PROCEEDINGS

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Refereed Abstracts

Elizabeth Newcomb Hopfer, Editor
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Exploring Effectiveness of Buddy Reading Program Between Kindergarten and First Grade Students

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Purpose and Rationale: Reading competency is an imperative part of children’s academic performance, future success, and career development. The ability of a student to read at grade level is one of the most important competencies achieved at school, as reading skills are essential for every course of study and career path. The more students read, the higher their reading levels become (Concordia University-Portland, 2018). Therefore, it is important for educators to look for strategies that enhance literacy skills and reduce the stress associated with reading, particularly for students struggling with reading. Thus, the purpose of this study was to explore the effectiveness of a 4-week buddy reading program between kindergarten and first grade students at a primary school in a southern rural community.

Methodology: A practical action research design was used to create a buddy system intervention for first grade and kindergarten students in a primary school to help solve the immediate problem of low reading comprehension scores among first grade and kindergarten students. Vygotsky’s sociocultural theory (1978, 1986), which focuses on how individuals are shaped by what they see others do, guided the study.

Participants were kindergarten and first grade students (n = 84). The intervention group (n = 42) consisted of kindergartener and first grader pairs to buddy read, and the control group was another pair of kindergarteners and first graders (n = 42) who received standard classroom instruction. The Reading Attitude Survey and mClass Reading 3D assessment were used to assess how the buddy reading program impacted students’ attitudes toward reading, as well as their text reading comprehension (TRC) and dynamic indicators of basic early literacy skills (DIBELS) scores, respectively. Field notes were gathered by the authors to provide qualitative insight into the buddy reading process. The University Institutional Review Board (IRB) approved the study. Parents provided consent and student assent to participate in the buddy reading program. Data was analyzed using Excel (survey), an independent samples t-test (change in TRC scores), and theme analysis (qualitative data).

Findings: The survey indicated that attitudes toward reading of the first graders in the intervention group increased from pre-to-post survey (63% vs. 100%). Similarly, kindergarteners’ reading attitudes improved from 23% to 71%. There was a statistically significant difference in the end of year TRC scores between kindergarten intervention group (M=4.05, SD=3.045) and control group (M=2.29, SD=1.102) t (22.236) = 2.391, p = 0.026. This suggests that the buddy reading intervention has a positive effect on the end of the year mClass Reading 3D text comprehension assessment and should be considered when investigating approaches to improve and motivate students’ reading skills. No significant difference in the mean scores were found among first grade intervention and control groups. Field notes revealed the buddy reading program increased students’ confidence and motivation to read as well as collaboratively learn from each other.

Conclusions and Implications: The results generally show support for previous literature on effective strategies for improving reading comprehension. Students’ attitudes toward reading improved, which may have led to developed confidence in reading comprehension (Cassy, 2009). Kindergarten students’ improvement in end-of-year test scores shows improvement in comprehension skills, which is consistent with Theurer and Schmidt’s (2008) study implementing similar strategies. By using first graders as mentors, kindergarteners developed better reading skills and attitudes toward reading, showing that having a human mediator resulted in an inner desire to internalize skills taught by higher-skilled mentors (Vygotsky, 1978). Additionally, the end-of-year testing served as evidence of the effectiveness of the Zone of Proximal Distance (ZPD) in increasing test scores from pre- to post-intervention (Vygotsky, 1978).

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Rural Transformational Service Activities with Pre-K-12 Teachers

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**Purpose and Rationale:** Higher education programs are engaging in more community partnerships to augment their teacher shortage. Several teacher education programs across NC are designing service-learning engagement approaches and experiential activities by preparing pre-service teacher candidates for employment opportunities in rural and underserved communities. The underlying rationale of this project is to improve the teacher shortage in rural and underserved communities and the vital role that higher education programs play to prepare pre-service teacher candidates for employment opportunities in rural and underserved public or private schools, community agencies or organizations.

**Methodology:** During 2017-2018 internship program, 28 high performing pre-service teacher candidates (6 birth-kindergarten, 17 elementary education/special education, 2 agricultural education, 2 history education, and 1 speech) served as paid interns. Teacher candidates were recruited and accepted into the internship program in rural and underserved public or private schools, community agencies or organizations across North Carolina for 10 weeks. All interns met educator preparation program admission standards with a wide array of specific cognitive social, and technology requirements. Interns completed a written application, interviewed, and submitted additional evidences to be accepted into the internship program. All interns designed an action service plan based on their site partner’s service needs such as STEM awareness programs, tutoring and mentoring K-12 students, technology-based projects, food and clothing drives, and community cultural activities. Selection criteria for service partners exemplify “best practices” in the teacher education profession in which interns enhance their knowledge, skills, and dispositions from different aspects of culture, diversity, and community life in rural and underserved communities. Finally, qualitative data using a heuristic approach with surveys structured questionnaires from interns and site partners’ results was analyzed and coded by the research team. Results from both parties’ presented the most dominant themes and patterns from variables such as relevance of the job experiences, community service learning development, and career opportunities for future employment as a direct result from participation in the program.

**Findings:** Analysis from qualitative data results suggested that interns and site parties had positive responses relative to the relevance of the job experiences with the capacity to build and sustain professional development service-learning projects in rural and underserved communities. Site partners’ surveys suggested that the interns developed, implemented, and disseminated high-quality artifacts that met their service development needs using individualized plans within a research model format. Data further suggested that over 90% of the interns received favorable responses to return for future internships or employment opportunities in rural and underserved communities.

**Conclusions and Implications:** There is a growing need for educator preparation programs in higher education to establish more diverse service immersion experiences for pre-service teacher candidates with employment opportunities to combat teacher shortages in rural and underserved communities in NC. According to our research model with pre-service teacher candidates, student's understanding of rural communities in North Carolina service learning experiences was enhanced by implementing journal writings, literature reviews, and weekly discussions with their faculty mentors. Equally important, we hope that this service-learning experience will serve as a research teaching model for future exploration use in higher education with rural and underserved communities.

This internship program was sponsored by North Carolina State Employees Credit Union Public Fellows Internship Program.

