by evaluating the colorfastness to laundry, light and staining. **Method:** This study utilized aluminum potassium sulfate mordanted and nonmordanted 30/2 wool yarns dyed with Kansas black walnut, Osage orange, and eastern redcedar at equal depths of shade. AATCC test methods for lightfastness, washfastness and staining were used to evaluate for colorfastness and were then compared to ASTM standards. **Results and Conclusion:** Anticipated color findings will show that aluminum potassium sulfate tends to change the dye colors from black walnut, Osage orange, and eastern redcedar towards warmer and brighter. Furthermore, an aluminum mordant will improve colorfastness to light on wool yarns dyed with black walnut, Osage orange and eastern redcedar, while no obvious improvement will be seen between mordant and nonmordanted yarns for washfastness and staining.

REDUCING POST-HARVEST LOSS: THE CASE OF POVERTY REDUCTION IN NORTHERN GHANA

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BACKGROUND AND PURPOSE: Agribusiness literature outlines agricultural productivity's importance in poverty and food security initiatives in Sub-Saharan Africa. Farm productivity and profitability depend on multiple factors that are affected by physical and institutional infrastructure availability. Previous studies found positive direct and indirect effects of infrastructure investment on individual household productivity, profitability and regional agricultural development. In partnership with the United States Agency for International Development (USAID), Ghana is working to generate economic growth in poverty-stricken regions. Recent policy initiatives emphasize the importance of agriculture in economic growth and poverty reduction in northern Ghana, where the seasonality of agricultural production makes crop storage necessary. However, without sufficient physical and institutional infrastructure, storage introduces increased risk of post-harvest loss from pests, and spoilage and affects farm profitability and the regional food security in northern Ghana. The purpose of this paper is to develop a better understanding of the relationship between northern Ghanaian farm profitability, storage availability, and market access. The specific objective is to examine how storage affects farm profitability, reflected by the extent of post-harvest loss incurred by northern Ghanaian smallholder farmers while storing. **METHOD:** The analysis is based on data from a USAID funded agriculture production survey conducted in 2013 and 2014 in northern Ghana. Econometric analysis was performed using the Maximum Likelihood Estimation method. **RESULTS AND CONCLUSION:** The results are expected to emphasize infrastructure investment's role in poverty and post-harvest loss reduction and bring new perspective to development in northern Ghana. This study could make valuable contributions to existing literature and future policy discussions.

REPLACING 100% COTTON FABRIC WITH JUTE-COTTON BLENDED (JUTTON) FABRIC: AN ECO-ENVIRONMENTAL SUSTAINABILITY APPROACH IN THE CONTEXT OF BANGLADESH

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BACKGROUND AND PURPOSE: Other than the socio-economic and cultural influences, some favorable properties (e.g., natural fiber, easily spin-able, greater comfort, biodegradable) and availability of cotton fibers make it a preferred fiber for humans. However, cotton fiber grows under certain environmental condition and only a few geographic locations have such favorable ecological circumstances. As a result, some cotton cultivating countries benefit from this naturally occurring phenomenon whereas other non-cultivating countries like Bangladesh are becoming economically underprivileged, being forced to import cotton to meet global apparel production demand. This increases the carbon footprint from the transportation of cotton fiber. On the other hand, jute fiber is available in inexhaustible quantities in Bangladesh, comparatively cheaper than cotton, but cannot be used for clothing alone. In this research, a comparative study between comfort properties of 100% cotton and jutton (jute-cotton blend) fabrics was conducted to evaluate the potential of replacing 100% cotton fabric with jutton fabric. **METHOD:** Two woven fabric specimens (100% cotton and 30-70 jutton fabric) with the same weaving and finishing specifications were evaluated for their drape-ability, stiffness, wick-ability, abrasion resistance, and water vapor transmission properties. **RESULTS/FINDINGS:** Though the jute fiber alone is harsh and stiff in nature, jutton fabric shows properties remarkably similar to the 100% cotton fabric. **CONCLUSION:** Jutton fabric can be a potential alternative for 100% cotton in some cases (e.g., shirting, suiting, curtains, bed cover, and sofa cover) where it may be important to have similar properties to 100% cotton. Using jutton will reduce the cost of fabric as well as minimize the carbon footprint by replacing 30% of cotton fiber transportation.

INVESTIGATING THE ROLE OF SOCIAL NETWORKING SITES IN CREATING CONSUMER DEMAND FOR ENVIRONMENTALLY SUSTAINABLE APPAREL: AN EXPLORATORY STUDY

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BACKGROUND AND PURPOSE: With apparel production finding itself a leading cause of harm to the environment, the call to action to influence consumer demand of environmentally sustainable apparel (ESA) is pertinent for the current and future well-being of both the environment and mankind. The increasing popularity of social media, specifically social networking sites (SNS) in which consumers adapt to their online influent referent groups, gaining information from peers, media sources, and retail brands, the need for SNS as an advocacy tool for ESA demand is imperative. This study will better understand the variances among consumer characteristics and their knowledge of ESA issues. The purpose of this study is to provide initial understandings regarding which types of consumers are using SNS, and also how they use those sites, i.e. to gain knowledge, to get influence from peers, etc. **METHOD:** An online national survey of 820 participants was conducted utilizing six altered scales. Simple bivariate correlations, ANOVA, and a linear hierarchial regression will be conducted to understand if adding social influence of SNS as an additional component to Theory of Reasoned Action (Azjen and Fishbein, 1980) provides greater predictive power for ESA behavior intentions. **RESULTS/FINDINGS:** Results hypothesize that SNS influence and subjective norm are stronger predictors of purchase intention above knowledge and attitudes.**CONCLUSION:** By looking at varying consumer characteristics, this study will begin to identify the differences among SNS users to understand how consumers are influenced on SNS so sustainable retailers can better market their product on these sites to consumers.

THE USE OF FERTILIZER AND ITS IMPACT ON PRODUCTIVITY IN NORTHERN GHANA

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BACKGROUND AND PURPOSE: Ghana is one of the few African country that will reach its first Millennium Development Goals objective – reduce poverty by half – and it also has made good progress on the other seven goals. Previous research states that increasing agricultural productivity can improve food security and reduce poverty with good managerial practices while maintaining environmental sustainability. To increase agricultural productivity in a region with poor soil quality such as northern Ghana, smallholder producers need to use a sufficient amount of fertilizer. However, the amount of fertilizer that Ghanaian producers currently apply to their fields is significantly lower than other countries including others in Africa. **METHOD:** The purpose of this study is to gain a better understanding of how fertilizer affects the variation in productivity among smallholder farmers in northern Ghana. A regression model is estimated and it takes into account several factors affecting producer's productivity such as crop and seed selection, labor, managerial decisions, and education. Data used in this study are from a United States government funded agriculture production survey conducted in northern Ghana during the 2013-2014 production season. **RESULTS AND CONCLUSIONS:** Results indicated that fertilizer use and education have a positive impact on a producer's productivity. Demonstration field plots and producer training sessions can be an effective way to teach a producer the correct method to apply fertilizer in the appropriate quantities to ensure maximum producer productivity, which will have a positive impact on improving food security and reducing poverty.

ETHANOL EXPANSION IN THE BRAZIL: ANALYSES OF THE ECONOMIC DRIVERS

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BACKGROUND AND PURPOSE: Brazil produces ethanol from sugarcane, a crop that has expanded more rapidly since the 2000s into the Brazilian states of Goias and Mato Grosso do Sul, where the number of mills has more than doubled between 2000 and 2013. This expansion is the result of forces brought by government policies and regulations, technological innovations, changes in domestic and global demand among others. This study aims at identifying and analyzing the domestic and international market factors, such as fuel and sugar prices, quotas and tariffs, and government policies, such as subsidies and taxes, which have motivated the sugarcane expansion in Brazil. **METHOD:** Secondary data was collected for the whole country as well as for the states of Goiás and Mato Grosso. A multi-equation, multi-product economic model was developed to study the impact of various factors on the supply and demand for Cerrado sugarcane products (sugar and ethanol). For each product, a supply equation, a domestic demand equation, and a foreign demand equation are specified. **RESULTS/FINDINGS:** Estimation results will show the effects of various factors including government policies, world oil price and other market factors on the supply, domestic demand, and foreign demand for Brazilian ethanol and sugar. **CONCLUSION:** The identification and determination of the factors motivating sugarcane's expansion, and subsequently, ethanol's expansion in Brazil allow the implementation of more effective government policies.

AIRLINE CODE-SHARING AND ON-TIME PERFORMANCE: THE CASE OF THE US DOMESTIC AIRLINE INDUSTRY

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BACKGROUND AND PURPOSE: Most studies in airline product/service quality have focused on exploring the link between multimarket contact and service quality, examining how competition affects on-time performance, investigating the relationship between on-time performance and prices or market shares, among others. Surprisingly, questions regarding the on-time performance of airline alliances have not been explored as of yet. This paper attempts to fill this void in the literature by empirically examining the on-time performance of the Delta/Northwest/Continental codeshare alliance with a particular focus on the codeshare effects in markets where the alliance partners competed prior to the alliance. **METHOD:** To examine whether Delta, Northwest and Continenral airlines vary their on-time performance in response to their codeshare alliance, we estimate reduced-form regression equations of the various measures of on-time performance. Possible codeshare effects on on-time performance are identified using a difference-in-differences strategy. This strategy enables us to compare pre-post alliance periods' changes in on-time performance of products offered by the alliance firms, relative to changes in on-time performance of products offered by non-alliance firms over the same pre-post alliance periods. **RESULTS AND CONCLUSION:** We find evidence that an alliance formation does not reduce the competitive pressure among alliance partners. The implication is that although alliance members cooperate on various aspects of the passenger's air travel experience, they still remain competitors. In fact, the codeshare agreement resulted in better on-time performance on flights operated by these alliance partners.

*****WITHDREW*****

FROM US TO ME: CULTURAL VALUE CHANGE FROM COLLECTIVISM TO INDIVIDUALISM OF CHINESE STUDENTS STUDYING IN THE UNITED STATES

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BACKGROUND AND PURPOSE: This is an exploratory research about the cultural value shift of the younger generations in China. A fundamental framework in cross-cultural research is individualism and collectivism. Although Chinese culture is always viewed as collectivistic, many evidences reveal that economic and social changes have influenced the culture since the Open-Door Policy was implemented in 1979, particularly manifested by the young Chinese generations. In the media context, as the U.S. is always treated as a country with individualism, the cultural value shift might be the result of the American information flows into China since 1979 and it gradually constructs a individualistic environment and keeps cultivating Chinese younger generations. **METHOD:** This qualitative study uses interview as the data collection method. It is conducting in a Midwestern university of America. Chinese international students will be selected from a QQ (a Chinese version of MSN) group that almost has the entire group of Chinese students who are studying in this university. This research has three groups, the first group is Chinese students who are new in the United States, the second one is Chinese students who have been here for 3 years, and the last one is the control group consisted by American students. **RESULTS/FINDINGS:** Chinese international students who have been in the United States exhibt more individulistic characteristics than the ones who are new here. **CONCLUSION:** If the result consistent with the prediction, some advertisements made for American brands could be used directly in China.

SITE OF ENTRY AND GRAIN PHYSICAL CONDITION ON INFESTATION AND DEVELOPMENT OF LESSER GRAIN BORER LARVAE IN HARD RED WINTER WHEAT KERNELS

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BACKGROUND AND PURPOSE: The lesser grain borer, *Rhyzopertha dominica* (F.), is a destructive pest of stored wheat worldwide. Mated females lay eggs loosely outside of wheat kernels, and newly-emerged larvae (first instars) enter wheat kernels to complete immature development. Little is known about wheat kernel infestation by first instars of *R. dominica*. Two laboratory experiments were conducted to understand the site of entry and establishment of larvae within kernels and its influence on the speed of larval development. **METHOD:** The first experiment used fifty individual sound, organic hard red winter wheat kernels and 50 kernels artificially-damaged with a micro-drill at the brush end, endosperm, or germ of the kernel. Each kernel was infested with one first instar and held in a growth chamber at 28ºC and 65% r.h. Successful kernel infestation was confirmed by dissecting kernels 21 days after infestation. In the second experiment the speed of development of first instars entering through artificially-damaged brush end, endosperm, and germ of wheat kernels was monitored every 3 d for 30 d by measuring head capsule widths of developing larvae. **RESULTS/FINDINGS:** In both experiments, the germ of the kernels was the most preferred site of entry. About 82-90% of artificially damaged kernels were infested by larvae compared with 12% for sound kernels. Larval development was fastest on the germ, followed by endosperm, and brush end. **CONCLUSION:** Our findings indicate that germ was the preferred site of entry. Damaged kernels had higher infestation rates than sound kernels. Larvae infesting the germ area developed faster when compared with other kernel portions.

