

# From Food Safety to Economics: Processing Your Chickens for Market

By Southern SARE MPU research team:

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Have you ever wondered about the most economical way to process your pasture-raised poultry? What about the safety of the broilers after processing with respect to potentially harmful pathogens? Or do you feel stuck between a rock and a hard place when it comes to the lack of available small-batch processors in close proximity and state regulations that limit your ability to process your chickens on farm? In late 2010, researchers—including myself—from the University of Georgia, University of Arkansas, and Oklahoma State University came together to work on a collaborative project funded by the Southern Sustainable Agriculture Research and Education (SARE) program to answer these and other questions related to the processing of pasture-raised poultry. The overall goal of this currently, ongoing project is to assess the food safety risk, environmental impact of disposal of wastes related to

processing, and the economic feasibility of pasture poultry processing using mobile processing units (MPU), as compared to USDA-inspected and on-farm processing systems.

One of the first steps we took was to understand what information was already out there with respect to processing options for small-scale poultry farmers. The USDA Food Safety Inspection Service (USDA-FSIS) has recognized the lack of processing options and created a map that identifies all of the counties in the U.S. which have seven or more small chicken farms and no processing facilities. The map was developed as part of the USDA's "Know Your Farmer, Know Your Food" initiative in an effort to further support the 2008 Farm Bill which focused primarily on increasing farmer accessibility to local markets, as well as increasing the availability of

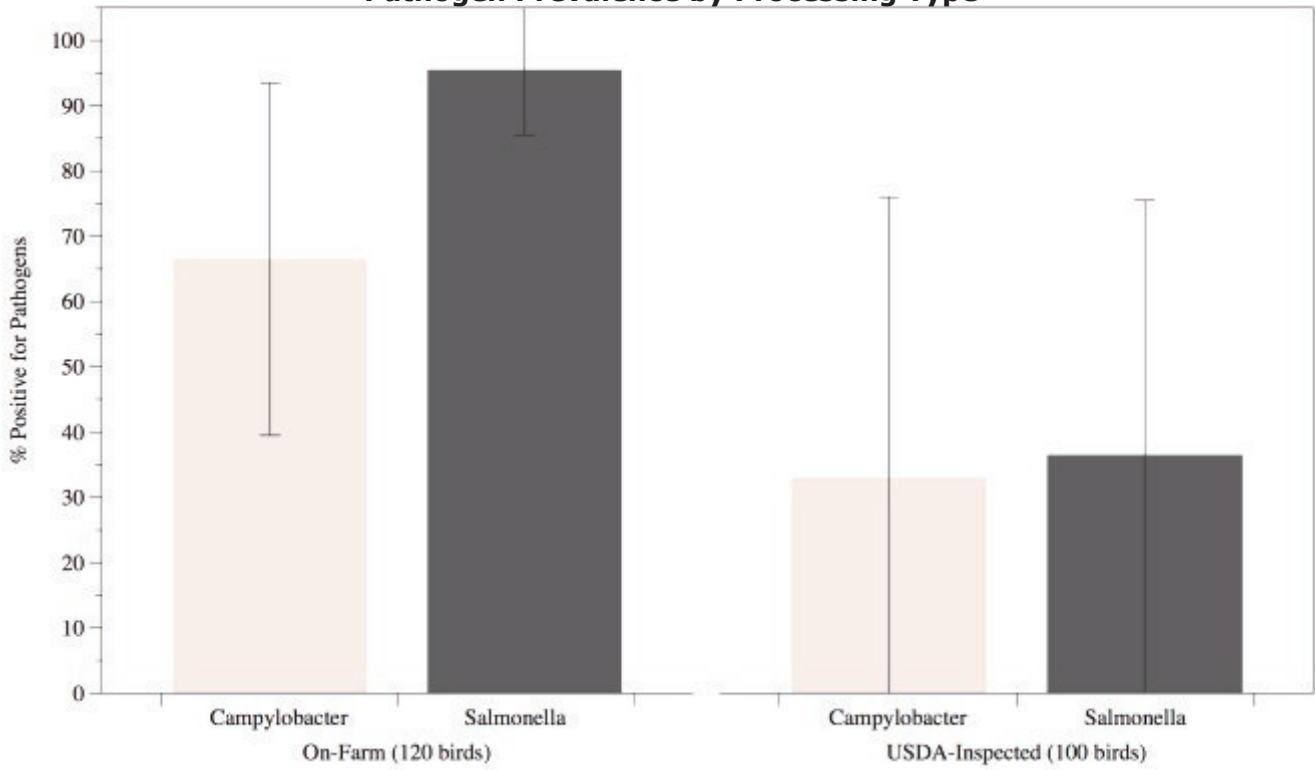
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Pastured poultry shelters on a farm in Louisiana.  
(Courtesy of Divya Jaroni)