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Adolescents Internalizing Behaviors: The Role of Authoritative Parenting, Parent-Adolescent Religiousness and Connectedness

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Purpose and Rationale: Religion and parenting style play significant role in the psychological health and well-being of adolescents (Kim-Spoon, Longo, & McCullough, 2012). It is estimated that 11.4% of adolescents (ages 12-17) in the US report on internalizing behaviors which include internal/behavioral experience of depression and/or anxiety (Barber, Stolz, Olsen, & Maughn, 2005), and suffer at least one major depressive episode in the past year (National Institute of Mental Health, 2015). However, the links between this public health issue of adolescents (depression and anxiety) and its association with religiosity and parenting style has not been thoroughly established. The purpose of this current study was to explore relationships among authoritative parenting style, religiosity, family connectedness, and internalizing behaviors of adolescents. We hypothesized that (1) authoritative parenting will lower parent-adolescent organizational and personal religious incongruence, (2) organizational incongruence will lower family connectedness, personal religious discrepancy will increase incidence of adolescents internalizing behaviors, (3) parent-adolescents connectedness will lower internalizing behaviors, (4) family religious practices will increase connectedness, and (5) connectedness will mediate between organizational religious incongruence and lower internalizing behaviors.

Methodology: Wave V (2015) national representative data of the Flourishing Families Project (FFP) were analyzed for (n = 325) adolescents-caregiver-dyads with complete data. Descriptive statistics was computed with SPSS-PASW 22.0 and a path model was estimated with AMOS 22.0 (Byrne, 2001). Measures selected from the FFP dataset provide information on (a) religiousness, (b) family-level religious practices, (c) parenting style, (d) connectedness, and (e) adolescent internalizing behaviors.

Findings: The predominately Caucasian (82.5%) sample consisted of 51.9% males and 48.2% females. Adolescents were 13-18 year of age (M = 15.28) and affluent with annual household income of $178,450 (M = $123,628). The structural path (β = .124, p < .001) and bivariate correlation (r = .434, p < .01) demonstrated that parents or caregivers who practice authoritative style were more likely to be connected with their teens. Higher levels of parent-adolescent connectedness (β = .25, p < .01) and Pearson correlation (r = .161, p < .01) revealed that discrepancies in organizational religious significantly increased connectedness. Overall, adolescents reported low levels of internalizing behaviors which included “self-conscious or easily embarrassed” behaviors among female (69.8%) and male (52.6%) adolescents. Authoritative parenting was negatively associated with internalizing behaviors among teens (r = -.04) and parent-child connectedness was inversely associated with adolescent internalizing behaviors (β = -.15).

Conclusion and Implications: Parents should be aware that during adolescence, (a period when exploration of ideas, values and identity is part of development) discrepancies between their own religious practices or beliefs are likely to arise and may lead to arguments. The findings underscore the value of authoritative parenting in creating an environment where adolescents are able to thrive (Piko & Balazs, 2012), explore their own religious beliefs and values, while parents/caregivers provide the warmth/support, reasoning and induction, and democratic participation (Robinson et al., 2001) that are central to authoritative parenting. Low internalizing behaviors among study participants also can be linked with authoritative parenting, indicating that open communication and discussion is taking place between parents and teens, lowering the triggers for depressive symptoms and suicidal ideation among this population. While having discrepancies in organizational religion in families, a parent-child connectedness is a byproduct of authoritative parenting; parents should not be alarmed, but instead, encouraged, that their adolescent feels secure enough in their relationship with them to begin exploring their own beliefs (for themselves). By highlighting the developmental transition that teens undergo, it is important that religious leaders working with adolescents (e.g., youth pastors) be equipped to communicate with parents who may be concerned about their adolescent’s changing religious beliefs or religious service attendance practices. Parents and religious leaders should be available to answer questions that teens may have about religion or the beliefs of their parents as the adolescent seeks to understand and weigh these concepts for themselves.

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Purpose and Rationale: Obesity is a worldwide health issue because it is increasing risk factors to develop other metabolic disorders such as type 2 diabetes and cardiovascular diseases. Various strategies such as exercise, diet control, surgeries and medication are already in place to manage obesity but its prevalence is still increasing. Obesity is caused by accumulating the excessive fat in the body due to unbalanced energy metabolism. During cold exposure, a mitochondrial uncoupler of brown adipose tissue (BAT), named uncoupling protein (UCP) 1 dissipates the proton electrochemical gradient, which allows mitochondria for generating heat instead of energy by breaking stored fat, which results in increasing body temperature (Cypess et al., 2015). This process is called non-shivering thermogenesis, a function of BAT. At the similar physiological condition, some adipocytes in white adipose tissue (WAT) shows UCP1 expression, which makes WAT acquire BAT function, called browning effect. Therefore, increasing energy metabolism by activating non-shivering thermogenesis in both WAT and BAT has been recently recognized as a potential way to burn body fat. Our previous findings showed that quercetin, a main dietary compound in onion peel exhibited browning effect in white adipocytes in vitro (Lee, Parks, & Kang, 2017). The purpose of this study was to determine whether quercetin improves obese condition by activating non-shivering thermogenesis in both BAT and WAT using high-fat diet-induced obese mice in vivo.

Methodology: Four-week-old C57BL/6 male mice were fed either a low-fat diet (LFD) (10% energy from fat) or a high-fat diet (HFD) (60% energy from fat) with or without 1% quercetin (Q) for 16 weeks. Body weight and food consumption were monitored weekly. At the end of the feeding study, blood, BAT and WAT were collected. Epidydimal (E) and retroperitoneal (R) WAT were weighed. Plasma triacylglycerol and total cholesterol (TC) were measured. Total RNA was extracted, and cDNA was synthesized from BAT and WAT. The expression of genes that are involved in the regulation of non-shivering thermogenesis such as ucp1, cell death-inducing DFFA-like effector A (cidea), peroxisome proliferator-activated receptor gamma (pparγ), pparγ-coactivator 1-a (pgc1α), fibroblast growth factor 21 (fgf21), PR domain containing 16 (prdm16), and T-box protein 1 (tbx1) was determined using a real-time PCR.