INFLUENCE OF TEMPERATURE AND DOSAGE ON EFFICACY OF A DIATOMACEOUS EARTH FORMULATION ON *TRIBOLIUM CASTANEUM* ADULTS

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Department of Grain Science and Industry, College of Agriculture

BACKGROUND: It is good practice for farmers to clean their grain bins before storing newly harvested grain to prevent cross infestation. Unsanitary bins can harbor grain-infesting insects, including the red flour beetle, *Tribolium castaneum* (Herbst). The use of elevated temperatures has been proven to kill stored-product insects within 4-8 hours when temperatures of 50-60°C are reached and maintained in empty bins. Previous research has shown improved efficacy of diatomaceous earth dusts against stored-product insects at temperatures below 50°C. In this study, the efficacy of a diatomaceous earth formulation (Diafil) was examined against *T. castaneum* adults at 28 (control), 36, and 46°C. **METHOD:** Laboratory trials were conducted to determine the efficacy of Diafil at three application rates (0, 2.5 and 5.0 g/m^2) on concrete arenas in Petri dishes to simulate the floor of empty bins. Twenty adults of *T. castaneum* were placed on untreated and Diafil treated concrete arenas for 4, 8, 12, and 24 h at the three temperatures. **RESULTS/FINDINGS:** The efficacy of Diafil against *T. castaneum* adults increased with an increase in Diafil dosage and temperature. Adult survival was inversely related to exposure time at each temperature. **CONCLUSION:** At 2.5 and 5.0 g/m^2 of Diafil and 46°C, zero percent survival of *T. castaneum* adults was observed at 12 and 4 h, respectively. The combination of diatomaceous earth and temperature can be used as an integrated approach for controlling insects in empty bins prior to storing newly harvested grain.

USING SPECTRAL RESPONSE PROPERTIES TO IDENTIFY AND CHARACTERIZE INFESTATIONS OF *DECTES TEXANUS* IN SOYBEAN

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BACKGROUND AND PURPOSE: The soybean stem borer, *Dectes texanus* Leconte (Coleoptera: Cerambycidae), has become an important pest in Kansas soybean. Currently, farmers rely on field-level inspections to identify *D. texanus* presence and/or severity of infestation, which can be time-consuming or inaccurate especially when there is no established sampling plan. Potential solutions to this problem include the use of remote sensing platforms, particularly aerial imagery, which are capable of tracking and monitoring plant health via detectable changes in spectral responses and associated vegetation phenology curves/metrics (VPM). The objective of this study was to investigate the use of remote sensing and VPMs as a method to detect soybean infested with *D. texanus*. **METHOD:** The study was conducted in small soybean plots near Scandia, KS during 2014. Open plots were arranged in a randomized complete block design (n = 8) with two treatments: 1) treated control (insecticide applied to foliage to treat and prevent *D. texanus* infestation), and 2) natural colonization of soybean by *D. texanus* adults. For image acquisition, 2-m sections (3 per plot) were monitored through time using a modified Cannon S100 camera. Using AgPixel™ software, the normalized difference vegetative index (NDVI) and green normalized difference vegetative index (GNDVI) were calculated from the near-infrared images to create vegetation phenology curves. **RESULTS/FINDINGS:** We will use the VPM's to quantify the physiological impact of *D. texanus* when feeding on soybean. **CONCLUSION:** The results will lead to a better understanding of how *D. texanus* feeding changes soybean phenology, which will aid in developing and implementing site-specific management and sampling strategies.

PROPERTIES OF STARCH IN EXTRUDED NOVEL FORTIFIED BLENDED FOODS

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BACKGROUND AND PURPOSE: The micronutrient levels in Public Law 480 fortified blended foods (FBFs) may not be appropriate for all food aid beneficiaries, particularly in infants and/or young children and pregnant and /or lactating women. The project aimed at developing novel FBFs by extrusion of grains like sorghum and cowpea in addition to corn and soy which are native to resource –constrained populations of Africa. **METHOD:** Porridge containing 20% solids was made from extruded blends of grains that were milled and fortified with micronutrients, oil, sugar and whey protein concentrate to achieve higher nutritional and energy density as specified in Food Aid Quality Review. Milled extrudates were tested for consistency using Rapid Visco Analyzer (RVA), water absorption index (WAI) and water solubility index (WSI). The degree of cooked starch during processing was ascertained using Differential Scanning Calorimetry (DSC). **RESULTS:** RVA results showed that formulations having whole grains had higher final viscosity and had higher peak development time than formulations having decorticated grains. WAI and WSI was lower in whole formulations. DSC results showed almost complete gelatinization of starch across all formulations. The Bostwick flow rate was found to be lower in whole formulations. **CONCLUSIONS:** It was found that whole formulations had lower starch damage as compared to decorticated formulations. This resulted in higher final viscosity and lower Bostwick flow rate for whole formulations. A completely cooked product was obtained due to extrusion processing which reduced the overall cooking time of porridge as compared to traditional corn soy blend being currently used as primary fortified blended food.

THE EFFECT OF LOW BLOOM GELATIN ON THE PHYSICAL PROPERTIES OF PET FOOD

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BACKGROUND AND PURPOSE: Innovations in pet food have increased protein and decreased cereals, but negatively impacted durability and texture. Gelatin is a protein used to improve pelleted feeds. The objective was to determine the relationship between expansion and hardness or durability and compare low-bloom gelatin (Pro-Bind 100) to higher bloom gelatins in a dry extruded pet food application **METHOD:** Two experiments were conducted on a Wenger X-20 extruder. In experiment 1, treatments (0% and 10% Pro-Bind 100) were extruded at various settings to achieve 2 different densities. In experiment 2, treatments (0%, 10% Pro-Bind 100, 10% PigSkin 175, and 10% PigSkin 250) were processed at typical pet food conditions through two dies. Products were analyzed for bulk and piece density, radial expansion, hardness, and pellet durability index (PDI). Statistical software (SAS Institute) was used to analyze differences between treatments (α=5.0%) and correlations between expansion and hardness or PDI. **FINDINGS:** There was no correlation between expansion and hardness (R^2=0.06) or PDI (R^2=0.23). Expansion increased with gel strength (3.36 for no gelatin to 5.72 for Pig Skin 250, $P<0.05$). There was a decrease in both hardness and PDI between the 0% gelatin treatments and the mid-bloom and high-bloom gelatins (6.42kg v. 5.36 and 3.61 kg, $P<0.05$; 90.32% v. 70.19% and 26.06%, $P<0.05$). However, the inclusion of Pro-Bind 100 increased hardness relative to the 0% formula (6.42kg v. 7.88 kg , $P<0.05$). **CONCLUSION:** Radial expansion and hardness or PDI do not appear to correlate. The inclusion of low-bloom gelatin may improve the strength of higher protein pet foods.

EFFECTS OF METHOPRENE IMPREGNATED BIRD SEED PACKAGES ON FOUR WEEK OLD LARVAE OF *TRIBOLIUM CASTANEUM* AND *TROGODERMA VARIABLE*

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BACKGROUND: Methoprene, an insect growth regulator, is approved for use on stored commodities to manage stored-product insects. It is exempt from a residue tolerance. Recently, methoprene is being used to impregnate packages of bird seed to prevent stored-product insect invasion or penetration. **PURPOSE:** The objective of this research was to evaluate the effects of short-term expsoure to methoprene-treated bird seed packages on four-week-old larvae of the red flour beetle, *Triboium castaneum* (Herbst), and warehouse beetle, *Trogoderma variable* Ballion at different temperatures. **METHOD:** Inside and outside surfaces of methoprene-treated and untreated package discs were fitted into 150 x 15 mm Petri dishes and the disc edges were glued to the Petri dish sides. Fifty larvae of *T. castaneum* or *T. variable* were added to individual Petri dishes for periods of 8 h, 1 d, 2 d, 3 d, and 4 d, and held at either 27 or 32°C and 60% RH. Exposed larvae were transferred to untreated petri dishes containing 500 mg of diet at each respective temperature. Observations were made weekly to determine the percentage of normal adult emergence for each insect species. **RESULTS/CONCLUSIONS:** The larvae to adult emergence of *T. castaneum* and *T. variable* generally decreased with increasing exposure time. After 4 d of exposure, *T. castaneum* larvae were more susceptible to methoprene than *T. variable* larvae. Larvae of *T. castaneum* expossed for 4 d showed a decrease in percent emergence compared to the control. Methoprene appears to have potential for impregnating packages to control stored-product insect attack.

HESSIAN FLY, *MAYETIOLA DESTRUCTOR* (DIPTERA: CECIDOMYIIDAE), ATTRACTION TO DIFFERENT WAVELENGTHS AND INTENSITIES OF LEDS

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BACKGROUND AND PURPOSE: The Hessian fly, *Mayetiola destructor* (Say) (Diptera: Cecidomyiidae), is a major pest of wheat around the world. Early detection and implementation of management methods are dependent on cost effective and efficient surveillance strategies. While the existing trap surveillance strategy utilizing the Hessian fly female sex-pheromone is effective and efficient, it does not attract female Hessian flies. Surveillance of female adults is key to assessing the severity of new invasions, modeling changes in population dynamics at the field level, and incorporating trap captures into management decisions. Preliminary experiments have shown the female Hessian fly is attracted to green light emitting diodes (LEDs) significantly more than other colors. The purpose of this research is to expand on preliminary experiments, which examined different color wavelengths, and focus on attraction to LEDs in the green spectrum at varied light intensities. **METHOD:** Hessian fly attraction to different LED wavelengths and intensities was tested in a four-leaf, clover-shaped arena, which contained a LED within a collection cup at the apex of each of the four cloverleaves. The wavelengths (colors) covered the low, medium, and upper spectra of green light (492 to 577nm). The intensities (brightness) covered the low, medium, and upper emission limits of the LEDs. **RESULTS/FINDINGS:** The results of these experiments demonstrate the influence of light wavelength and intensity on Hessian fly attraction to LEDs. **CONCLUSION:** Ultimately these results will be incorporated into new trap designs, adding multiple sensory stimulants to the existing trap, thus improving trap attractiveness and effectiveness for surveillance of both sexes of Hessian fly.

MODEL STUDY ON EXTRACTION OF BOTH FERMENTABLE SUGARS AND NO-STRUCTURAL CARBOHYDRATE FROM SWEET SORGHUM THROUGH DIFFUSION PROCESSER

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BACKGROUND AND PURPOSE: Sweet sorghum, a draught resistant thick-stemmed annual grass is attractive for bioethanol production because of its high biomass and fermentable sugar yield. The stalk has similar fermentable sugar content comparable to sugarcane. Typically, harvested sweet sorghum conveyed for ethanol fermentation or syrup processing does not include the grains, thus a significant source of starch which could easily fermented into ethanol is left on the field. Additionally, the current roller-mills recovers only about 60-70% of the sugars from the stalk with up to 40% of the sugars remaining in the bagasse. The goal for this research is to integrate the utilization of both fermentable sugars and no-structural carbohydrate for ethanol production and to increase the final ethanol yield using pre-processing methodologies that integrate the extraction of both fermentable sugars and starch via the diffusion process. **METHOD:** In this work, sweet sorghum biomass is harvested and hummer-milled. Sorghum grain is also hammer-milled into the same particle sizes. A ratio of 85% biomass to 15% grain is used to determine the optimum diffusion conditions over temperatures of 75-95 C and diffusion time of 60-120 minutes employing response surface methodology design. **RESULTS/FINDINGS:** To obtain the optimum diffusion conditions for fermentatble sugars from sweet sorghum. **CONCLUSION:** To fully utilize both sugars and starch for increased ethanol production

*****WITHDREW*****

EFFECT OF VERTICAL MINI-FINS ON EXTERNAL CONDENSATION HEAT TRANSFER

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BACKGROUND AND PURPOSE: The purpose of this research is to experimentally study how mini-fins affect the heat transfer coefficient on a vertical surface under external condensation conditions. Filmwise condensation is a major concern when designing steam condensers for thermoelectric power plants. These plants currently account for 40% of freshwater withdrawal and 3% of freshwater usage in the United States. Filmwise condensation averages ten times lower heat transfer coefficients than those present in dropwise condensation. Currently, filmwise condensation is the dominant condensation regime in thermoelectric power plants due to their prolonged usage. The film thickness is directly proportional to the condenser's overall thermal resistance. This investigation focuses on optimizing mini-fins to reduce film thickness and maximize filmwise condensation heat transfer. **METHOD:** The experimental setup allows us to control the cooling load, pressure, and steam quality in order to measure the steam-side surface temperature under steady state conditions. The heat transfer coefficient is determined by measuring surface temperature and steam temperature with relation to the conduction heat transfer across an aluminum test section. By comparing the heat transfer coefficients across a range of heat fluxes, we can find the optimal surface geometries. **RESULTS:** Results demonstrate an average improvement of 51.96% in heat transfer coefficients for heat fluxes above 75 kW/m^2K. **CONCLUSION:** In this research, heat transfer coefficients have been improved for vertical surfaces with mini-fin geometries. For future work, we will test micro-fin pitch widths and frequencies.