### Pathogen Prevalence by Processing Type



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Simulated MPU processing at the University of Arkansas. The MPU was simulated using equipment that could be installed on a USDA inspected MPU

healthy foods in America. However, the issue for the small-scale farmer is not just finding a market to sell the birds but rather finding a way to convert the live birds into a processed food product that can be sold. Even though a processing plant may be nearby, often these facilities are owned by the larger companies and are subsequently off limits to the small-scale producers. As a result of increased consolidation of poultry processing facilities, many small-scale poultry farmers have been forced to seek alternative processing strategies as a means to continue to produce locally grown birds that can be sold commercially. Therefore, one of first questions was “is there a difference in the food safety risk between processing options?”

In order to address the question regarding food safety, we assessed pasture-raised poultry processed by three different systems (i.e., USDA-inspected, on-farm, and simulated MPU) for the presence of two pathogens most often associated with poultry products—Salmonella and Campylobacter. Our research team collaborated with pasture poultry farmers in Arkansas, Georgia, Louisiana, and Oklahoma to collect data on the levels of these two pathogens on the chicken carcasses in relation to the processing options. Both on-farm and USDA-inspected processing options were assessed in Georgia, Louisiana, and Oklahoma, while a simulated MPU was assessed in Arkansas. Through close partnerships with farmers, Dr. Divya Jaroni at Oklahoma State University (Oklahoma State) worked

with farmers in LA to collect carcass rinse samples from 50 birds over 5 separate on-farm processing events—10 birds from each event. In Georgia, Dr. Walid Alali at the University of Georgia (UGA) worked with 3 separate farmers to collect carcasses from 7 on-farm processing events—at least 2 events per farm with 10 birds collected at each event. Researchers at UGA and Oklahoma State also collected 10 carcasses from two USDA-inspected facility on 5 separate occasions for each facility. Preliminary results on the prevalence of pathogens by processing type are displayed in the figure found on page 7.

Alongside the on-farm and USDA-inspected processing, researchers at the University of Arkansas (UA) assessed the food safety aspects of a simulated MPU. The term ‘simulated MPU’ is used here since the birds were processed using equipment that would be purchased for use in a MPU, but the equipment was stationary in a brick and mortar building as opposed to being on a trailer. The equipment is all manufactured by Pickwick Company (Cedar Rapids, IA) and consists of a hand-held electric stun knife, SHC-16 chicken shackles, a 5A140 scalding unit with PDK Dunkmaster immersion unit, and a JS-2A Spin-Pik picker. For the MPU assessment, UA researchers worked with two pastured poultry farmers to process their chickens on 5 separate occasions. In total, there were 150 birds processed—30 birds per event—and 50 birds were assessed for presence of pathogens—

*Cont’d page 10*

10 per event. The MPU results were different than the other processing methods and were 100% positive for *Campylobacter* and 0% positive for *Salmonella*.