Findings: Mice fed HFDQ showed a significant reduction in body weight and RWAT weight without a change in food consumption compared to mice fed HFD. Plasma TC concentrations were significantly reduced as well. In both BAT and RWAT of mice fed HFDQ, ucp1, prdm16, pgc1a, cidea genes were upregulated. The expression of tbx1 gene, a browning marker was also increased in RWAT. Interestingly, the quercetin-induced browning effect was not observed in EWAT and subcutaneous WAT. However, quercetin supplement did not affect mice fed LFD.

Conclusions and Implications: Quercetin activated non-shivering thermogenesis in BAT and RWAT by increasing the expression of genes related to BAT function and browning. Intake of quercetin may cause health benefit by increasing energy metabolism in obese people.

References:

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Antioxidant Activities of Peanut Protein Hydrolysates as Affected By Degree of Peanut Roasting and Molecular Size

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Purpose and Rationale: Antioxidants at low concentrations inhibit or delay oxidation in food system, thus extending shelf life of processed food products. The mechanisms of antioxidant’s action include reducing transition metal ions, scavenging free radicals, chelating pro-oxidative metals, quenching singlet oxygen and photosensitizers, and inactivating lipoxygenase. Some studies show that peanut flour has certain antioxidant activity which increases with the degree of roasting. This study evaluated different aspects of antioxidant activities of peanut protein hydrolysates (PPH) produced by proteolytic hydrolysis of light and dark roasted peanut flours and the effects of hydrolysis time on the antioxidant activity.

Methodology: Partially defatted light/dark roasted peanut flours with about 50% protein were hydrolyzed using Alcalase for 1-6 hours at 40°C and pH 8, and samples were taken hourly. After enzyme inactivation and centrifugation, total protein concentration in the supernatants, PPH solutions, were determined. The supernatant was then diluted to desired protein concentrations. The in vitro antioxidant activities including ferric reducing antioxidant power (FRAP), DPPH free radical scavenging capacity (FRSC) and metal chelating capacity (MCC) of diluted PPH samples were determined. Data were analyzed by linear regression analysis to establish the relationship between antioxidant activity and PPH concentration. The comparison between the antioxidant activities of light roasted PPH and dark roasted PPH was conducted by analysis of variance (ANOVA).

Findings: Data show that enzymatic hydrolysis of peanut flour resulted in dramatic increases of in vitro antioxidant activities such as FRAP, FRSC and MCC. The FRAP increased with enzyme treatment time and protein/peptide concentration. Within the concentration range tested (0.5-2.5 mg/ml), the DPPH free radical scavenging capacity increased linearly with PPH concentration (R²=0.9985). At same hydrolysis time and PPH concentration, the PPH of dark roasted peanut flour showed lower FRAP (The highest FRAP values for light and dark roasted PPH were 2.61 and 2.16, respectively.), similar MCC with highest being 92.5%, but much higher FRSC (The highest FRSC values for light and dark roasted PPH were 29.5% and 55.5%, respectively) than the PPH from light roasted peanut flour. The in vitro antioxidant activity of smaller molecule fraction (<5kDa) was significantly higher than the larger molecule fraction (>30kDa) for both light and dark roasted PPHs which explains that longer hydrolysis time resulted in PPH of higher antioxidant activity.

Conclusions and Implications for research: This study indicates that the PPH from defatted peanut flour can be a potential antioxidant ingredient, but the studies in real food models and biological models are needed.

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Chicken Protein Could Minimize Fat-Uptake in Deep-Fat Fried Chicken Drumstick

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Purpose and Rationale: Foods cooked by deep-fat frying have desirable organoleptic characteristics. However, the deep-fried foods absorb the oil used as the heating medium, which increases the total fat content of the food. The consumption of these foods has been correlated with cholesterol-related morbidities such as high blood pressure, obesity, type 2 diabetes. The appropriate selection of an edible coating that could provide a barrier to oil absorption during deep frying, without significant changes to the sensory characteristics of the food is important. In this study, edible coating was prepared from protein isolated from chicken processing by-products using isoelectric precipitation and solubilization. The main objective of this study was to determine the impact of the prepared edible coating as a barrier to reduce fat-uptake during frying.

Methodology: Chicken drumsticks were cut in strips of about 10 g. They were coated with wheat flour (WF) as a predust, dipped in batter, and subsequently coated with either 5, 10 or 15 (w/w) chicken protein coating (CPC), and breaded. Chicken drumstick coated with WF as a predust, dipped in batter with no CPC was used as the control. All samples were deep-fried at 177°C for 3-4 min. Soxhlet extraction method was used to determine the fat uptake of samples. The pH, texture (puncture test), moisture, and color properties of each fried sample were also measured. One-way analysis of variance was used for comparison of the results.

Findings: Fat uptake of chicken samples coated with either 5, 10 or 15% (w/w) CPC was reduced to 39.25, 58.24 and 62.68%, respectively, when compared to the control. All coated samples, except in 5% had significantly lower fat content (P < 0.05) than the control. Fat-uptake reduction increased with increasing protein concentration. However, no significant fat-uptake (P>0.05) was observed among deep-fat fried samples coated with the various concentrations of edible coating. With color, there was no significant difference (P >0.05) in lightness (L*), redness (a*) and yellowness (b*) between CPC coated and uncoated fried samples. The puncture test revealed uncoated samples were significantly harder than the CPC coated (P<0.05). Also, samples coated with CPC had higher moisture content after frying, compared to uncoated samples.

Conclusions and Implications: This study showed that application of edible coating in deep-fat fried chicken samples had no effect on pH and some of the textural attributes of the food samples. Therefore, the development of low-fat deep-fried chicken would allow consumers to enjoy the taste and texture that is characteristic of fried food which simultaneously provides a healthier product by reducing the oil uptake during the deep-fat frying process.