AN EFFICIENT PKI FOR SECURE COMMERCE USING BASIC PHONES

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BACKGROUND AND PURPOSE: With increased uptake of mobile technology, mobile phones have become an integral part of everyday life in developed as well as developing/emerging countries. Older, "dumb" phones have limited to no security protection, depending solely on the network operator for communication security. Historically, hardware limitations of dumb-phones have limited access to modern security features, and led to difficulties in using dumb-phones to securely perform basic day-to-day functions like banking in areas where a phone may be the only computing device a person owns. Easy-to-use and transparent security can significantly strengthen such economies by introducing modern security features into otherwise insecure transactions. In this paper, we describe a mobile public-key infrastructure (mPKI), a lightweight cryptographic solution for strong security even on basic phones. **METHOD:** mPKI is specifically designed for the low computation capacity and small memory footprint of basic phones. In order to use mobile phones for authentication and digital signatures, the end user needs a verified digital identity. In mPKI, we use the ubiquitous SIM card as a trusted element to bootstrap security. The SIM securely stores the user's private key while a digital certificate containing the public key is stored on the network operator's server. The private and public keys stay linked and can be used for authentication and digital signing. **RESULTS AND CONCLUSION:** Using Elliptic Curve cryptography to accommodate the computational limitations of SIM cards, mPKI removes current vulnerabilities associated with SIM use, providing a trusted element with sufficient computational power to secure transactions using modern cryptographic features.

STRESS-STRAIN MODEL FOR CONCRETE CONFINED BY STEEL AND FIBER REINFORCED POLYMER (FRP)

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BACKGROUND AND PURPOSE: Application of Fiber Reinforced Polymer (FRP) to enhance the ductility, flexural strength, and shear capacity of existing deficient concrete structures has increased during the last two decades. As a result, various monotonic models have been proposed for concrete confined by only FRP. Although, FRP wrapping is typically used to confine the existing concrete members containing conventional lateral steel reinforcement (tie/spiral), a majority of related models considers confinement due to FRP and ignore the effect of conventional lateral steel reinforcement. **METHOD:** In this study, a new stress-strain model is proposed to predict the monotonic behavior of concrete confined by both FRP and lateral steel reinforcement using experimental data from four independent databases. These specimens were reinforced laterally by FRP wraps and steel tie/spiral and tested under monotonic loading. The performance of the proposed model along with the four representative models from literature is compared to the experimental data. **RESULTS/FINDINGS:** In order to show the accuracy of the proposed model compared to the four aforesaid models, a blind verification was performed using nonlinear moment-curvature analysis and the experimental moment-curvature response of two specimens not used to calibrate the proposed model. The analytical result was in a good agreement with experimental data. **CONCLUSION:** Various aspects of FRP-confined concrete members, specifically monotonic and cyclic behavior of concrete members confined and reinforced by FRP can be evaluated using the proposed model.

SELECTIVITY CONSIDERATIONS FOR ALKALINE-PROMOTED NI CATALYSTS USING FIRST-PRINCIPLES METHODS

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BACKGROUND AND PURPOSE: The water gas shift reaction (WGSR), $CO + H_2O \rightarrow CO_2 + H_2 \rightarrow H_{298K} = -41.2$ kJ/mol, is a historically and industrially important reaction that can be used to tune CO/H_2 ratios in the syn gas mixture. Ni is a good catalyst for WGSR, but it is also effective for methanation step which can lower the hydrogen selectivity. **METHOD:** Periodic density functional theory (DFT) calculations have been performed to investigate the reaction selectivity of WGSR and methanation on Ni (111) surface. A reaction network, consisting 18 of surface species and 33 elementary steps have been considered in this computational investigation. Alkaline metal-based promoter (e. g. potassium) effect on the hydrogen selectivity has also been investigated. **RESULTS AND CONCLUSION:** The reaction free energies for all three main reaction pathways involved WGSR were obtained with explicit DFT calculations and statistical thermodynamic estimations. Energy barriers for the key elementary steps were also calculated. We found all three WGSR pathways are competitive on Ni (111). Possible methanation reaction pathways were also analyzed. The DFT results suggest that C-O bond cleavage from CH_2OH^* is the most kinetically competitive among the considered reaction steps. Finally, the surface K species can thermodynamically stabilized certain reaction intermediates and promote water dissociation while destabilized the formation of alkyl species, and thus could further assist the WGSR in general.

COMPARTIVE EVALUATION OF ACID AND ALKALI PRETREATMENT FOR SECOND GENERATION BIOFUELS PRODUCTION FROM A WIDE RANGE OF BIOMASS RESOURCES

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BACKGROUND AND PURPOSE: Development of efficient pretreatment method to maximize high quality sugars yield from biomass is vital for lignocellulose-based biorefineries. Dilute acid and alkali are widely used pretreatment approaches; acid pretreatment deconstructs biomass by hydrolyzing hemicelluloses whereas alkali pretreatment performs this job by removing lignin. Therefore, effectiveness of these methods primarily depends on the composition and structure of carbohydrate polymers and lignin in biomass. The purpose of this research is to develop appropriate dilute acid and/or alkali pretreatment process for each types of biomass, including grass, hardwood and softwood. **METHOD:** Dilute sulfuric acid and sodium hydroxide were compared for the pretreatment of softwood (Douglas fir), hardwood (Poplar), and grasses (Switchgrass, Corn stover, Sorghum stalk and *bmr* Sorghum stalk). Effectiveness of the deconstruction processes was evaluated based on the production of toxic compounds during pretreatment, and sugar yield during enzymatic hydrolysis of pretreated biomass. **RESULTS AND DISCUSSION:** The primary results showed that alkali pretreatment is more effective than acid pretreatment at same degree of severity to maximize sugar release and minimize toxin production for grasses and hardwood; however, none of these methods worked well for softwood. Optimization of Douglas fir pretreatment strategies is currently ongoing. Additionally, the biomass lignin structure will be evaluated using GC-MS and NMR, and quality of released sugars will be assessed for 2,3-butanediol production using *Bacillus licheniformis*. These results will also be discussed at the presentation. **CONCLUSION:** The results from this research will lead to the development of appropriate biomass pretreatment method for each type of biomass that generates clean sugar for biofuels production.

STRUCTURE DETERMINATION BY NMR OF M2GLYR DERIVED CHANNEL FORMING PEPTIDES WITH POTENTIAL AS A CYSTIC FIBROSIS THERAPEUTIC

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BACKGROUND AND PURPOSE: Defective cellular ion channels disrupt the function and regulation of epithelial surfaces, causing diseases like cystic fibrosis. We explore the strategy of delivering a soluble monomeric membrane-active channel forming peptide to the apical surface of affected epithelia. With the purpose of finding an optimal sequence for the cystic fibrosis therapeutic peptide, a series of channel forming peptides derived from the second transmembrane domain of the α1-subunit of the glycine receptor were designed, synthesized and tested over recent years. I will present the efforts in the determination of the atomic level molecular structure of two of the tested peptides under membrane mimicking conditions. The availability of detailed structural information advances the understanding of the functioning of the channel forming peptides as well as guides further improvement of the peptide sequence**. METHOD:** For the determination of the monomeric structures of the M2GlyR peptides in membrane mimicking solution we used multidimensional proton Nuclear Magnetic Resonance (NMR) spectroscopy of samples prepared in sodium dodecyl sulfate micelles. NMR is considered as one of the most powerful techniques for the investigation of molecular structures in solution and membrane like environments. **RESULTS AND CONCLUSION:** The determined structures for both peptides have similar predominantly α-helical secondary structures. Amino acid residues predicted to function as membrane anchors as well side chains responsible for lining the interior of the ion channel were identified. The determined structures serve in the identification of targets for further modification of the peptide sequence, and also as a starting point for computer simulations of the assembled ion channels.

INTERACTIONS OF AMINO ACIDS IN AQUEOUS SOLUTIONS

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BACKGROUND AND PURPOSE: Amino acids are the building blocks of proteins. Solvent mediated interactions between amino acids determine protein structure, protein association, and protein aggregation. Although an understanding of the behavior of proteins in aqueous solutions is important for our understanding, design, and optimization of biological systems, the underlying molecular level interactions are poorly understood. **METHOD:** Here, we have attempted to quantify the interactions between amino acids in aqueous solutions using the Kirkwood-Buff (KB) theory of solutions, which provides a link between the molecular interactions and the corresponding solution thermodynamics. **RESULTS AND CONCLUSION:** The results are illustrated using computer simulations for various concentrations of the twenty zwitterionic amino acids at ambient temperature and pressure. Several amino acids are also studied at higher temperatures and pressures. Moreover, the results are discussed in terms of the preferential (solute over solvent) interactions between the amino acids, and are then used to help explain some of the common features of temperature and pressure denaturation.

NEXT GENERATION SEQUENCING UNVEILS GENES ASSOCIATED WITH ABNORMAL PHENOTYPE IN ALS HERBICIDE RESISTANT SORGHUMS

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BACKGROUND AND PURPOSE: Acetolactate synthase (ALS) herbicides are among widely marketed herbicide chemistries. ALS resistant sorghums were developed as a viable post-emergence weed control option in sorghum. However, many of the lines resistant to ALS herbicides tend to show inter-veinal yellowing at seedling stage. Though affected plants green-up at advanced stage, this phenotype may undermine adoption of ALS resistant sorghums by farmers. The objective of this study was to identify genetic causes and plant mechanisms underlying such an abnormal phenotype. **METHODS:** Two selected ALS resistant sister lines expressing yellow and normal phenotypes were grown and leaf tissues were harvested at four different times with the last sampling made after genotypes re-greened. RNA was extracted from all samples and profiled using RNA sequencing. Differential gene expression analysis was performed using DESeq2 followed by Gene Ontology (GO) enrichment and SorghumCyc metabolic pathway analysis. **RESULTS:** Results revealed significant up-regulation of Pheophorbide A Oxygenase (PAO) and Red Chlorophyll Catabolite Reductase (RCCR) genes in yellow genotypes only during first three samplings. Both enzymes are involved in chlorophyll degradation pathway and are highly up-regulated when plants enter senescence. **CONCLUSION:** It appears that ALS lines with yellow phenotype comprise an altered PAO/RCCR gene regulation that has directed a developmental shift in chloroplasts forming gerontoplasts found in senescing leaves. However, up-regulated toxin catabolic processes thus feedback regulation of chlorophyll degradation has led to re-differentiation of gerontoplasts to chloroplasts. This was reflected through gradual re-greening of yellow plants at advanced stage. However, proteins involved in speculated altered PAO/RCCR regulation are yet to be investigated.

GENE EXPRESSION AND FUNCTIONAL ANALYSIS OF THE INTERACTION BETWEEN NEMATODES AND BACTERIA

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BACKGROUND AND PURPOSE: We aim to elucidate the genetic mechanisms that the bacteria eating nematode *Caenorhabditis elegans* employs in response to the bacterium *Stenotrophomonas maltophilia.* The study of this interaction has ecological and medical relevance as *S. maltophilia* is known to cause fatal bacteremia and is found in association with *C. elegans* and other nematodes in the wild. We have found that *S. maltophilia* isolates display different levels of pathogenicity to *C. elegans*. For example, the local JCMS isolate is more pathogenic than the clinical isolate K279a. Several genetic pathways that serve to protect *C. elegans* from pathogens have been discovered. We have found by mutation that disrupting numerous components of these pathways causes increased nematode susceptibility to JCMS. However, usually pathogen resistant DAF-2/16 insulin-like signaling pathway mutants are also susceptible to JCMS. **METHOD:** We analyzed nematode gene expression to identify candidate genes that might explain this JCMS specific evasion of the DAF-2/16 pathway. Several bioinformatic tools were used to parse the list of 395 differentially expressed genes. Of the tools used, we decided to focus our attention on WormNet v2. WormNet is a gene network model available online that uses multiple data sources and types to infer functional connections. Specifically, we focused on gene candidates that were highly connected within WormNet. **RESULTS:** All tested candidate genes by mutation showed a significant effect on nematode survival for nematodes fed JCMS or K279a. **CONCLUSION:** We propose that the use and comparison of multiple bioinformatic tools allows the more reliable identification and prioritization of gene candidates.

