Integrating Food Science into High School Agricultural Education

John C. Ricketts, PhD
Professor of Agricultural Education | Agricultural Sciences
Tennessee State University
3500 John A. Merritt Blvd.
Nashville, TN 37209
615.630.0526
jricket1@tnstate.edu

Sandria Godwin, PhD
Professor of Food Safety | Family and Consumer Sciences
Tennessee State University
3500 John A. Merritt Blvd.
Nashville, TN 37209
615.963.5619
sgodwin@tnstate.edu

Integrating Food Science into High School Agricultural Education

Introduction/need for research

Approximately one in six Americans, or approximately 48 million people, are affected by foodborne illnesses each year. Approximately 128,000 of these people are hospitalized and 3,000 people die (Centers for Disease Control and Prevention, 2011). *Salmonella* and *Campylobacter* pathogens are in the top five list of pathogens that cause humans to become sick, hospitalized or die (Centers for Disease Control and Prevention, 2011). Raw and undercooked poultry and eggs are often associated with *Campylobacter* and *Salmonella* caused human illnesses (United States Department of Agriculture, 2015). Consumers can reduce their risk of foodborne illness from *Salmonella* and *Campylobacter* pathogens by safely purchasing, storing, handling, and preparing poultry products and eggs (Kosa, Cates, Bradley, Chambers IV, & Godwin, 2015), and educators can help by making sure future consumers (e.g. Youth) know the science behind their food (Beaty, 2016).

The Poultry and Egg Education Project (PEEP), funded by a USDA National Food and Agriculture Institute (NIFA) Agriculture and Food Research Initiative (AFRI) grant, conducts bench science research on best practices for safe handling and use of poultry and egg products and creates science-based educational programming for consumers. This poster will detail efforts to integrate science-based research findings in secondary education in (state).

Conceptual or theoretical framework

Historically, youth were taught new agricultural practices through FFA and 4-H with the goal to bring that knowledge to their parents and adult farmers. If youth could demonstrate the success of a new corn variety or farming practice, adults were more likely to adopt the practice (Rasmussen, 1989). This same concept is being implemented through high school agricultural education and food safety in this study. Students in agricultural education can bring food safety knowledge and practices home to their families and other adults.

Methodology

The objectives of this study were the following.

1. Gauge teacher interests and intentions regarding the new Food Science and Safety Pathway being introduced [state].
2. Identify current and expected food science/food safety integration that could take place in current courses and topics being taught.
3. Discover the importance of and teachers' ability levels in five food safety practices.
4. Identify the training priorities of five food safety practices by calculating mean weighted discrepancy scores.

Survey research was utilized for this descriptive study. The survey instrument was developed by researchers at [University] and contained 20 questions that sought to determine current teaching practices, intentions, and views regarding the new food science pathway. Teachers were asked

to rate their importance and abilities in five food safety practices using a five-point summated rating scale. Teachers' knowledge of food safety was tested through seven questions. The demographic questions were gender, age, name of teachers' current school, years of teaching experience, and number of students in teachers' FFA chapters. Researchers conducted in-person surveys of agricultural educators at the 2014 [State] FFA Convention Career Show. The survey was also entered into Qualtrics Survey Software and disseminated electronically via email to agriculture educators in [State]. A total of 89 educators completed the survey either in person or electronically. Data was analyzed using Qualtrics Survey Software, Microsoft Excel, and SPSS-PC.

Results/findings

Half of the respondents indicated they were somewhat interested in the new food science pathway (n = 39, 50%) followed by 21% (n =16) stating they were not at all interested. A total of 33 respondents (43%) indicated they were somewhat qualified to teach food science and safety while 27 respondents (35%) indicated they were somewhat unqualified. Nine teachers (12%) indicated they were very qualified, and eight teachers (10%) indicated they were not at all qualified. Teachers were asked which courses listed they believed lessons in food safety could be incorporated. Food science and safety received the most responses (f =71) with 92% of respondents choosing this course, and advanced food science received the second most responses (f = 67) with 87% of the respondents choosing this course. Agriscience received the third most responses (f = 65) with 84% of the respondents choosing this course. MWDS scores indicated the most need for professional development training in How to safely transport packaged food products to market, Creating a clean & safe environment for slaughter & packaging, and How to safely store packaged food products while at market.

Conclusions

Teachers had some interest in offering courses in the new food science pathway. They had largely different responses regarding confidence in their level of qualification to teach in the pathway. Teachers believed the new courses, Food Science and Safety, Advanced Food Science, and Agriscience were the courses where food science and safety could be integrated best. Teacher professional development in the area needs to focus on safe transport of food to market, creating safe and clean environments for slaughter and packaging, and safely storing foods at market.

Implications/recommendations/impact on profession

Given the impact teaching food science has on knowledge gained (Beaty, 2016), teacher preparation programs should consider revising course maps to include food science and safety content knowledge. The PEEP project will develop curriculum to support current teachers and educate youth about poultry and egg food safety, and ultimately reduce foodborne illnesses. This curriculum will be disseminated at teacher professional development institutes in the summer, and through webinar presentations. Teachers in (state) will also be encouraged to consider the Curriculum for Agricultural Science (CASE) institute, Food Science and Safety to feel most comfortable in the new Food Science pathway.

References

Beaty, M. (2016). Impact of a poultry and egg education workshop on 4-H youth. (Unpublished masters thesis) Tennessee State University, Nashville, TN.

Centers for Disease Control and Prevention. (2011). CDC estimates of foodborne illness in the United States. Retrieved from http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html#top

Kosa, K., Cates, S. C., Bradley, S., Chambers IV, E., & Godwin, S. (2015). Consumer reported handling of raw poultry products at home: Results from a national study.*Journal of Food Protection, 1* (January), 180-186, doi: 10.4315/0362-028X.JFP-14-231

Rasmussen, W. (1989). Taking the university to the people: Seventy-five Years of Cooperative Extension. Ames: Iowa State University Press. Retrieved from https://books.google.com/

United States Department of Agriculture. (2015). Foodborne Illness: What Consumers Need to Know. Retrieved from: http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/foodborne-illness-and-disease/foodborne-illness-what-consumers-need-to-know/ct_index