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Design in the Jungle: Cross-Disciplinary Immersion Experience Researching the Researcher’s Environment

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**Purpose and Rationale:** The Radford Amazonian Research Expedition (RARE) at the Las Piedras Peru Biodiversity Station offers undergraduate students an opportunity to explore primary research first-hand in the Amazon rainforest. Instinctively this research setting aligns to biological explorations, yet interior design has connected with the expedition-based research. This immersion experience integrates the physical environment, intellectual learning and research practices, social and cultural interactions, along with a wholistic emotional response to the unique, remote situation. Scientists and research students primarily focus on the body of their work with little consideration of the function and design of the physical environment in which they are working. This is the case with the crude Amazonian research environment. The interior design student proposal studied the built environment, researching the researcher’s functionality in the rustic biodiversity station, applying a facility improvement project, and facility documentation for future improvements. While researchers are able to perform their tasks within the remote location, the limited functionality inhibits research efficiency and social interactions. Studies have shown that improved function and aesthetics of the physical and social workplace environment have a strong impact on worker satisfaction, encourages creativity, and increases productivity for routine tasks (Kopec, 2006). The station’s improvements will have significant impact on the physical and social uses of the space and the users themselves.

**Methodology:** In order to assess the functional needs and use of the RARE Biodiversity Station, data from current and previous participants was gathered through both quantitative and qualitative research methods with a questionnaire and interviews. The facility-use questionnaire included the function and purpose of the space from the perspective of faculty, students, and caretakers along with questions to promote sharing station interaction experiences. Both remote and onsite evaluations were conducted with analysis, site diagrams, and environmental observations. Additional research included information gathering and project development for the hands-on facility improvement project.

**Findings:** Students prepare for a minimal quality working and living environment prior to arrival, low expectations. Students and faculty are primarily transient, with use a few weeks out of the year, and few repeating individuals. Local caretaker addresses major concerns and safety. Facility improvements would benefit the caretaker and chef. Storage and privacy improvements are valuable to all participants. Applied improvements included the construction of a clay oven for cooking, collecting specific Amazonian clay and employing appropriate construction methods; the finished project was immediately put to use.

**Conclusions and Implications:** The documentation and proposal of the station’s physical improvements are part of a multi-phased design plan and elements of station reconstruction. The purpose of these improvements is to advance the researcher’s ability to perform in the crude rainforest setting and improve social interactions, personal space, safety, and privacy – addressing the psychological and physical needs of the built environment. These renovations will directly benefit Radford University, the station facilitators, student participants, and all users of this station.

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Developing a Screening System to Identifying Efficient Inhibitors of the Choline Kinase of *Streptococcus pneumoniae*

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**Purpose and Rationale:** *Streptococcus pneumoniae* and other Gram-positive pathogens can be detrimental to both human and animal health. Antibiotic solutions are available; however, resistant strains emerge continuously. Controlling Gram-positive pathogen growth requires new strategies. Putative inhibitors of Gram-positive isoforms of the enzyme choline kinase have been shown to block the growth of *S. pneumoniae*. However, the strength of inhibition and the mechanism of action of these inhibitors on *S. pneumoniae* choline kinase (sChok) is unknown. The objective of this project is developing a method for screening sChok inhibitors and categorizing them by inhibition strength and mechanism of action.

**Methodology:** The sChok enzyme was expressed in BL21(DE3) cells and purified by affinity chromatography. The plasmid pet28a(+) containing the histidine tagged choline in *E. coli* BL21 (DE3) cells was transformed into *E. coli* cells then the protein expression was induced with IPTG. His-tagged choline kinase was purified with affinity chromatography with His-tag Ni-NTA resin. LDH/PK reporter assays were used to determine enzyme kinetics with each substrate: choline and ATP. The strength of inhibition (IC50) of choline analogs 717 and MN58 were measured at the Km measured for the choline substrate. Kinase activity was measured by adapting the LDH/PK system. Inhibitor strength was determined by calculating IC50s. LDH/PK comparative kinetic method was applied to determine inhibitor mechanism of action.

**Findings:** The Km choline and Km ATP of sChok were 164.247 +/- 59.92 μM and 144.523 +/- 17.8 μM, respectively, while the Vmax choline and Vmax ATP was 103.562 +/- 9.125 and 67.5896 +/- 2.352, respectively. Two promising sChok inhibitors were identified: MN58 and 717, with IC50s of 645 μM and 0.5 μM respectively. MN58 and 717 had competitive and uncompetitive mechanisms of action, respectively.

**Conclusion and implications:** In conclusion, a screening system was developed to test inhibitors of choline kinase of *Streptococcus pneumoniae*. Choline kinase of *Streptococcus pneumoniae* was expressed in *E. coli* and purified with Ni-NTA resin. Two promising inhibitors of *S. pneumoniae* choline kinase were identified and characterized.

**References:**

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Development of Low-Fat Fried Fish using Edible Coating Approach

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Purpose and Rationale: During deep-fat frying, oil not only serves as a heating medium but also is absorbed by food, increasing the total fat content. High consumption of fried foods has been associated with several health issues. Therefore, there is a great interest in reducing fat uptake during deep-fat frying. Edible coatings can act as barriers to moisture loss, which is important commercially, and thereby reduce fat uptake during frying. On the other hand, filleting fish for frying generates large quantities of by-products (frames, heads and meat left over on the bones and skin). The main objective of this research was to study the application of recovered proteins from these by-products as an edible coating to reduce the fat uptake in deep-fat fried fish.

Methodology: Edible coating was prepared from protein isolates recovered from fish processing by-products in three concentrations; 5, 10, and 15%. Fish samples were dipped in either of the three edible coatings, battered, and breaded. Fish samples not dipped in any of the edible coatings were used as control. Samples were deep-fried at 177°C for 3-4 min. Fat uptake contents of samples were determined using Soxhlet extraction method. Physicochemical tests (moisture, fat, pH, color) were run on the different treatments.

Finding: Compared with the uncoated samples, coating treatments decreased the oil uptake and moisture loss of fried fish by 85% and 8.21%, respectively. The most reduction in fat content was observed when fish samples were coated with 15% protein coating, while the control samples had the highest values of fat after deep-fat frying process. In general, coated samples had lower L* values but no significant difference was noted in b* values of the fried samples (P > 0.05). Coating treatments had no significant effect (P > 0.05) on pH values of the samples.

Conclusions and Implications: The results suggested that application of edible coating on the fish could be effective to provide a healthier product by reducing the oil uptake during the deep-fat frying process.