Poster Abstracts

Social Sciences/Humanities/Education 1

1

FOSTERING THE PROFESSIONAL DEVELOPMENT OF SAUDI FEMALE STUDENTS: IMPLICATIONS FOR EDUCATORS IN APPAREL AND TEXTILES PROGRAMS IN SAUDI ARABIA

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BACKGROUND AND PURPOSE: The participation of women in the Saudi Arabian workforce is only 14.4%, with the unemployment rate of Saudi female college graduates at 54%. To address this issue, the Saudi government is now pushing to replace foreign salesmen with Saudi women in its apparel stores; however, this is being done without properly preparing women to succeed in this industry. Thus, the purpose of this study was to develop an apparel merchandising (AM) track in the apparel and textiles (AT) discipline in Saudi Arabia based on data collected from Saudi apparel industry professionals and current apparel and textile students. **METHOD:** Qualitative data were collected in three phases: (1) the content of current AM programs in the U.S was examined, (2) the perceptions of industry professionals in Saudi Arabia was explored through interviewing 21 human resource managers and apparel store managers, (3) and the needs of students currently enrolled in AT programs were examined through interviewing 17 female students. **RESULTS/FINDINGS:** Based on the findings, an equal emphasis in developing students' hard and soft skills is needed in preparing Saudi female students for apparel retail positions. These competencies are included in developing a four-year AM curricula in Saudi Arabia. **CONCLUSION:** Despite the significance of a new AM program in enhancing the AT discipline in Saudi Arabia to meet the needs of current students and industry standards, social support is still needed to support the success of Saudi women in the apparel retail industry.

2

"WE'RE JUST TALKING": A GENDER ROLE TRANSITION

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BACKGROUND AND PURPOSE: Relationship formation is evolving and changing from past, traditional relationship models. Today, the dating scene has changed for emerging adulthood with a new "just talking" phenomenon. This new occurrence within relationship formation varies in levels of commitment, relationship expectations and intimacy, all important aspects of successful relationship formation. The current study sought to define and discover how relationship formation integrates the "just talking" phenomenon. **METHOD:** To research the concepts and definition behind "just talking," scales were created and added to the K-State Relationship Survey to analyze the social norms and behaviors behind "just talking" relationships. The survey included 664 male and female student participants (18-29 years old). **RESULTS/FINDINGS:** Within the K-State Relationship Survey, of 664 students, 64% of participants agree that it does not matter who initiates "just talking." Further, 115 additional participants strongly agreed with the statement "It does not matter who initiates just talking." While researching the concept behind "just talking," we discovered a contingency behind who initiates. Romantic relationship formation is evolving due to an increase in technology use and a casual dating culture as illustrated by "just talking." Social norms, traditional relationships, and gender roles are changing as well. **CONCLUSION**: These findings suggest that unlike the historical idea that men initiate romantic involvement, relationships, or dating, "just talking" can be initiated by both men and women.

3

"WE'RE JUST TALKING" A LOOK INTO TECHNOLOGY'S ROLE

Paul Busk, Blair McMillan, Aeriel Dodson, Megan Hiser, Cameron Brown, Allen Mallory, Jonathan Kimmes, Michelle Washburn

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BACKGROUND AND PURPOSE: Commitment and relationship formation among emerging adults has changed over the years. Dating is less common in this age group, as they have shifted towards the use of technology to get to know one another. More specifically, a newer phenomenon that seems to be currently involved in relationship formation is the concept of "just talking." In this concept, commitment levels are often times ambiguous, intimacy may or may not be involved, and expectations in the "just talking" relationship may differ from person to person. We conducted the current study to help elucidate this potential new stage of romantic relationship formation. **METHOD:** Using a large survey of K-State men and women (N = 659) in the emerging adulthood age range (18-29), specific items were used to evaluate participants extent of use of particular forms of technology in "just talking" relationships. These items were formed using preliminary findings from focus groups discussing the "just talking" phenomenon. **RESULTS**: Findings showed 39% of students reported that "just talking" occurs over texting all of the time. The next highest form of technology use was Snapchat, with 23% of participants reporting, "just talking" occurs all of the time on Snapchat. **CONCLUSION:** Further exploration is necessary in order to better understand this phenomenon of "just talking." While emerging adults at K-State seem to understand what "just talking" is and the mediums in which it occurs, many aspects are still quite ambiguous.

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PLAYING NATURALLY: A CHILD WITH AUTISM IN AN OUTDOOR SETTING

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BACKGROUND AND PURPOSE: Potential benefits have been described when children spend time in nature. Children with ASD may benefit from carefully-designed nature-based playgrounds. Such playgrounds should follow a theoretical model derived from attention restoration theory and the affordances of a nature-based environment. **METHOD:** A child with ASD ("WB") played in the Garden in three phases: an initial independent use of the space, an adult-guided experience, and return to independent use of the space. Student observers recorded the child's movements on a site map during Phases 1 & 3 and acted as "guides" for engaging in the space during Phase 2. **RESULTS/FINDINGS:** During Phase 1, free play, "WB" engaged almost exclusively (82% of 90 observation points) in the water play area. He engaged with the other children when they entered that space or attempted to use the water bowls and did not initiate communication or attempt to engage with peers in any other area. Of the 90 observation points during Phase 3, "WB" was engaged with the water bowls 27% of the time and the other areas 73% of the time. He also initiated communication with his peers in those areas and was more responsive to their social initiations. **CONCLUSION:** A brief period of adult guidance to demonstrate what is available within the outdoor space, as well as ways to engage with those materials, affords new ways for the child to use the space. Without directly targeting communication, the guided use of space resulted in increased initiations and responses to peers.

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PRODUCTIVITY OF SMALLHOLDER PRODUCERS IN NORTHERN GHANA: A GENDER BASED COMPARISON

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BACKGROUND AND PURPOSE: Women play an important role in the agricultural sector in developing countries. In Sub-Saharan Africa, women constitute approximately 50 percent of the active labor force. Even though women are involved in a variety of agricultural activities, they have limited access to resources and restricted decision-making power compared to their male counterparts. These limitations and restrictions are likely to have a significant effect on women's productivity levels compared to men. This study examines and measures the productivity differences between male and female producers in a Sub-Saharan African country. **METHOD:** A pooled ordinary least squared regression is estimated to measure the differences in productivity among men and women smallholder producers in northern Ghana. The study utilized data from a recent agriculture production survey conducted in northern Ghana for the 2013-2014 cropping season. The survey collected data from 527 smallholder farmers and included information on their production levels and managerial decisions. **RESULTS AND CONCLUSIONS:** Results indicated that the differences in agricultural productivity for men and women were due to access to improved seeds and agro-chemicals, land characteristics, and education. The results suggested that if women had access to the same quantity of inputs as men and access to more fertile field plots, then the gender-based gap in productivity would be reduced. Empowering women and giving them access to resources can help close these gender-based productivity gaps and contribute to the economic growth in the agricultural sector, which in the long run would lead to reduction in poverty and food insecurity.

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PARENTAL PERCEPTIONS OF TRANSITIONS BETWEEN CHILD CARE CLASSROOMS FOR CHILDREN BIRTH TO THREE YEARS

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BACKGROUND AND PURPOSE: The aim of this study was to analyze parental perceptions of their experience during their child's transition (< 3 years) between classrooms. Drawing from the bioecological and attachment theories, these early transitions are significant experiences for the young child's social-emotional development and parent-child relationship. Parental adjustment during this time of transition may ultimately affect the quality of the child's adjustment. Empirical research is limited on the transitional process for parents, particularly before three years of age. Knowledge regarding the meaning of this experience for parents as well as identifying specific needs that may arise during the process will inform practitioners on possible strategies to support parents during their child's first transitions. **METHOD:** Drawing from a phenomenological approach, five sets of parents were interviewed before, during and after their two-year-old child's transition between classrooms. Researchers analyzed the transcripts for common themes emerging at each point in time and across the transition. **RESULTS/FINDINGS:** Parents perceived the transition as a necessary aspect of their child's early education experience. Personal observations as well as information from teachers led parents to anticipate the benefits of their child being in a developmentally-appropriate environment with increased opportunity for varied social and cognitive experiences. When parents viewed the experience as a natural step ultimately promoting their child's development, they were able to positively anticipate and experience the classroom transition. **CONCLUSION:** Findings from this study indicate that child care practitioners can influence the experience of parents by providing information focusing on the benefits of a classroom transition in terms of their child's development.

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I WAS WALKING WITH A GHOST: LORI'S STORY, REFRAMING DISSOCIATIVE IDENTITY DISORDER AS STRENGTH

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At 47-years-old, Lori is a high-functioning businesswoman, matriarch, and contributing member of society. Lori is also diagnosed with Dissociative Identity Disorder (DID). From age 3, Lori was violently raped and assaulted by multiple perpetrators, yet views her multiple personalities as strength, as survival mechanisms and wants to share her story to help prevent child sexual abuse. **METHOD:** Utilizing methods drawn from communication studies, ethnodrama, and autoethnography, this study aims to tell a person's story in their own words, and in a format that will be easily disseminated to both academic and non-academic audiences. **RESULTS:** Lori's story will be woven together as an ethnodramatic play that includes original interview transcripts from the research along with autoethnographic monologue describing the experience of writing someone's truth when it fights against the hierarchical views of society and embraces the feminist ideals of equality and deconstruction of power while providing a platform for the value of the *n of 1*. **CONCLUSION:** Academic research is important and needs to reach further than academic journals to make a true impact. Through the non-conventional venues of autoethnography and ethnodrama, we can breathe life into our research and provide accessibility to innovative information for those who may need it most.

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"WE'RE JUST TALKING" A QUALTITAIVE INQUIRY

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BACKGROUND AND PURPOSE: Commitment is a vital component to the success of long-term romantic relationships (e.g., Robinson & Blanton, 1993; Stanley, 2005). This study aimed to explore a recent phenomenon in romantic relationships that has been referred to as "just talking." Research has shown that emerging adults often do not fully examine or understand the implications of relationship transitions before they occur. This leads to many emerging adults entering, sustaining, or ending relationships unintentionally, often without making a conscious decision. Stanley, Rhoades, & Markman (2006) explained this process as "sliding vs deciding." The current study was conducted in order to discover how "just talking" might influence the progression of romantic relationships among emerging adults. **METHOD:** Four focus groups composed of a total of 11 women and 10 men were conducted in order to generate themes regarding the phenomenon of "just talking." After a preliminary analysis, themes were identified which led to five qualtitative questions. These questions were then directed to 659 undergraduate students (18-29 years old) in the K-State Relationship Survey. Data was analyzed through a content analysis and through the use of the qualitative software NVivo. **RESULTS/FINDINGS:** The process of forming romantic relationships continues to change due to technology and percieved social norms and gender roles. A lot of ambiguity was discovered regarding "just talking", including discrepencies in defining this phenomenon. **CONCLUSION:** The current study suggests a need for further exploration concerning "just talking" and the evolving process of romantic relationship formation among emerging adults.

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EXERCISE AND DIET AS POTENTIAL MODERATORS BETWEEN TRAUMA, POSTTRAUMATIC STRESS, DEPRESSION, AND RELATIONSHIP QUALITY

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BACKGROUND AND PURPOSE: The experience of trauma is pervasive among emerging adults. Although multiple interventions have been studied as treatments for trauma, exercise and diet have not yet been examined as potential moderators of the relationship between trauma and conditions that commonly develop as a result of trauma. **METHOD:** A path analysis was used with 321 emerging adults involved in romantic relationships to test for interaction effects between the number of traumatic life events experienced and posttraumatic stress, depression, and relationship quality. **RESULTS/FINDINGS:** Although exercise was not found to be a protective factor, results revealed that a healthy diet moderated the relationship between trauma and relationship quality, such that in the context of high trauma and a very healthy diet, participants were especially satisfied in their romantic relationships. A number of significant direct effects were also observed, including that healthy dietary practices were significantly associated with posttraumatic stress, depressive symptoms, and relationship quality. We also found a significant association between the number of traumatic life events experienced and posttraumatic stress, and depressive symptoms. Exercise was also significantly associated with posttraumatic stress and depressive symptoms. **CONCLUSION:** Results suggest that healthy dietary practices are a protective factor for emerging adults who have experienced more traumatic life events. Findings provide support for the development of interventions for emerging adults aimed at health promotion through emphasizing healthy dietary practices. Findings also highlight the importance of incorporating an examination of dietary practices for clinicians providing treatment to couples and individuals who have experienced traumatic life events.