Here, it should be noted that a diverse range of broiler breeds were processed across the different systems including Naked Necks, Freedom Rangers, Red Rangers, Cornish Rock Cross, Ross 708s, Cobb 700s, and K-22s. We would also like to stress that these preliminary results are highly variable and that only a few farms employed some type of sanitizing agent or step (i.e., vinegar, lactic acid-based product, hot water) before or during chilling which would certainly help to reduce the prevalence of *Campylobacter* and *Salmonella* positive chicken carcasses. In the end, however, proper handling of the product by the consumer would most greatly eliminate the risk of illness due to these pathogens. Such information may be found at [www.fsis.usda.gov](http://www.fsis.usda.gov) and [www.eatchicken.com](http://www.eatchicken.com).

While we are still establishing a baseline understanding of processing types and their relationship with food safety, we are also interested in the different impacts each system may or may not have on the environment with respect to waste disposal practices. Do you ever wonder where the liquid and solid wastes ultimately end up or if your pasture can sustain repeated application? Well, for each type of processing system, wastewater samples were collected and analyzed for the presence of pathogens and levels of nutrients. Compost and soil samples were also collected during on-farm processing events to better understand how pathogen and nutrients levels may decrease over time. For the MPU, we also collected information on water usage to determine total wastewater per bird, and we recorded the amount of solid waste generated by weighing the birds after each processing step. Preliminary results show on average 400 grams (0.9 pounds) of solid waste

(including blood) generated per bird and 10 liters (2.6 gallons) of water used per bird with the majority of water use coming from the 5A140 scalders since it is constantly adding water to hold the temperature at 140° F. Our ultimate plan is to be able to provide guidelines for how to dispose of processing wastes properly (i.e. for MPUs and on-farm processing) with respect to the amount of land area needed for both composting and wastewater application. These guidelines could be presented in a matrix based on the number of birds being processed and amount of land available.

One of the primary hypotheses of our project is that operating a USDA-inspected MPU is a viable option for small and medium-scale pasture poultry farmers compared to small batch processors in brick and mortar buildings; therefore, the last component of our SARE research project—led by Dr. Genti Kostandini at UGA—is to better understand the economic profitability and feasibility of MPUs at the farm and state level. To determine the costs associated with operating a MPU versus other systems as well as the sustainability aspects, we have begun to collect information on production costs, processing costs (e.g., water use, electricity inputs, labor requirements, etc.) and prices of USDA versus non-USDA inspected systems to determine potential profits for small and medium size operations. To collect this information, we have worked with the National Center for Appropriate Technology (NCAT), Yahoo! Pasture Poultry Group, and APPPA to distribute an electronic survey to pastured poultry farmers nationwide through newsletters (NCAT Weekly Harvest and APPPA Grit) and online message boards. We plan to use the results from the farm level analysis and combine it with information on the current number of pasture poultry farmers in each state in order to project state level profitability for Georgia, Arkansas, Oklahoma, and Louisiana. In addition, we have collected information from several previous projects with MPUs and compare costs related to different structures and batch sizes. Dr. Kostandini plans to provide different forward looking scenarios based on cost-benefit analyses with respect to the potential economic impacts of an increase in poultry production in the Southeast using several relevant adoption scenarios and price. In combination with production and

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processing costs, we will also collect information on the consumers' willingness to pay for pasture poultry products processed in USDA versus non USDA-inspected facilities. This will tie into the potential profitability of operating a MPU that is USDA inspected. Finally, the impact of different policy changes with respect to the size restriction for USDA inspection will be explored.

As an integrated and diverse group of researchers, we are excited to be working together on what we feel is a very important need (i.e. more sustainable processing options for small-scale poultry farmers) that will have impact for pasture poultry farmers. This project will culminate in October 2013, and we hope to follow up with a final report to APPPA and NCAT. In addition, if you are located in the Southern or Midwest regions of the U.S., we have organized a symposium entitled "Mobile Poultry Processing for the Small-Scale Farmer" for the Southern Sustainable Agriculture Working Group (SAWG)

Conference in Little Rock, Arkansas, in January 2013, and we will present an overview of 1) equipment requirements and options available; 2) getting organized and operating a MPU, and 3) basic business strategies for different types of MPUs. Please free to contact us directly regarding this project.

#### References

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