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Does Satisfaction of a Family-Based Childhood Obesity Treatment Program Correlate with Changes in Child BMI-z-score and Parent BMI?

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**Purpose and Rationale:** Participant satisfaction with health-related programs have been linked to improved engagement in personal healthcare, reduced primary care use, and better health statuses. Studies have also shown that evaluating participant perceptions through summative evaluations can provide insight for program modifications and program sustainability (Fragala-Pinkham, O'Neil, & Haley, 2010). Summative evaluations are considered useful for newly developed programs and can be pivotal in assisting program developers in revising and improving the quality of a program. Therefore, the purpose of this study was to examine parental satisfaction with a multicomponent family-based childhood obesity treatment program (iChoose) and determine if program satisfaction influenced changes in child BMI-z-score and parent BMI. iChoose is a 3-month evidence-based program that included 6 family classes, 24 physical activity sessions, and 6 support calls.

**Methods:** Using a Community-Based Participatory Research approach and systems-based approach, iChoose was delivered in 3 waves to 94 caregivers and 101 children in a medically-underserved region. Research staff delivered family classes to wave 1, community staff delivered family classes to waves 2 and 3, community staff delivered all physical activity sessions, and support calls were shared among research and community staff. Sixty-five caregivers completed the mixed-methods semi-structured satisfaction interviews. Quantitative satisfaction was operationalized as the degree of parental satisfaction with family classes (2-items), physical activity classes (3-items) and support calls (8-items) (1=Completely Dissatisfied; 10=Completely Satisfied). Caregivers were categorized into low or high attenders for each program component and data were compared for those receiving program content from community or research staff.

**Findings:** Overall satisfaction was high for family classes=9.4(0.8), physical activity sessions=9.0(1.7), and support calls=7.9(1.8). However, program satisfaction did not correlate with changes in child BMI-z-score and parent BMI. Likewise, there was no significant difference between program attendance and parental satisfaction with program components. Qualitative data revealed both parents and children enjoyed iChoose and identified areas for improvements.

**Conclusion and Implications:** Understanding participant satisfaction and engaging community partners is a key aspect of developing sustainable programming in underserved regions. iChoose had high satisfaction ratings, which was unrelated to child BMI-z-score and parent BMI. Satisfaction was also unrelated to program attendance or delivery agent.

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Effectiveness of Different Methods on Detoxification of Ochratoxin A in Grape Pomace

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**Purpose and Rationale:** Grape pomace (GP) is the residue of grapes after wine making and is a valuable source of dietary polyphenol and fiber. It has potential to serve as a food ingredient for health promotion. However, our previous studies found the presence of Ochratoxin A (OTA) in the GP at concentrations higher than maximum allowed level, which makes GP unsafe for human and animal consumption. This study evaluated the effectiveness of thermal pressure treatment, baking, acid treatment and enzymatic treatment on OTA contents of GP.

**Methodology:** GP samples from 7 grape varieties were collected from two North Carolina wineries. For thermal pressure treatment, the wet GP samples were autoclaved for 10, 20 and 30 minutes at 121 °C. For acid treatment, the GP sample was treated with acetic acid, citric acid, lactic acid and hydrochloric acid (HCl) at pH 2.0, respectively, for 24 hours at 37°C. For enzymatic treatment, purified OTA solution was treated with pepsin, papain, Alcalase, lipase and carboxypeptidase A at the optimal pH of each enzyme, and the effective enzymes were selected to treat GP. The untreated pomace samples were used as controls. The OTA was extracted using methanol and quantified using an ELISA method. The results are expressed as percentage OTA reduction in comparison to the control.

**Findings:** Autoclaving 20 minutes reduced 37-80% of OTA in GP depending on the varieties of grapes, but increasing treatment time did not enhance OTA reduction. The effectiveness of different acids in OTA reduction varied with the variety of GP and 8-62% reduction was achieved. In the pure OTA solution, treatment of by carboxypeptidase A, Flavourzyme and lipase at 37°C for 24 hours reduced OTA by 36, 60 and 100%, respectively, but other enzymes did not show effect on OTA under the experimental condition of this study. However, the treatment of GP by Flavourzyme, lipase and carboxypeptidase A only reduced OTA in the GP by 3.12, 14.55 and 11.37%, respectively. This might be caused by the inhibition of enzyme activities by GP polyphenols.

**Conclusions and Implications for Research and/or Practice:** This study demonstrated that the OTA content in GP can be effectively reduced to safe level by thermal pressure treatment such as pressure cooking or acid treatment such as acetic acid, citric acid and lactic acid.

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Efficacy in Using Case Study Simulations: Practical Application of Resource Management Theories

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**Purpose and Rationale:** The purpose of this study was to understand the efficacy of applying family case study simulations to resource management theories and how the utilization of case studies impacted student preparation to work with real-life families. Students found case studies to be helpful in increasing the relevance and value of the lecture content (Gudmunson, et al., 2015) and Popil (2011) noted case studies serve as an active teaching strategy to apply classroom concepts.

**Methodology:** Case study simulations development was supported by a university teaching grant and built on data from the North Carolina United Way Self Sufficiency Study. Students’ scores from four unique team-based assignments were analyzed. These assignments included values clarification and goal setting; family members’ roles identification and mission statement development; utilizing decision making models and SMART goals in order to solve a financial problem; and compiling research on available resources by county to meet family needs. Students responded to a series of questions about course learning outcomes and their perceptions of the efficacy of the case studies as their final in-class team reflection.

**Findings:** A trial test of the case studies and related assignments was conducted in a Family Resource Management course in spring 2017 (n=48). After review of student’s scores and responses, additional case studies were developed and assignments were modified for the fall 2018 course (n=47). Research outcomes were based on student responses to fall 2018 measures. Overall, responses to the qualitative efficacy questions used from the final reflection of both courses show that students gained valuable insight into their future careers based in family resource management. Students expressed value in learning how to identify goals for a case family based on family dynamics and family values. Student learning regarding family decision making is evidenced by scores on assignments and responses to reflective questions regarding efficacy. Additionally, students expressed that they learned how to find and utilize resources for various family circumstances. Students reported in a qualitative survey during fall 2018 that the usage of case studies helped them meet course learning outcomes. Specifically, 79.07% (n=34) of students indicated that the use of case studies improved critical thinking skills regarding family management most of the time. Additionally, 72.09% (n=31) of students indicated that the use of case studies helped them to improve career preparation most of the time. Students remarked in their reflections at the end of the semester that the assignments and case studies helped them understand the value of learning about the families that they work with and how resources management theories can then help them work more effectively with families. One of the groups remarked that they gained insight into “understanding the needs of families, how to use the resource you already have, [and the] power of making SMART goals”. Other students echoed this response and specifically emphasized the value of learning about community resources for family needs.