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MENTAL ILLNESS AND RISK FOR INTIMATE PARTNER VIOLENCE: A META-ANALYSIS

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BACKGROUND AND PURPOSE: Borderline Personality Disorder (PD), antisocial PD, depression, anxiety, and PTSD have been positively associated with intimate partner violence (IPV) perpetration and victimization. **METHODS:** Published and unpublished research articles from 1969-2012 were gathered using online research article search engines with specific key-word searches. Over 13,000 articles that measured physical IPV as the outcome were found, and 201 studies and 430 effect sizes met our criteria. The articles were cross-coded, and discrepancies were recorded. Meta-analytic software was used to enter, calculate, and analyze effect sizes. Using the aforementioned mental illnesses as risk markers, we tested for differences in direction of violence (perpetration vs victimization) for males and females. We also tested if males differed from females on perpetration and victimization. **RESULTS/FINDINGS:** Overall, there were few significant within or between gender differences. There was a significant gender difference for depression (Q_b (1) = 14.16, $p < .001$) with depression being more strongly related to IPV victimization for women ($r = .25$) than for men ($r = .12$). For men, depression was more strongly related to IPV perpetration ($r = .21$) than to IPV victimization ($r = .13$). For women, borderline PD was more strongly related to IPV perpetration ($r = .39$) than to IPV victimization ($r = .11$).**CONCLUSION:** All of the mental illnesses included in this analysis were significant risk markers for IPV perpetration and victimization for men and women. These findings suggest that the examined mental disorders are related to IPV and that when working with clients with these disorders, assessing for IPV is imperative.

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COMMUNICATING LOVE: RELATIONAL OUTCOMES AND LOVE LANGUAGES

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BACKGROUND AND PURPOSE: Love languages is a widespread conceptual framework utilized by many practitioners that promotes five "equal" expressions of love, however, these assumptions remain untested due to the lack of research. The present study aimed to explore interpersonal factors associated with love languages. **METHOD:** In this study, 217 college students completed the love language questionnaire and a variety of additional relational assessments. **RESULTS/FINDINGS:** Using a multiple regression analysis and controlling for relationship stability, closeness, self-esteem, age, and gender, it was found that higher value of receiving gifts was significantly associated with lower levels of relationship satisfaction (β = -.16, p < .01), less positive conflict management (β = -.21, p <.01), and lower sexual satisfaction (β = -.16, p < .01). Contrariwise, higher value of quality time was significantly associated with greater relationship satisfaction (β = .16, p < .01) and more positive conflict management (β = .20, p <.01), but not sexual satisfaction (β = .12, p = .06). The remaining languages were not significant. **CONCLUSION:** Based on these results, it is possible that promoting the value of quality time with couples may engender more satisfaction with the relationship as a whole. Clinicians, therefore, may be able to facilitate positive relational outcomes with clients through applying the love language framework in a way that encourages couples to see the value in quality time compared to promoting each partner's preference, which is the widespread application. This will help clients adopt a language that promotes stronger relationships. Further research is needed with more diverse samples.

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THE SEATED INACTIVITY TRIAL (S.I.T): HEALTH OUTCOMES ASSOCIATED WITH EIGHT WEEKS OF IMPOSED SEDENTARY BEHAVIOR

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BACKGROUND AND PURPOSE: Sedentary time is an independent risk factor for chronic disease and all-cause mortality. The negative effects of extreme sedentary behavior have been examined (e.g., bed rest); however, more true-to-life trials are necessary. The objective of this study was to determine whether imposing sedentary time would alter cardiometabolic risk in physically active adults. **METHOD:** Sixteen healthy adults (21.6 ± 1.4 years, 10 males) who met physical activity guidelines (≥150 minutes moderate-to-vigorous physical activity/week) were randomized into the sitting (SIT) group or no-intervention control (CON) group. SIT participants attended monitored sedentary sessions for eight weeks (10hrs/week). Laboratory assessments, including blood pressure, body composition scan, and fasting blood samples occurred at baseline, week four, and week eight. **RESULTS:** SIT and CON were not different at baseline for cardiometabolic risk factors (p>0.05*)*. Systolic blood pressure increased in SIT, but not CON, from baseline to week four (SIT: +10.1 ± 7.2 mmHg; CON: -7.3 ± 9.6 mmHg; p=0.001), and remained significantly elevated at week eight. At week eight, there was a significant increase in total cholesterol for SIT (+11.1 ± 12.5 mg/dL), but not CON (+1.1 ± 22.2 mg/dL), with no between-group differences. There were no changes in fasting glucose or body composition. Physical activity did not change, but SIT participants decreased caloric intake from baseline to week eight (p<0.05). **CONCLUSION:** Following eight weeks of imposed sedentary time, systolic blood pressure and total cholesterol increased in physically active adults, while caloric intake decreased. Taken together, these results suggest negative cardiometabolic outcomes may result from increased sitting.

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SENSORY PROFILING OF BREWED ARABICA COFFEE PRODUCED IN THE REGION OF HUILA, COLOMBIA

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BACKGROUND AND PURPOSE: Several studies have been conducted to understand the different compounds responsible for coffee aroma and flavor. Since the high number of compounds and complex interactions existing among them, descriptive sensory analysis is a key tool to understand the sensory properties of coffee beverages. The objectives of this study were to provide a sensory profile for Arabica coffee samples from a limited area (Pitalito, Huila, Colombia) and to determine similarities or differences among samples from the same sub-regions. **METHOD:** Thirteen medium roasted brewed Arabica coffee samples, originated from different farms in different areas of the region of Huila, Colombia, were evaluated using descriptive sensory analysis. Six highly trained descriptive panelists from the Sensory Analysis Center at Kansas State University evaluated the samples for aroma, flavor, and aftertaste. A terminology consisting of 92 terms was developed prior the evaluation. Samples were individually evaluated by panelists and ten 2 h sessions were necessary for the evaluation phase. **RESULTS/FINDINGS:** Overall, samples did not show large difference in their sensory properties although some differences were detected. Moreover results did not show effects based on sub geographical area, different farming practices or storage methods.**CONCLUSIONS:** Coffees produced in the region were similar, but effects such as different growing altitudes, or different agriculture practices adopted by the farms were not specifically related to sensory characteristics in the samples. The small differences detected can be rather be influenced by specific and unique combinations of these different aspects.

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IS THERE A LINK BETWEEN SUGAR-SWEETENED BEVERAGE CONSUMPTION AND POST-EXERCISE AIRWAY NARROWING ACROSS PUBERTY?

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BACKGROUND AND PURPOSE: Recent epidemiological data suggests that sugar-sweetened beverage (SSB) consumption plays a role in the development of asthma in adults. However, the role of SSB consumption in the manifestation of asthma across maturation remains unknown. The purpose of this study was to determine whether SSB consumption was associated with post-exercise airway narrowing (predictor of asthma development) both pre- and post-puberty. **METHODS:** We recruited 20 subjects (10 boys, 10 girls) from a previous cohort of 40 subjects tested ~5 years ago in our laboratory. At both time points, subjects completed pulmonary function tests, physical activity and dietary questionnaires, and an exercise test to exhaustion on a cycle ergometer. **RESULTS:** SSB consumption was not significantly correlated with airway narrowing pre-puberty (r = -0.35; p = 0.13), but the relationship was significant post-puberty (r = -0.60; p = 0.005). Change in SSB consumption from pre- to post-puberty was significantly associated with airway narrowing post-puberty (r = -0.61; p = 0.01) as well as change in airway narrowing from pre- to post-puberty (r = -0.45; p = 0.048). Adding fruit/vegetable intake to the regression model explaining airway narrowing post-puberty, strengthened the model (R^2 = 0.42; R^2 change = 0.12; $p < 0.05$), while inclusion of body fat percentage (R^2 change = 0.004; p = 0.76) did not. **CONCLUSION:** These findings suggest a possible link between SSB consumption and post-exercise airway narrowing, an indicator of future asthma development, in boys and girls during maturation. This research adds support to the evidence indicating that SSB consumption adversely impacts airway health.

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WHY DO THEY DO IT? AN EXPLORATION OF FACTORS THAT INFLUENCE CROSSFIT PARTICIPATION

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BACKGROUND AND PURPOSE: CrossFit is high-intensity functional training that incorporates both strength and aerobic exercises. Continued CrossFit participation helps participants meet national physical activity guidelines through group exercise. Key factors affecting CrossFit participation were explored through interviews and focus groups. **METHOD:** Participants were recruited from CrossFit gyms of different sizes and settings (e.g. military, private, university) in Kansas and Missouri. Key informant interviews involved CrossFit coaches (n=6, 67% male, 38.5±8.2y) with coaching experience of 1-9y. Participants in six focus groups (n=48 participants, 56% males, 33.7±8.6y) reported CrossFit participation from 1-50 months. Individuals interviewed (n=10, 50% male, 40.5±15.1y) had participated in CrossFit for 14-38 months. Coaches were asked "What do you feel is most important about CrossFit to your members?" CrossFit members were asked "Why do/have you continue(d) to do CrossFit?". Open coding was used to identify themes. **FINDINGS:** Four key themes were identified. Physical benefits included seeing results such as improvements in fitness, strength, technique, posture, and flexibility. Health benefits included exercise as prevention, positive lifestyle and diet changes, and decreases in chronic health conditions. Social benefits included being part of a supportive community with positive attitudes, encouragement, and strong camaraderie. Exercise programming involved good coaching, challenges, variety, and always having something new to learn. Participants noted that these benefits were not all instantaneous and often required hard work. **CONCLUSION:** Despite many health, fitness, and social benefits CrossFit does require investments of time and effort. CrossFit is a promising type of exercise to help adults meet guidelines and see health-enhancing benefits.

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SENSORY CHARACTERISTICS AND CONSUMER ACCEPTANCE OF BLACK WALNUT GELATO

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BACKGROUND AND PURPOSE: Research has not been done to determine the flavor profile or consumer acceptance of black walnut gelato/ice cream- one of the most common ways black walnuts are consumed. Characterizing the sensory attributes and consumer acceptance of gelato made with different black walnut cultivars will help guide walnut growers to select cultivars that are ideal for use in consumer food products. The objective of this study was to determine the sensory characteristics and consumer acceptance of black walnut gelato made with six different black walnut cultivars. **METHOD:** A descriptive sensory panel evaluated the black walnut gelato samples to characterize the sensory attributes of gelati made with different black walnut cultivars. The gelati samples were also evaluated by 103 consumers who were acceptors of black walnuts (either consume or willing to consume black walnuts). Consumers evaluated the gelato samples on overall liking, overall flavor liking, flavor intensity, black walnut flavor liking, and black walnut flavor intensity. **RESULTS AND CONCLUSION:** The descriptive sensory panel found that the gelati samples differed on three main flavor attributes: Black Walnut ID, Overall Nutty, and Sour. Based on consumer liking data, there were three distinct clusters of consumers. One cluster of consumers preferred gelato samples with a milder black walnut flavor, while another preferred gelato samples with more intense black walnut and overall nutty flavor. The third cluster of consumers liked all of the gelato samples. Overall, we found the Pounds II and Sparks 127 cultivars were accepted by all consumers, and therefore, are good cultivars to include in consumer products.

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FOOD SAFETY INFORMATION IN EGG DISH RECIPES

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BACKGROUND AND PURPOSE: Research has shown that many consumers do not follow recommended food safety practices for cooking egg dishes, which can lead to foodborne illnesses such as Salmonella. For egg mixtures, the USDA recommends cooking until the center of the mixture reaches 160°F. In previous studies consumers have stated that they obtain their recipes from the internet, cookbooks, and family. The objective of this study was to determine what food safety information consumers receive when cooking egg dishes. **METHOD:** Two hundred twenty-six recipes from 65 websites, 50 cookbooks, and 9 magazines were analyzed. Recipes types included in decreasing order: pie, quiche, casserole, frittata, custard, strata, soufflé, omelet, torte, pudding, egg taco, baked French toast, macaroon, and shaksouka recipes. **RESULTS:** Seventy-eight recipes gave multiple indicators for determining the endpoint of the cooking process, 95 gave a single indicator in addition to time, 50 gave only a single indicator, and 3 gave neither a visual or time indicator. Time was the most frequently used indicator, given in 204 of the recipes, with 32 of those using only time. Other indicators were if the product was set (95), browned (75), had a probe inserted and come out clean (60), puffed (20), jiggling (13), and bubbling (5). Thermometer temperatures were given in only two of the recipes. **CONCLUSION:** This review shows that consumers are not getting the recommended food safety information for cooking egg dishes from recipes. Efforts to educate consumers on food safety in egg dishes should emphasize that recipes may not give adequate end point indicators.

