

EDUCATIONAL INITIATIVES FOR VIRGINIA EXTENSION AGENTS' AWARENESS OF FOOD PROCESSING TECHNOLOGIES



Minh Duong¹, Nicole Arnold², Melissa Chase¹, Lily Yang³, Tiffany Drape⁴, Robert Williams⁵, and Renee Boyer¹

¹Department of Food Science and Technology, Virginia Tech, Blacksburg, VA;

²Department of Nutrition Science, East Carolina University, Greenville, NC

³The Acheson Group (TAG), Frankfort, IL

⁴Department of Agricultural, Leadership, and Community Development, Virginia Tech, Blacksburg, VA

⁵Department of Food Science, University of Tennessee, Knoxville, TN



INTRODUCTION

- Foods are processed for a variety of reasons; processing can occur at any step in the food production chain
- New food processing technologies [FPTs] can ensure the safety and quality attributes of produce commodities to be consumed raw or minimally processed
- Waterless nonthermal FPTs have shown promise in reducing pathogen load while maintaining food quality
- Despite the numerous benefits attributed to 'food processing', consumers continue to perceive the term negatively^{1, 2, 3}
- Educators working with Cooperative Extension are a resource for public dissemination of food information
- By working directly in the community, Extension educators have often cultivated relationships within the community and are therefore better able to "rely on [these] existing relationships to respond to local needs, build trust, and engage effectively with citizens"⁴
- Extension educators can effectively dispel myths related to FPTs and deliver science-supported information to consumers

We have the commonwealth covered

- 107 Local Extension Offices
- 11 Agricultural Research and Extension Centers
- Two Departmental Research Centers
- Six 4-H Educational Centers
- Virginia Tech, Blacksburg campus
- Virginia State University, Petersburg

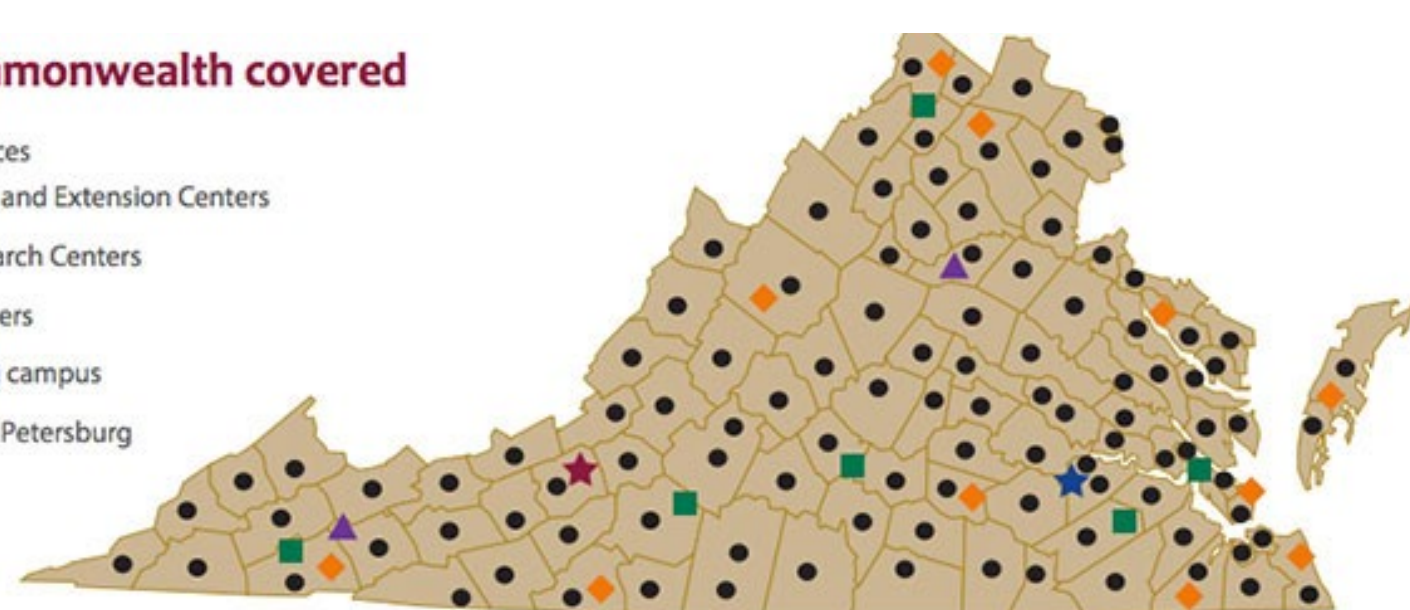


Figure 1. Virginia Cooperative Extension Map

PURPOSE

- To assess VCE Extension agents' FPT knowledge, perceptions, and purchasing intentions
- To conduct a needs assessment to determine need of educational materials for FPTs utilized by agents