**Conclusion and Implications:** The findings indicate that the use of case studies helped students to understand the economic and resource impact for various family compositions, generally improved their critical thinking skills, and increased preparation for post-graduate employment, based on self-report. Additionally, the case studies provided students the opportunity to develop a deeper understanding of families by building a rich narrative to their case families. This application of resource management theories using case study simulations assists students in career preparation for working with families.

**References:**


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FCS Undergraduates Perceptions on Training to be Mentors of Adults with I/DD

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Purpose and Rationale: Young adults with Intellectual and Developmental Disabilities (I/DD) face unique challenges to fully acquire self-sufficiency in areas of life such as proper nutrition, financial literacy, and social engagement. Mentoring programs with a firm foundation in family and consumer sciences (FCS) can support individual success in these areas. Adequate training must be provided to mentors in order to effectively mentor and positively influence behavior change. Mentors should also find value and purpose in the training provided to transfer skills to participating adults with I/DD. The purpose of this study is to investigate the perceptions of undergraduate students on the preparatory training received to serve as mentors to adults with I/DD to increase self-sufficiency. It is part of a larger study aimed to develop a mentoring program for adults with I/DD to enhance self-sufficiency and aspects of nutrition, resource management, appearance and relationships through peer-mentoring and peer-facilitation of specialized FCS based content. This undergraduate-as-mentor approach is unique in addressing the needs of adults with I/DD.

Methodology: Eight (8) undergraduate FCS majors serving as peer mentors underwent two hours of training once a week for eight weeks to serve as mentors and educators. Weekly trainings focused on: getting familiar with intellectual and physical disabilities, disability etiquette, first person language, leading with emotional intelligence, research fundamentals and ethics; data collection, journaling and program expectations. They also interacted with participants, three times, in organized informal social settings. Mentors recorded their experiences and reflections on trainings and initial time spent with their mentees through electronic journal entries. Those journal entries were de-identified, reviewed by three coders, and recurring themes based on mentors’ thoughts, beliefs and attitudes were found.

Findings: The mentors consisted of 50% (N=4) Fashion and Merchandising majors, 25% (N=2) Child Development and Family Studies majors, and 25% (N=2) Food and Nutritional Sciences majors. Data analysis revealed 50% (N=4) had previous experience interacting with this population. Coding revealed two prevailing themes of 1.) Optimism about the program and relationships with the mentees as wells as 2.) Self-doubt in their abilities to succeed as mentors.

Conclusion and Implications: Themes found through journal entries may be used as formative evaluations to develop future mentor trainings for a program targeting adults with I/DD. Mentors should be further instructed on mentoring techniques such as various motivational methods to increase mentor confidence and promote mentee self-sufficiency.

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FCSfit KIDS: Exploring Healthy Eating and Physical Activity among Young Children in a Family Systems Course

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**Purpose and Rationale:** The proposed project is designed to bring awareness of the childhood obesity epidemic that plagues the lives of many young children, especially children of color. The FCSfit KIDS project will be designed to provide hands-on and interactive lessons and activities to teach young children about healthy eating and staying active through gardening education and gardening activities. Many young children may not know the source of the fruits and vegetables they eat. Therefore, FCSfit KIDS will educate young children in creative ways about growing and consuming healthy foods. The FCSfit KIDS project is a 20 hour hands on experience designed to teach college students about the importance of healthy eating and physical activity of young children.

**Methodology:** The FCSfit KIDS was implemented fall 2018. Seventeen (17) students, sophomores and juniors from various majors, i.e. Child Development, Psychology, and Early Education, were enrolled in the course. The FCSfit KIDS project involved the integration of course contents from FCS 331 – Family Systems, the Family Mentor Experience (FME) assignment and with children and families from the University’ Child Development Laboratory (CDL). Children ages 2 ½ to 5 years of age were paired with college students form FCS 331. College students participated in various learning activities including guest lecturers, training sessions, and gardening activities related to healthy eating for children and families. In addition, a pre/posttest assessment was administered to college students and families to assess knowledge on nutrition and healthy eating. College students completed the Eating Behavior Eating Pattern Questionnaire – Youth and families completed the Eating Pattern Questionnaire.

**Findings:** Preliminary data findings suggest both college students and families’ showed improvement in the areas of nutrition and healthy eating. For example, college students’ showed slight improvement in the areas of low-fat eating 3.00 to 3.5 on a 4.0 scale and Snacking and Convenience 2.8 to 3.2 on a 4.0 scale. The final/culminating project students averaged a score of 95%. Over 30% of families showed improvement in several areas including increasing water intake, decreasing sweets intake and over 98% of families shared they “would like to change their eating habits.”

**Conclusions and Implications:** The FCSfit KIDS project provided college students with the ability and context to teach young children about healthy eating and physical activity. Moreover, families also benefitted from the various tools and materials related to nutrition and exercise shared from FCSfit KIDS project. Findings gained from FCSfit KIDS can be used as pilot data for a larger funding opportunity with a focus on health and well-being in young children and families from limited resource communities. Moreover, results of FCSfit KIDS will bring awareness of the childhood obesity epidemic and provide breadth and depth in various ways to employ the concepts of healthy eating and physical activity in the context of contemporary families.

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Financial Security and Future Housing Plans for Low-Income Older Renters in Rural NC: A Case Study

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Purpose and Rationale: In North Carolina, 57% of older adults live in rural counties where they may lack access to sustainable/accessible housing, transportation, healthcare, and social services (North Carolina Center for Public Policy Research, 2011; Rural Health Information Hub, 2014). When considering that the proportion of aging renters in rural NC county areas is larger than that of the U.S. (U.S. Census Bureau, 2015) and that aging renters, particularly having low income, are likely to have more financial challenges than those having high incomes and/or homeowners (Gibler, 2003), attention should be given to rural low-income older renters in NC. This is a case study to examine financial security and future housing plans for low-income older renters in rural NC areas.