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RELATIONSHIP BETWEEN YOUNGER DRIVERS' RESPONSE TIMES AND VEHICLES' COLOR

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BACKGROUND AND PURPOSE: The effect of vehicle color on crash involvement has been an interesting topic for several decades; however, the effect of vehicle color on its visibility by drivers has not been studied in detail, especially at rural intersections. There has been some speculation that the combination of the vehicle color and the background environment can cause a camouflage effect on the visibility for the drivers stopped at an intersection. **METHOD:** A stopped vehicle was simulated at a rural intersection in Kansas, where a large number of crashes have occurred and various vehicles with different colors approaching from eastbound and westbound directions under different daytime light conditions were shown to participants. Response times of participants to identify the approaching vehicles were measured for each vehicle color under different conditions. The collected data were analyzed using an Analysis of Variance (ANOVA) test to determine whether the mean response times of various vehicle colors are different or not. A Least Significant Difference (LSD) test was used to identify which vehicle colors or daytime light conditions are different from the others using SPSS software. **RESULTS/FINDINGS:** Findings do not conclude that the differences between colors' response times are consistent, meaning a specific color does not stand out above the others. Despite differing lighting conditions where some colors were slightly more recognizable, the difference is not uniformly significant. **CONCLUSION:** There is not enough evidence to determine that the elevated number of crashes at the study intersection is due to camouflaging of vehicles due to coloring and no other immediate cause can be identified.

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IS HIGH-INTENSITY FUNCTIONAL TRAINING SUFFICIENT FOR IMPROVING CARDIOVASCULAR ENDURANCE IN CANCER SURVIVORS?

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BACKGROUND AND PURPOSE: Cancer survivors are recommended to follow the 2008 Physical Activity Guidelines for Americans (PAG), although specific guidelines for exercises are lacking. This study tested cardiovascular endurance of cancer survivors participating in high-intensity functional training (HIFT) and compared their workouts to PAG. **METHOD:** Cancer survivors with last treatment within five years were recruited and screened for comorbidity (n=8; ages 47-60, 25% male). HIFT was conducted three days/week for five weeks (60-minute sessions including warm-up, cool-down, and various aerobic and resistance workouts); 12 HIFT workouts were completed. A pre and post 6-minute walk test (6MWT) was conducted on a 200-meter track to measure cardiovascular endurance; the total distance was measured. Participants wore heart rate monitors at all times. Max heart rate and intensities were calculated: Max_{HR}= 207 – 0.7 x age; moderate=50-70% $Max_{HR;}$ vigorous>70% Max_{HR}. Time at vigorous intensity was doubled, added to the time spent at moderate activity, and compared to aerobic PAG (150 minutes of moderate exercise/week). Two participants dropped out after HIFT workouts 1 and 4; their heart rate data for completed sessions was included. Adherence averaged 10.33±2.25 HIFT workouts; total HR observations=63. **RESULTS/FINDINGS:** The average session lasted 48:48±13:27 (vigorous M=10:57±10:51; moderate M=24:43±12:43). Participants completed a calculated average of 139:51 per week of moderate intensity aerobic activity. There was a significant improvement in the 6MWT (638.3±41.2m vs 733.8±19.1m, t=3.23, p=0.039). **CONCLUSION:** Training at a higher-intensity led to cardiovascular improvements in less time than recommended. Indicators of improvement, not only time spent active, are important in determining exercises appropriate for cancer survivors.

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DIETARY ACCULTURATION AND INTEREST IN MODIFICATION OF STAPLE FOODS: A QUALITATIVE STUDY WITH RICE

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BACKGROUND AND PURPOSE: Immigration often brings changes in a person's lifestyle and environment, which can result in major changes in food habits, and often a less healthy diet. This study examined differences in dietary perceptions and beliefs of a staple food product and a health focused modification of that food product of native Vietnamese in Vietnam (VNV) and Vietnamese immigrants to the United States (USV). **METHOD:** The study used focus groups, a qualitative technique where participants engage in group interviews guided by a moderator. The concepts investigated were rice product awareness and beliefs, use and preparation of rice, and overall interest in value-added brown rice product concepts incorporating health related language. **RESULTS AND CONCLUSIONS:** While white rice was well accepted and daily consumed by both USV and VNV, the brown rice product concept, despite its numerous health benefits, was not readily accepted by Vietnamese consumers, either from US or Vietnam. Both sets of consumers had culturally negative associations of brown rice with poverty, aging, and illness in Vietnam and those perceptions had not changed with immigration. Neither USV nor VNV consumers considered health benefits as key factors for rice consumption, a staple food in all of their diets, a difference from Caucasian US participants studied earlier. Exposure to US culture seemed to have little impact on US-Vietnamese's rice eating habits. Thus, for a staple food product it appears that it would take time and considerable effort to impact the Vietnamese immigrants' cultural foodways.

Interdisciplinary

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STAYGREEN ALLEVIATES THE EFFECTS OF STALK ROT DISEASES IN GRAIN SORGHUM

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BACKGROUND AND PURPOSE: Stalk rots are known to be the most destructive sorghum diseases worldwide. The staygreen trait (delayed senescence) is generally accepted as a physiological means of stalk rot resistance. Staygreen is shown to be highly correlated with chlorophyll content (measured by Soil and Plant Analytical Development meter: SPAD). The objectives of this study were to test the effects of Fusarium stalk rot and charcoal rot on SPAD at three maturity stages and to investigate the relationships between SPAD and stalk rot resistance and tolerance when plants were inoculated with causal organisms. **METHOD:** Staygreen and non-staygreen genotypes established in the greenhouse and field were inoculated with three *Fusarium* spp. (*F. thapsinum, F. proliferatum, F. andiyazi*) and *Macrophomina phaseolina* at 14d after flowering. SPAD readings were obtained at soft-dough, hard-dough, and physiological maturity. Panicles harvested at physiological maturity were measured for total seed weight (TSW) and 100-seed weight (SW). Disease severity was measured by splitting stems longitudinally and measuring lesion length (LL). **RESULTS AND CONCLUSIONS:** ANOVA with combined greenhouse and field data revealed significant pathogen, genotype and growth stage main effects on SPAD. All pathogens significantly reduced SPAD readings of tested genotypes in comparison to the control. LL was significantly and negatively correlated to SPAD at physiological maturity, revealing the impact of staygreen in reducing the extent of pathogen infection. The difference between control and pathogen-treated TSW was significantly and positively correlated to the difference between control and pathogen-treated SPAD at all maturity stages, demonstrating the ability of staygreen trait to enhance stalk rot tolerance under disease pressure.

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DUPLICATION AND REDUNDANCY OF LEUCINE, VALINE AND ISOLEUCINE BIOSYNTHESIS GENES IN *ASPERGILLUS NIDULANS*

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BACKGROUND AND PURPOSE: The branched chain amino acids (BCAA) leucine, isoleucine, and valine are essential dietary amino acids in mammals; however, fungi can synthesize BCAA. Therefore BCAA biosynthesis enzymes are potential drug targets for treatment of infections by opportunistic pathogens such as *Aspergillus fumigatus*. The final two steps of leucine biosynthesis, which have been studied in yeast but not in the Aspergilli, are carried out by β-isopropylmalate dehydrogenase (β-IDH) and BCAA aminotransferase (BAT). BAT also catalyzes the final step of isoleucine and valine production. **METHODS:** Using protein sequence comparisons and phylogenetic analyses we identified two β-IDH (*leuD, leuE)* and six BAT (*batA-F*) encoding genes in the model research fungus *Aspergillus nidulans*. We compared mRNA expression levels of these genes using quantitative RT-PCR and deleted each by gene replacement. **RESULTS:** The *leuD*Δ mutant, but not *leuE*Δ, had poor growth in the absence of leucine. Furthermore, a *leuD*Δ *leuE*Δ double mutant is unable to grow without leucine supplementation. Therefore both genes encode functional enzymes. The difference in growth is likely due to higher expression of *leuD than leuE* in wild type strains. Deletion of *batA-F* separately does not result in BCAA requirement. However, simultaneous deletion of the two most highly expressed genes, *batA* and *batB,* confers inability to grow without BCAA supplementation, suggesting that *batC-F* may have acquired new roles since gene duplication. **CONCLUSION:** With the identification of *leuD, leuE, batA* and *batB,* the genes encoding the final steps of branched chain amino acid biosynthesis in *A. nidulans* have now been elucidated.

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SOY PROTEIN ADHESIVE BLENDS WITH SOY OIL BASED WATERBORNE POLYURETHANE TO IMPROVE WET STRENGTH ON WOOD

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BACKGROUND AND PURPOSE: The necessity to develop greener materials to reduce the dependence on petroleum feedstock is growing. Soy is the most promising bio-based substitution for petroleum materials due to its biodegradability and ready availability. Soy protein based adhesive has been commercially available as replacement of urea formaldehyde. However, poor water resistance has limited the application of soy protein (SP) as high performance wood adhesive. Waterborne polyurethane (WPU) can form good aqueous dispersion with excellent mechanical properties of final crosslinking network. Free isocyanate groups in WPU are possible to react with amine and hydroxyl groups in SP and crosslink SP with WPU through covalent bonds and hydrogen bonds. The hydrophobic groups from WPU are supposed to improve wet strength of adhesives based on SP/WPU blends. **METHOD:** Samples with different ratios between SP and WPU were prepared. Fourier Transform Infrared Spectroscopy (FTIR) was used to confirm the chemical reaction between SP and WPU. Differential Scanning Calorimetry (DSC) and Thermal Gravimetric Analysis (TGA) indicated thermal properties changes in blending adhesives. Apparent viscosity and dynamical modulus were studied to give information on rheology. Dry and wet shear adhesion strengths were tested with cherry wood specimen using Instron Tester. **RESULTS AND CONCLUSION:** Through covalent and non-covalent interactions with WPU, SP could be modified into functional copolymers with good compatibility. The blends are stable dispersions with acceptable viscosity. The wet adhesion performance of SP/WPU blends has been improved significantly.

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ROLE OF HIGH-INTENSITY-PRECONDITIONER IN PET FOOD SAFETY

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BACKGROUND AND PURPOSE: Both pet food industry and pet population are fast developing. There are several pet food related *Salmonella* outbreaks every year and it starts to grab pet owners' attentions. Pet food mix with a simple formula was used in our study as base material and inoculated with *Enterococcus faecium* (*E. faecium*), which has been approved to be a nonpathogenic surrogate for *Salomnella*. **METHOD:** The study had two phases: phase 1 was to test residence time distribution (RTD) in High-Intensity-Preconditioner (HIP) by manipulating the machine with different shaft speed and direction. Phase 2 was to test the impact of processing temperature and residence time on microbial destruction. 2 temperature ranges (150-160^{o}F & 190-200^{o}F) were picked out along with 2 residence time setups (153sec&65sec). 3 treatments were conducted and concluded that longer residence time and/or higher temperature would have positive impact on decreasing microbial population. **RESULTS/CONCLUSION:** More than 4log, 2log and 5log of microbial population were reduced under 153^{o}F &153sec, 154^{o}F & 65 sec and 196^{o}F & 65sec conditions, respectively. However, due to the large throughput in the preconditioner, heat was not able to uniformly distribute which led to the condition that even under high temperature (196^{o}F), there were still some microorganisms managing to survive. Both low temperature (153-154^{o}F) and high temperature (196^{o}F) conditions were capable of injuring bacterial cells and injured cells were able to get recovery when nutrients and optimal environment was provided.

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CHARACTERIZATION OF ORGANIC CARBON IN SOIL AGGREGATES FROM TEMPERATE CONTINUOUS CORN SYSTEM WITH CONTRASTING MANAGEMENT PRACTICES USING NEXAFS AND ^{13}C-NMR SPECTROSCOPY

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BACKGROUND AND PURPOSE: Understanding the chemistry of soil organic carbon (SOC) is useful in determining the level of C stabilization. Main mechanisms of SOC stabilization are biochemical recalcitrance, chemical stabilization, and physical protection. The objective was to characterize SOC and to determine the degree of C stabilization using synchrotron based C (1s) near edge x-ray absorption fine structure spectroscopy (NEXAFS) and ^{13}C-nuclear magnetic resonance (NMR) in water stable soil aggregates from long-term continuous corn system with contrasting management practices. We hypothesize that long-term soil management practices affect SOC stabilization. **METHOD:** Soil samples were collected from the north agronomy farm, Manhattan, KS (0-5 cm depth). This site has been under 22 years of continuous corn and had two tillage treatments (no-till and conventioanl till), two fertilizer treatments (fertilizer and manure) and a control with 4 field replicates. Four different classes of soil aggregates (macroaggregates, mesoaggregates, large microaggregates and small microaggregates) were separated by wet aggregate sieving method. Bulk C-NEXAFS data were collected at Canadian light source. Data analysis was done using Igor Pro, Axis 2000, and Athena. Macromolecular C chemistry of extracted humic acid from soil aggregates was determined using liquid-state ^{13}C-NMR.
RESULTS/ FINDINGS: All the aggregate sizes were dominated with aliphatic and aromatic C. Both manure addition and no-till management practices enhanced the propotions of labile C (aliphatic C) in soil aggregates and this could be an indication of improved or long-term C stabilization mechanisms. **CONCLUSION:** Long-term favourable agricultural management practices may induce SOC-stabilization through chemical stabilization and physical protection mechanisms indicating enhanced propotions of labile C.