METHODS

- Research was approved by the Virginia Tech Institutional Review Board (IRB #17-773)

Pre-and Post- Survey Development

- The surveys created in Qualtrics (pre) and Google Forms (post) consisted of fixed choice, check-all-that-apply, preference, and open-ended questions regarding food processing, conventional FPTs (pasteurization, microwave technology, high pressure processing, and irradiation), emerging FPTs (light and gas technologies), and educational resources for FPTs
- The post-survey, specifically, assessed changes in perceptions of FPTs and the usage of educational resources.

METHODS CONT.

Pre-Survey Distribution

- Survey was piloted with North Carolina Extension agents and distributed to Extension agents in Virginia through electronic mailing lists
- Inclusion criteria included individuals:
 - at least eighteen years of age;
 - currently employed by VCE; and
 - holding a Cooperative Extension agent position

- Survey collection remained open for 7 weeks from November to December 2018

Pre-Survey Data Analysis

- Qualitative data analysis was conducted in NVIVO 12 for Mac
- A secondary coder was used to evaluate coding and minimize bias in codebook development

Workshop – "Exploring Food Processing Technologies: An Overview of Commonly Used and Emerging Technologies"

- Train-the-trainer workshop for Agents
- Q&A and discussion session, opportunities to learn about FPTs, and exploration of educational opportunities of FPTs.
- Input on better resource development for Agents

1. First, to what extent do you agree that you would purchase food that has been processed? Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?

2. Do you have any concerns about foods that have been processed?
Yes – Please specify, No, Don't know/Refuse

3. Food processing is any deliberate change in a food that occurs before it is available for us to eat. It can be as simple as freezing or drying food to preserve nutrients and freshness, or as complex as creating a frozen meal with the right balance of nutrients and ingredients ingredients³. Now knowing this, to what extent do you agree that you would purchase food that has been processed? Do you... Strongly agree, Agree, Disagree, Strongly disagree, Don't know, Refuse



Figure 2. Sample Survey Questions

- 4-point Likert scale (Figure 2) was used to measure Extension agent agreement for specific FPT statements .
- After initial questions about knowledge and purchasing intentions for a specific FPT, the FPT's definition was provided (Figure 2). Purchasing intentions were also measured post-definition.

Post-Survey Distribution

- Survey was distributed to Extension agents who attended VCE workshop
- Survey collection occurred from January to February 2021

Post-Survey Data Analysis

- Quantitative and qualitative data analysis was conducted in NVIVO 12 for Mac

RESULTS

Have you been asked by your clients about any of the following FPTs; but did not have the adequate resources to assist them?

| FPT | % (check all that apply) |
|--------------------------|--------------------------|
| Pasteurization | 23% |
| Microwave Technology | 10% |
| High Pressure Processing | 20% |
| Irradiation | 17% |
| Forms of Light | 13% |
| Forms of Gas | 10% |
| Cold Plasma | 7% |

Pre-Survey Results

49 Extension agents completed the pre-survey
19 Family and Consumer Science (FSC) agents,
24 Agriculture and Natural Resources (ANR) agents,
6 4-H Youth agents

Food Processing (Pre-survey)

- 93% (n=49) of agents agreed that they would purchase processed foods
- When asked to describe what the term 'food processing' meant to them, agents most frequently described:
 - Changing a food from its original state;
 - Incorporating ingredients, preservatives, and additives;
 - Preserving and extending the shelf-life of food;
 - Physical changes (such as cutting, slicing, mixing, etc.)

*Cohen's-kappa coefficients ranged from 0.82 - 1.00

RESULTS CONT.