Methodology: Between January and July in 2018, a structured, face-to-face survey was conducted in three subsidized senior housing properties in rural NC areas. Fifty-one elderly renters completed the questionnaire. The responses were coded and analyzed using the IBM Statistical Package for the Social Sciences (SPSS; IBM Corporation, Armonk, NY) version 24. Descriptive statistics were employed to define financial security and future housing plans.

Findings: The average age was 73 years old (range: 63-87). The participants were mostly female (84%) and single (94%). Half the participants (57%) were Caucasian and 33% were African American. Most (96%) lived in a one-bedroom rental unit. In terms of financial security, their financial condition was unstable even though 56% of the participants stated feeling financially secure as they age. That is, more than half (61%) were not able to support their health care costs, and the majority had no funds for emergencies (75%) and no financial plans for later life (73%). The majority were dependent on governmental resources: Social Security (83%), Supplemental Nutritional Assistance Program (47%), Medicare (49%), and Medicaid (37%). Regarding future housing plans, all participants wanted to remain in their homes (aging in place) for as long as possible, and 75% had no clear plans of where to live in the future if their health or other factors would no longer allow them to.

Conclusion and Implications: This study had a small sample size. However, it still provided meaningful findings that the low-income older renters in rural NC areas were finically insecure and that aging in place can be the only option for their later life. It implies a need to expand access to community resources and public assistance in rural areas to increase older renters’ well-being. Also, the majority of elderly renters were female and single, suggesting a need for greater support for such groups in NC rural areas. In the future, a quantitative study targeting a larger sample and/or multiple locations could enhance the knowledge of low-income rural renters and their aging in communities.

References:

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Oxidative Stability of Roasted Peanuts Treated by Alcalase

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Purpose and Rationale: Due to high lipid (about 50% fat) and high allergenic protein contents, the storage stability and allergenicity are two major concerns of peanuts, particularly, after roasting. Our previous studies have shown that protease hydrolysis of peanut kernels resulted in significant reduction of allergen content and allergenicity. However, the breaking down of protein molecules by proteolytic enzyme may modify the surface and internal structure of peanut kernels thus leading to change in oxidative stability. This study evaluated the impact of protease treatments on the oxidation of dry roasted peanuts during a 10-week storage period at 37 °C.

Methodology: Dry roasted Runner peanuts were treated with Alcalase at enzyme to peanut ratio of 3.5% in phosphate buffer (pH 7.5), then dried in a vacuum oven for 18 hours. The dry peanuts were packed in 10 glass jars (50g/jar) and stored at 37 °C in an isotemp incubator for 0-10 weeks. Untreated dry roasted peanuts were packed and stored in same way, and used as controls. Samples were taken weekly to evaluate the oxidation status using peroxide value (PV), p-Anisidine Value (p-AV) and thiobarbituric acid reactive substances (TBARS) as indicators of oxidation. Each indicator was measured in triplicate for each sample. The change of each indicator with storage time was presented using line chart or bar chart, and the differences in each indicator between Alcalase treated and untreated peanut samples taken at same time were analyzed by post-ANOVA LSD test at 0.05 significance level. The aroma/odor of each sample was recorded at the time of sampling.

Findings: The PV of untreated peanuts was higher than that of enzyme treated peanuts from the beginning to the end of storage period (P < 0.05) and increasing faster during storage, while the PV of enzyme treated peanuts only increased slightly during storage. The TBARS of enzyme treated dry roasted peanuts were slightly but significantly lower than that of untreated (P<0.05). In addition, the TBARS of untreated and treated dry roasted peanuts changed in the same trend. The p-AV of enzyme treated dry roasted peanuts was significantly higher than that of untreated (P < 0.05) before week 8, but was surpassed by the p-AV of untreated treated peanuts after week 8. Rancid odor was detected at week 8 and 10 for untreated and treated dry-roasted peanuts, respectively.

Conclusions and Implications for research: The results of this study indicate that protease treatment of dry roasted peanuts will not enhance the oxidation of the peanut during storage at high temperature. Instead, the treatment may slow down the oxidation, thus increasing the shelf life of dry roasted peanuts.

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Patching Yesterday Into Tomorrow

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Purpose and Rationale: The purpose of this project was to create and design an ensemble out of used denim jeans, demonstrating sustainable practice. Denim is an everyday, everchanging staple item in the fashion industry which is readily available in thrift stores. Therefore, the design challenge was to create a project that is both fashionable and chic, while recycling old denim. As a fashion designer, I have always been influenced by sustainable designers, such as Stella McCartney, as seen in her Spring 2019 ready-to-wear collection. The overall inspiration for the long jacket and high waisted skirt is my unique interpretation of the trendy street style. My motivation to create a handmade denim look was from my mother and how she uses every part of the denim jean to create different forms of art including clothing. I have always had a love for denim and all the possibilities of what you can create with it.

Methodology: Design. The design idea was to create a jacket and high-waisted skirt by selectively choosing colors of a blue scheme in denim. Therefore, I started to cut denim into several 5”X5” individual squares using various parts of the jeans. Then, the pieces were intentionally placed to create visual interest. All the pieces were sewn together to then create a 120”X 45” continuous piece.

Materials. The denim jeans were acquired from a local thrift store. They were selected for their various colors and quality of the materials.

Techniques. Techniques that were applied to create both the jacket and skirt are flat pattern techniques using basic blocks, applying adding fullness method for jacket and the contouring method for the skirt to lengthen and control the fit.

Findings: More than 80% of the original denim pants were recycled for this project. The aesthetics of the ensemble were accomplished through the playful arrangement of color blocking through patchwork. The construction challenge was to balance the thickness of the denim, so the seams are not too stiff, restricting the movement of the garment. Therefore, all the seam allowances were leveled.