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DEVELOPING BEST MANAGEMENT PRACTICES (BMPs) TO MINIMIZE PHOSPHORUS LOSS FROM POULTRY LITTER APPLICTIONS IN SOUTHEAST KANSAS

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BACKGROUND AND OBJECTIVES: Developing best management practices to decrease phosphorus (P) loss from agricultural fields is an important environmental and agricultural priority. However, field-scale studies to evaluate P loss are expensive and time consuming and results are highly dependent on the weather patterns. The objective of this study was to determine the optimal timing, frequency, and rate for poultry litter applications to row-crop production systems using the Agricultural Policy/Environmental Extender (APEX) model. **METHODOLOGY:** The APEX model was calibrated and validated on event basis for runoff, sediment, and P loss based on the Nash Sutcliffe efficiency (NSE), coefficient of determination (r^2), and percent bias. **RESULTS:** The NSE was 0.63, -0.68, and 0.64 for runoff, sediment and TP during calibration and 0.70, -0.13, and 0.67 respectively during validation. Likewise, the r^2 was 0.87, 0.19 and 0.73 for runoff, sediment and TP during calibration and 0.84, 0.18 and 0.80 respectively during validation. The fully calibrated model was used to evaluate the effect of litter application timing (spring vs. fall), frequency (one, two, or four phosphorus and a nitrogen rate applications in a four-year rotation), and rate on P loss in two tillage systems (no-till and chisel tillage) for 100 different weather scenarios for each combination of rate, timing, and frequency. **CONCLUSION:** The results indicated that applying litter 2 Mg ha^{-1} every other year is the best method compared to others in an eight year corn-soybean crop rotation and 4 Mg ha^{-1} every other year and November application may be an acceptable management practice weighing environmental and economic benefits.

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ELEVATED CARBONDIOXIDE LOWERS NUTRITIONAL QUALITY OF LETTUCE AND SPINACH

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BACKGROUND AND PURPOSE: High CO_2 can severely affect not only crop production and food security but also the ability to provide food that is nutritious to humans. Therefore in this study, we investigate the effects of high CO_2 on the growth and nutritional quality of commonly consumed leafy vegetables namely, lettuce and spinach. **METHOD**: The plants were grown in controlled environment chambers maintained at 18/20^oC (night/day) and 250-300 □mol.$m^{-2}s^{-1}$ (PAR) and at two CO_2 concentrations, 400 ppm (control) and 700 ppm (elevated CO_2). Plants were analyzed for biomass accumulation, net photosynthesis, stomatal conductance and nutritional composition: major nutrients and health-promoting phytochemicals. **RESULTS AND CONCLUSION**: Results showed that biomass accumulation increased with increasing CO_2 in both lettuce and spinach. However, there was no significant effect on net photosynthesis, perhaps due to reduced stomatal conductance under elevated carbon dioxide level. Also, elevated CO_2 did not significantly affect the carbon accumulation, however, it significantly reduced the nitrogen content in the leaves of both lettuce and spinach, suggesting that increasing CO_2 levels may depress the protein content in these crops. In addition to N, high CO_2 reduced many other important major nutrient levels: phosphorus, potassium, copper, zinc and manganese in lettuce leaves and levels of potassium, iron and copper in spinach leaves. The study also examines the changes in many health-promoting phytochemicals in these crops grown at high CO_2. Overall, the results show that increasing ambient CO_2 has a negative impact on the nutritional quality of both lettuce and spinach.

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STOCHASTIC MODELING OF FLOW BEHAVIOR AND CELL STRUCTURE FORMATION DURING EXTRUSION OF BIOPOLYMER MELTS

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BACKGROUND AND PURPOSE: Extrusion is a widely used processing technology for various food products and non-food applications. Variability in extrusion parameters such as water injection and screw speed is often observed depending on the process controls employed. Stochastic modeling helps in studying the impact of variability of various parameters on the end product, which in turn helps in better process and product quality control. The primary purpose of this research was to develop a stochastic model for flow behavior of biopolymer melts inside extruder barrel and bubble growth dynamics after exiting the extruder using mass, heat and momentum transfer equations. **METHOD:** The mathematical model was developed and integrated with a Monte-Carlo based stochastic interface for input of randomly generated process data (based on experimental data acquisition) and output of simulated distributions of end-product properties such as expansion ratio and cellular architecture parameters (cell size and wall thickness). The model was experimentally validated using pilot-scale twin screw extrusion for processing of cereal-based cellular products. Process and product data were measured at different in-barrel moisture contents (19-28% dry basis) and experimental screw speeds (250-330 rpm). **RESULTS AND CONCLUSION:** Experimental process parameters such as specific mechanical energy (212.8-319.3 kJ/kg), die temperature (120.7-170.6 ^{o}C), die pressure (3160-7683 kPa) and product characteristics such as expansion ratio (3.29-16.94) and cell size or bubble radius (435-655 microns) compared well with simulated results from the mathematical model. Sensitivity analysis showed that the water added in extruder affects the magnitude and variability of expansion ratio the most, as compared to screw speed and consistency index.

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PRELIMINARY STUDIES ON *IN SITU* MONITORING OF LACTOSE CRYSTALLIZATION USING FOCUSED BEAM REFLECTANCE MEASUREMENT

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BACKGROUND AND PURPOSE: Lactose is the most abundant carbohydrate present in milk. One of the factors influencing industrial crystallization of lactose was degree of supersaturation. Concentration is the time dependent phenomenon in lactose crystallization and controlling crystallization step with non-invasive and online methods is essential in current manufacturing practices to meet required crystal size distribution (CSD). Focused Beam Reflectance Measurement (FBRM) could be used to monitor the CSD and chord length distribution (CLD) *in situ* from supersaturated alpha lactose. Overcoming industrial problems like production loss because of failure in separation of too many fine in decanter and, troubles in drying because of too many large crystals can be reduced by controlling CSD. **METHOD**: The FBRM data were compared with Brix readings taken over time using a refractometer during isothermal crystallization. Chord length distribution obtained from FBRM in the ranges of <50 µm (fine crystals) and 50–300 µm (coarse crystals) were observed and evaluated in relation to the extent of crystallization and rate constant results deduced from the refractometer measurements. **RESULTS AND DISCUSSION**: The measured fine crystal counts increased with supersaturated concentration and temperature during isothermal crystallization. On the other hand, coarse counts were observed to increase with decreasing supersaturated concentration and temperature. **CONCLUSION**: The efficiency of FBRM in studying lactose crystallization with respect to operation parameters such as concentration and temperature was evaluated. FBRM is a powerful tool, and it can be used to follow secondary nucleation as a result of attrition and breakage apart from chord length distribution and crystal size.

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BERMUDAGRASS CONTROL WITH GLYPHOSATE, FLUAZIFOP, AND MESOTRIONE FOR SPRING RENOVATION

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BACKGROUND AND PURPOSE: Effective bermudagrass (*Cynodon* spp.*)* removal is necessary for spring cool-season turfgrass establishment. Common non-selective removal recommendations include multiple glyphosate applications while bermudagrass is actively growing. Summer application timings are not practical for spring establishment of cool-season turfgrass. Non-selective control of bermudagrass through a fall application has not been examined. **METHOD:** Experiments were initiated in 2013 in Manhattan, KS at Rocky Ford Research Center (RF) and Stagg Hill Golf Course (SH) to determine non-selective bermudagrass control with glyphosate, fluazifop and mesotrione combinations prior to winter dormancy for spring renovation. Research at RF and SH was conducted on hybrid 'Midlawn' bermudagrass [*Cynodon dactylon* (L.) Pers.× *C. transvaalensis* Burtt-Davy] and common bermudagrass (*Cynodon dactylon* L. Pers*),* respectively. Treatments included all single herbicides and all possible combinations. All treatments were applied 9 October 2013. Experimental design was a randomized complete block with four replications. Herbicides were broadcast sprayed over 1.5 x 1.5 m plots. Visual percent green bermudagrass cover (0-100%) and Normalized Difference Vegetation Index (NDVI) were collected. **RESULTS/FINDINGS:** Significant differences between RF and SH prevented pooling spring green-up data. No difference in bermudagrass green up was observed at RF as all reached 100% green cover (25 Aug 2014). At SH, glyphosate, glyphosate + fluazifop, glyphosate + mesotrione, and glyphosate + fluazifop + mesotrione resulted in <38% green cover. **CONCLUSION:** Bermudagrass variety plays a key role in non-selective fall bermudagrass removal. Applications including glyphosate provide the best control of bermudagrass with a fall application timing. Research will be conducted the fall of 2014 to further examine variety differences.

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EX-ANTE ECONOMIC ASSESSMENT OF SORGHUM INNOVATION IN ETHIOPIA

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BACKGROUND AND PURPOSE: To improve the economic welfare of poor farmers, sorghum of high-yield and high-nutritional value is going to be introduced in Ethiopia. The resulting increase in supply and demand, may increase or decrease quantity and price of sorghum and other related crops depending on market dynamics. To better understand the economic impact of this new sorghum variety, it is essential to understand the effects on sorghum and related markets. In this study, ex-ante economic assessment is conducted to evaluate the impact of the new sorghum variety in Ethiopia. **METHOD:** An equilibrium displacement model is used to analyze the impact of new sorghum variety using single market (assuming the program affects only sorghum market) and multi-market (assuming the program affects multiple markets such as sorghum and other related cereal crops) models. Data is collected from previous studies, World Bank and FAO statistics. **RESULTS AND CONCLUSION**: findings indicted that the benefit of the program to farmers from sorghum under multi-market model as compared to single market model is smaller and creates loses and gains from the other related commodities. It is concluded that importance of using multi-market model increases with the increase of degree of relationship (cross elasticity) between sorghum and the related commodities.

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VISUALIZATION STUDY OF DROPWISE CONDENSATION IN MINICHANNELS

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BACKGROUND AND PURPOSE: Condensation in mini- and micro-channels has been a research topic of interest in the last ten to fifteen years due to the increase of heat transfer coefficients at decreasing diameters. This improved heat transfer performance enables the creation of lighter, more compact condensers for power generation, desalination, and other industrial applications. Furthermore, it has been shown that surface coatings which promote dropwise condensation can increase the heat transfer coefficient by an order of magnitude compared to filmwise heat transfer coefficients. Therefore, hydrophobic mini-channels offer an opportunity for significant heat transfer enhancement. **METHOD:** This study will visualize steam flow condensation in a 1-mm hydraulic diameter mini-gap (10 mm x 0.52 mm) for a wide range of qualities (0.2-0.9) and mass fluxes (50-200 kg/m^2s). Qualitative and quantitative observations and measurements regarding the effects of droplet nucleation and sweeping effects will be used to aid understanding of the formation and movement of the water film in hydrophobic and hydrophilic channels. **RESULTS/FINDINGS:** The research objectives of this paper are to explore the governing mechanisms for steam flow condensation in a minichannels enhancement using flow visualization techniques. Qualitative images and quantitative measurements will be compared for a Teflon AF^{TM} coated hydrophobic mini-gap and a copper, hydrophilic mini-gap. **CONCLUSION:** The effects of higher mass flux, and thus higher droplet shear force, will be analyzed and discussed. Flow visualization results will be compared to the flow maps developed by Taitel and Dukler (1976) for liquid-gas flows and Coleman and Garimella (2003) for condensing refrigerant.

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AQUEOUS ENZYMATIC EXTRACTION OF OIL AND PROTEIN FROM MICROALGAE

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BACKGROUND AND PURPOSE: Economic and life cycle assessment studies of microalgae as a biofuel feedstock have shown that, inefficient oil extraction and recovery limit the commercialization of microalgal-derived biofuels. Current extraction methods are either disadvantageous due to the costs associated with the energy-intensive processes of drying and mechanical pressing or environmentally unfriendly due to the utilization of solvents. Furthermore, other valuable compounds, such as proteins, may be degraded during extraction. The use of aqueous enzymatic extraction (AEE), a non-solvent and environmentally friendly oil recovery method, provides an opportunity to design an integrated process for protein and oil fractionation to reduce costs of bioenergy production. **METHOD:** A study was conducted to evaluate the feasibility of utilizing AEE for oil and protein recovery on the freshwater microalgae *Chlamydomonas reinhardtii* after 48 hours of oil induction via nitrogen deficient growth conditions. **RESULTS/FINDINGS:** Cell wall degradation was evident in between 3 and 12 hours of incubation and was dependent on dosage and treatment conditions, such as pH, temperature, and degree of mixing. **CONCLUSION:** Results indicate that enzymes can successfully degrade the cell wall and facilitate oil extraction from microalgae, providing an alternative to traditional methods of oil extraction.