Conventional Technologies (Pre-survey)

- While all agents acknowledged they would purchase pasteurized foods, some agents would not purchase foods treated with microwave technology (14.3%), HPP (4.1%), and irradiation (26.5%)
- Majority of agents expressed concerns with microwave technology (53.1%) and irradiation (63.3%)
- Agents often associated HPP with pressure cooking (i.e. using a pressure cooker for canned foods)

Post Survey Response Highlights (N=6)

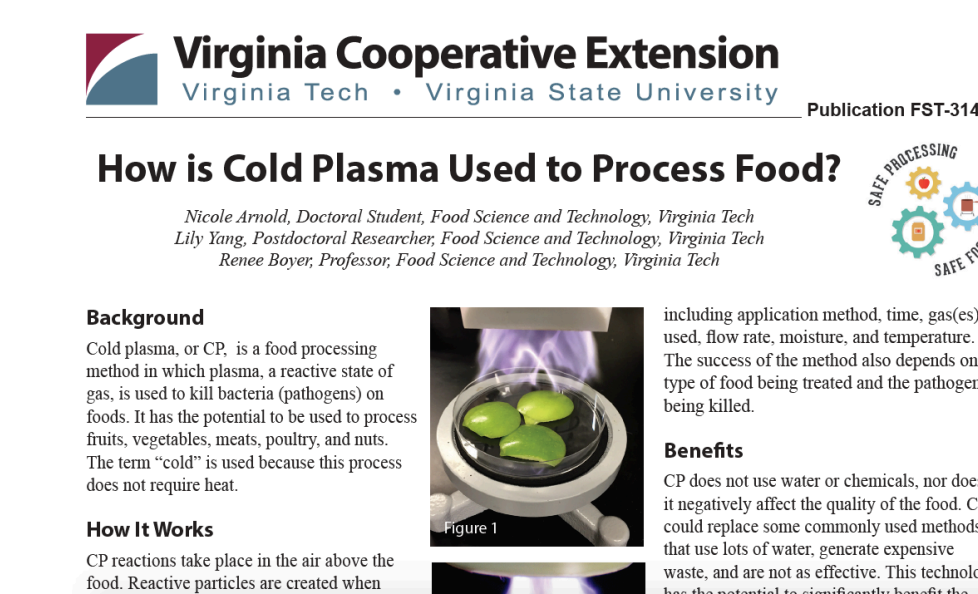
- 50% said their perceptions of food technologies changed after workshop attendance
- Only 4 of the 9 infosheets developed on FPTs were distributed or utilized by Agents. The sheets were shared with the seafood industry, ServSafe Participants, and among other Agents
- Agents wanted future FPT materials in the form of educational videos and easy-to-understand social media posts to share with their constituents
- 75% wanted additional, follow-up trainings on both FPTs and dispelling food safety myths

DISCUSSION & SIGNIFICANCE

- Because there is consumer demand for raw and/or minimally processed foods, FPTs are necessary to control foodborne pathogens
- Development of FPT educational materials is necessary to promote Extension agent confidence in disseminating FPT information to the general public
- Agents surveyed were located in Virginia; other needs assessments in other states are necessary to depict Extension agent FPT knowledge and perceptions, and the current available FPT resources
- Further FPT resources need to be developed as videos, social media posts, and other accessible forms.

OUTPUTS LIST

- Infosheets on FPTs
- VCE Winter Conference Train-the-Trainer Workshop
- Journal of Extension Publication – "How Virginia Extension Agents Engage with Public about Food Processing Perceptions"



RESEARCH NOTE

*FPTs outside the realm of the emerging technologies (e.g. pulsed light, monochromatic blue light, cold plasma, chlorine dioxide gas, and ozone gas) were referred to as "conventional technologies". "Conventional" technologies (e.g. pasteurization, microwave technology, high pressure processing, and irradiation) are all widely used food processing methods.

REFERENCES

- Bruhn, C. M. (2007). Enhancing consumer acceptance of new processing technologies. *Innovative Food Science & Emerging Technologies*, 8(4), 555-558. doi:10.1016/j.ifset.2007.04.006
- Cardello, A. V., Schutz, H. G., & Leshner, L. L. (2007). Consumer perceptions of foods processed by innovative and emerging technologies: A conjoint analytic study. *Innovative Food Science and Emerging Technologies*. https://doi.org/10.1016/j.ifset.2006.07.002
- International Food Information Council (IFIC) Foundation. (2010). Understanding Our Food Communications Tool Kit. Retrieved November 19, 2018, from https://foodinsight.org/wp-content/uploads/2014/07/IFIC_Leader_Guide_and_Handouts.pdf
- USDA NIFA. (n.d.). Cooperative Extension System. Retrieved from https://nifa.usda.gov/cooperative-extension-system

ACKNOWLEDGEMENTS

The material is based upon work that is supported by the National Institute of Food and Agriculture, U. S. Department of Agriculture, under award number 2015-69003-23410.