Conclusions and Implications: More fashion companies are moving towards more sustainable practices these days. As an aspiring fashion designer, I found this project valuable and important in representing sustainability. Further creative projects should be explored using different clothing items or upholstery materials for recycling, upcycling, and repurposing.

Reference:

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Project LLIFE: Lessons Learned from a Pilot Study

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Purpose and Rationale: Language-to-literacy connection begins in the early years prior to a child’s entry to kindergarten. To investigate the language-to-literacy connection, Project LLIFE (Language and Literacy Impacting Families and Educators) was created to facilitate increased skills and performance in language and literacy for children between the ages of 1-4 years old through a culturally responsive lens involving educators and families representing culturally, ethnically and linguistically diverse populations in Southeast Greensboro over a two year period. To test the credibility and validity of Project LLIFE’s research design, a pilot study was conducted.

Methodology: To assess the soundness of the research design, a three-phase pilot study was conducted with one early childhood center (not included in the full-scale study), including three female educators (1 Black/African-American, 1 White/Caucasian, and 1 Latina), 34 children (preschool age), and four families (2 Black/African-Americans, 1 White/Caucasian, and 1 Asian/Pacific Islander). Phase one included the administration of the pre-assessment measures and a feedback form across two separate days to the educators and families followed by an open dialogue regarding the research design process and validity of assessment items. Phase two included a pre-assessment of children’s language and literacy development, as well as social-emotional development, and a classroom observation of and interview with educators on culturally responsive interactions with children. Phase three involved the study’s researchers analyzing the data sets collected and evaluating the credibility and validity of the research design and procedures based on the feedback from the pilot sample. Research design procedures were evaluated in preparation for the actual full-scale study of Project LLIFE.

Findings: Based on the pre-assessment results, it was found that the educators highly rated their perceived knowledge and skills of fostering children’s language and literacy and social-emotional development, as well as promoting a culturally responsive learning environment. Also, from the pre-assessment results, families moderately rated their perceived knowledge and skills in supporting their children’s language and literacy development. From the feedback form, the results revealed that the assessment actually served as a tool and catalyst of learning for families. In an evaluation and reflection, lessons learned by researchers included some the following: 1) visit informally with educators and children within the context of the classroom to build rapport; 2) create an informal environment relative to room arrangement, positioning of researchers sitting with families, and promoting two-way communication among and between educators, families and researchers; 3) address researchers by first names and avoid use of a title such as “Dr. XX” attached to a name; 4) consider within classroom assessment of children’s language and literacy development rather than a pull-out process; 5) connect children with a researcher of the same ethnic background and gender identity to assess social-emotional development; and 7) pre-arrange an interview session with educators following a classroom observation of culturally responsive practices.

Conclusions and Implications for Research and/or Practice: Based on the results from the pilot study of Project LLIFE, it was concluded that the research design is valid, but the implementation of the procedures by the researchers must reflect cultural sensitivity and competence in all aspects of the study including, but not limited to communication, relationship building, and persona in an early childhood environment

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The Effect of in vitro Digestion on Total Phenolic Content and Antioxidant Capacity of Garlic Scape

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**Purpose and Rationale:** A balance between free radicals and antioxidants keeps cellular physiological functions in the body. When free radicals are more produced, oxidative stress occurs, which is a critical harmful state to develop various human diseases. Consuming antioxidants from external sources has improved the oxidative stress condition. Because of synthetic antioxidants’ side effects, natural antioxidants, especially found from fruits and vegetables has been interested. In addition, natural compounds may lose their antioxidant effect through gastrointestinal digestive system, which thus may not be effective on the cellular level. Therefore, it is important to find a new natural source and compound with effective antioxidant capacity after the gastrointestinal digestion. Garlic scape (GS), the green flower head of garlic is an edible byproduct of garlic that is removed for garlic bulb’s growth, which may have health benefits. The purpose of this study is to examine antioxidant capacity and total phenolic content (TPC) of GS and further investigate whether these properties are stable through the gastrointestinal digestion.

**Methodology:** Fresh GS was purchased from a local grocery market, washed, dried, and chopped into small pieces. Next, GS was mixed with 80% methanol (v/v), homogenized, sonicated, and filtered. GS extract (GSE) was prepared by completely evaporating solvents of the filtrate. GSE was reconstituted in a saline solution. To prepare gastrointestinal enzyme-digested GSE, GSE was digested with pepsin and a pancreatin-bile solution. TPC of GSE and gastrointestinal enzyme-digested GSE was measured using a Folin-Ciocalteu reagent whereas total antioxidant activity and radical scavenging activity of these samples were determined using the phosphomolybdeum, 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) (ABTS), and 2,2-diphenyl-1-picrylhydrazyl (DPPH) methods, respectively. Data were analyzed using a one-way ANOVA, followed by the Tukey’s post hoc test (Prism 5.0, GraphPad Software Inc). P values less than 0.05 were considered significant.

**Findings:** GSE at 10, 30, 50 mg/ml showed 23.1%, 41.4%, and 55.1% DPPH radical scavenging activity and 1203, 3483, 5782 mg vitamin C equivalent (VCE)/g ABTS radical scavenging activity. Because the same concentrations (10, 30, 50 mg/ml) of GSE exceeded a detectable range in total antioxidant activity, total antioxidant activity was determined using lower concentrations (0.5, 0.75, 1, 1.25, 1.5 mg/ml) of GSE. At these concentrations, total antioxidant activity exhibited 0.81, 1.42, 2.07, 2.42, 2.76 mg VCE/g, respectively. Gastrointestinal enzymatic treatment resulted in approximately a 46% reduction in DPPH and ABTS radical scavenging activity and total antioxidant activity of the GSE. Consistent with its antioxidant property, the GSE at 10, 30, 50 mg/ml showed a dose-dependent increase in TPC, reported as results of 601, 1713, and 2583 mg gallic acid equivalent (GAE)/g. After the gastrointestinal digestion, TPC of the GSE showed a 46% reduction.

**Conclusions and implications for research:** Garlic scape has antioxidant capacity. After the gastrointestinal digestion, antioxidant properties of garlic scape are still effective. Therefore, garlic scape is a valuable and reusable food source with the antioxidant capacity.

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