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A KIRKWOOD-BUFF DERIVED FORCE FIELD FOR ESTERS

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BACKGROUND AND PURPOSE: Here, we describe our ongoing efforts to improve the parameters used for classical molecular dynamics simulations of esters with the overall goal of providing an accurate description of lipids and membrane systems. The approach is outlined and illustrated for solutions of esters in water and alcohol solvents. **METHOD:** Parameters were optimized in order to reproduce experimental Kirkwood-Buff integrals that have been obtained from the thermodynamic properties of solution mixtures. This differs from the usual approaches taken in the field and provides an atomic level description of the properties of solution mixtures. **RESULTS AND CONCLUSIONS:** In addition, these models also reasonably reproduce many other properties of ester solution mixtures including the density, enthalpy of mixing, diffusion constants, and dielectric constants. The models developed here can be considered an essential first step in the development of accurate models for lipids which represent the dominant components of biological membranes.

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3D PRINTED POINT-OF-CARE DEVICE FOR PERSONALIZED DISEASE DIAGNOSIS

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BACKGROUND AND PURPOSE: Developing low-cost biomedical devices for personalized, near patient, point-of-care (POC) diagnostics is growing incredibly in recent years. POC diagnosis bypasses the need for sophisticated laboratory systems and substantially boosts the healthcare accessibility. The cost of POC diagnosis is only ~2% of conventional clinical tests, yet can affect 60-70% of treatment decisions, which has not taken into account extra costs related to false-positive biopsies and additional clinic visits. However, classical microfabrication of polymer-based POC device requires specialized skills and resources for producing replicable mold. Paper-based POC device only provides simple geometry with limited assay functionality. **METHOD:** We developed a low-cost POC device using consumer-grade 3D printer in ~50 □m printing resolution, which allows on-site customization of diagnostic test for personalized medicine. In contrast, the consumer-grade 3D printer centralizes all critical fabrication tasks for making highly versatile geometries and functionalities in one piece, yet in low cost. Most importantly, the simplest microfabrication process enables on-site and end-user customization with minimum infrastructure. We demonstrate the 3D fabrication of a continuous-flow mixer integrated with immunomagnetic beads concentrator for rapid isolation of diagnostic exosomes directly from human plasma. The isolation of diagnostic exosomes is characterized in terms of mixing efficiency and capture efficiency. The fabricated device is compatible with fluorescence microscopy and color imaging readout. **CONCLUSION:** The 3D-printer enabled fabrication approach will provide broader access to more versatile POC devices compatible with fast and affordable customization for personalized disease diagnosis.

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A METHOD TO MEASURE NANOMECHANICAL PROPERTIES OF BIOLOGICAL OBJECTS

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BACKGROUND AND PURPOSE: Key processes related to development and tissue homeostasis depend on mechanical properties of the involved proteins, cells, and other biological objects. It has become possible to interrogate such processes in situ and with a spatial resolution down to a single molecule. We are now able to quantitatively infer changes in the mechanical properties of such biological objects by measuring the shifts of several thermally excited resonance frequencies of atomic force microscopy (AFM) cantilevers in contact with biological objects. **METHOD:** We developed a method which allows us to measure nanomechanical properties such as spring constants and molecular damping factors of biological objects from the shifts of the resonance frequencies of a thermally excited AFM cantilever in contact with such an object in biologically relevant phosphate buffered saline (PBS) medium and using compliant AFM cantilevers with a small aspect ratio (a ratio of length to width).**RESULTS AND CONCLUSION:** We developed an accurate model and a method to fit thermal resonances for compliant AFM cantilevers in biological media like PBS. Mechanical signatures of proteins and cells can now be obtained by fitting the frequency shifts of flexural resonances of AFM cantilevers in contact with biological objects. Our model can also be used to describe changes in the mechanical signature with time, e.g., to describe single protein folding trajectories under force.

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EVALUATION OF EFFICACY OF CHEMICALS FOR PROTECTION AND PEST PREVENTION AS POTENTIAL SUBSTITUDES TO METHYL BROMIDE IN DRY CURED HAM PLANTS

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BACKGROUND: Dry cured ham is protected from arthropod infestations using the fumigant methyl bromide. *Tyrophagus putrescentiae*, known as mold mite, decrease the quality and quantity of dry cured hams during the aging process and is a serious threat to dry cured ham companies. Methyl bromide is a strong ozone depleting substance and it will be phased out from all industries in the U.S. by the end of 2015. Consequently, developing effective, feasible, and economic alternatives to methyl bromide is the main purpose of current project. **METHODS:** A. Small ham cubes were coated with the mixture of edible gels and propylene glycol and then infested with twenty adult mites in small jelly jars kept in an incubator. Mite populations were assessed after two weeks and treatment differences were assessed. B. Small glass vials were treated with different concentrations of ten registered residual pesticides and forty mites were transferred to each vial for 24 hrs of exposure on contact. Also persistence of these residual pesticides was evaluated over a two-month period. **RESULTS AND CONCLUSION:** Results indicated that carrageenan in combination with propylene glycol was significantly effective in preventing mites infestations compare to untreated ham cubes. Furthermore, the commercial products Storicide II®, Phantom®, and Malathion® showed promising results for contact toxicity against mites, and Phantom® was highly effective at very low concentrations. This research aimed to find potential alternatives to methyl bromide and results show that some of the introduced materials and methods may be able to address this question after further investigations.

WITHDREW

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INVESTIGATING THE EFFECTS OF RIG-I ON RIFT VALLEY FEVER VIRUS REPLICATION

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BACKGROUND: Rift Valley fever virus (RVFV) is a mosquito-borne, negative-sense, single-stranded RNA virus endemic to sub-Saharan Africa and the Arabian Peninsula, which causes sporadic outbreaks in ruminants and humans. Mammalian hosts use multiple strategies to suppress RNA virus entry and replication. One such mechanism is the induction of the retinoic acid inducible gene 1 (RIG-I), a pattern recognition receptor, which binds double-stranded RNA and induces anti-viral responses. A previous study demonstrated that RIG-I interacts with the 5'-triphosphate of RVFV double-stranded RNA bound to viral nucleoprotein but the potential effects of this interaction on RVFV replication have not been studied. The purpose of this study is to characterize the effects of RIG-I on RVFV replication. **METHODS:** We will infect human embryonic kidney cells with RVFV in the presence of transfected RIG-I and measure virus replication via quantification of viral RNA, protein, and infectious virus. Additionally, we will quantify the induction of RIG-I effectors such as type 1 interferon and other RIG-I cascade products and conduct parallel experiments in RIG-I effector deficient mammalian cells. **ANTICIPATED RESULTS:** We anticipate that RIG-I will inhibit RVFV replication in the presence but not the absence of RIG-I or RIG-I effectors. **CONCLUSIONS:** Results from this study will determine the importance the RIG-I pathway in the context of RVFV infection and further characterize the mammalian innate immune response to RVFV.

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CHRONIC HEART FAILURE AND NITRATE SUPPLEMENTATION: IMPACT ON SKELETAL MUSCLE VASCULAR CONTROL IN EXERCISING RATS

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BACKGROUND: Chronic heart failure (CHF) results in central and peripheral derangements that reduce skeletal muscle O_2 delivery and impair exercise tolerance. Dietary nitrate (NO_3^-) supplementation improves skeletal muscle vascular function and improves tolerance to exercise. We tested the hypothesis that NO_3^- supplementation would elevate exercising skeletal muscle blood flow (BF) and vascular conductance (VC) in CHF rats. **METHODS**: Myocardial infarction (MI) was induced in young-adult male rats. After 21-days, rats received NO_3^- rich beetroot juice (CHF+BR, n=10) or a placebo (CHF, n=10). Mean arterial pressure (MAP, carotid artery catheter) and skeletal muscle BF (radiolabeled microspheres) were measured during treadmill exercise (20 m/min, 5% grade). **RESULTS**: CHF parameters (MI size, CHF: 29 ± 3, CHF+BR: 33 ± 4%, LVEDP, CHF: 18 ± 2, CHF+BR: 18 ± 2 mmHg) and exercising MAP (CHF: 131 ± 3, CHF +BR: 128 ± 4 mmHg) were not different ($P<0.05$) between groups. Total hindlimb skeletal muscle BF (CHF: 95 ± 5, CHF+BR: 116 ± 9 ml/min/100g) and VC (CHF: 0.75 ± 0.05, CHF+BR: 0.90 ± 0.05 ml/min/100g/mmHg) were greater ($P<0.05$) in BR supplemented rats. The increases in BF and VC ($P<0.05$) were found preferentially in muscles and muscle parts containing ≥70% type IIb + d/x muscle fibers which resulted in a ~22% increase in total skeletal muscle BF and a 20% increase in total VC during exercise. **CONCLUSION**: These results provide evidence that dietary NO_3^- supplementation improves skeletal muscle vascular function during exercise in rats with CHF and suggests that BR may provide a therapeutic modality for treatment of CHF.

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IDENTIFYING INTERACTING PROTEINS AND THE FUNCTIONAL ROLE OF CLN8, A NEURODEGENERATIVE DISORDER RELATED PROTEIN

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BACKGROUND: CLN8 is an endoplasmic reticulum (ER) resident membrane protein with unknown function. Mutations in CLN8 lead to neuronal ceroid lipofuscinoses (NCLs), a group of inherited neurodegenerative lysosomal storage disorders that mainly onset during childhood. CLN8 is a 286 amino acid protein consisting of several transmembrane domains and a cytoplasmic C-terminus that contains an ER retrieval signal KKXX. Consistent with this CLN8 has been shown to localize mainly in the ER and travel between ER and ER-Golgi intermediate compartment. **OBJECTIVE AND METHOD:** In an attempt to identify proteins that could be potentially interacting with CLN8 we made constructs for soluble portions of CLN8. CLN8 (246-286) cytoplasmic region was used in a Glutathione S-transferase (GST) pull down experiment and Mass spectrometry analysis. **RESULTS AND CONCLUSION:** In repeated GST pull down and respective Mass spectrometry analysis experiments we were able to identify several potential target proteins including Serine carboxypeptidase (CPVL), Protein phosphatase 2A (PP2A) subunits A and B, protein SET which is an inhibitor of PP2A, Protein phosphatase 1G, and alpha and beta subunits of Coatomer protein complex which are coat components of Golgi-ER retrograde transport vesicles. Western blot analysis confirmed GST-CLN8 (246-286) pull down CPVL with high affinity. The results suggest that CLN8 could potentially be involved in protein and lipid trafficking. Future studies will address how CLN8 interacts with these proteins.

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DOES VO_{2peak} MODERATE THE ASSOCIATION BETWEEN DIETARY FAT INTAKE AND POST-PRANDIAL FAT OXIDATION?

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BACKGROUND AND PURPOSE: Current evidence suggests individuals with low fat oxidation at rest are more prone to developing metabolic disorders. Both exercise training and high-fat diets may increase fat oxidation. It is unclear, however, whether exercise training influences the relationship between dietary fat and post-prandial (PP) fat oxidation. The purpose of this study was to determine whether VO_{2peak} moderates the association between dietary fat and PP fat oxidation after a high-fat meal. **METHODS**: Twenty-nine adults (17 Males, aged 19-38yrs) of varying aerobic capacities (VO_{2peak}=49.4±11.1 ml/kg/min) were randomized to either a moderate intensity walking (EX) or sedentary condition. In the EX condition, walking was performed 60min PP. After a 12hr fast, all participants consumed a high-fat breakfast (65% fat, 10 kcal/ kg BW). Resting metabolic rate was assessed immediately after and 200min PP. **RESULTS**: Fat oxidation at baseline was not different from 200min PP ($p>0.05$). Significant correlations were found between dietary fat intake and 200min PP fat oxidation ($r=0.37$, $p<0.05$) and VO_{2peak} and 200min PP fat oxidation ($r=0.62$, $p<0.01$). VO_{2peak} did not moderate the association between dietary fat and PP fat oxidation ($\Delta R^2=0.007$, $p=0.60$). Linear regression, including VO_{2peak}, dietary fat, %body fat, baseline fat oxidation, and energy balance PP; predicted 79% of PP fat oxidation variance (adjusted $R^2=0.79$, $p<0.001$). **CONCLUSION**: VO_{2peak} did not moderate the association between dietary fat intake and PP fat oxidation. When examining additional factors correlated with fat oxidation, however, 79% of the variance in PP fat oxidation was explained, indicating that post-prandial fat oxidation is a complex process with multiple contributing factors.

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(Presenting Authors Only)