

Finding Relevant Supporting Documentation Materials

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Finding scientific articles that support the processes that you have chosen to use to produce a safer product is an important part of validating your HACCP plan. Finding articles that truly support what you are doing can be a challenge, particularly if you haven't done this before. To support what you are doing, the procedures and product characteristics used in the articles need to match what you are doing. From what I am hearing from both FSIS and ODA, quite a few companies are still dealing with how to find articles that truly support their HACCP decisions. This article is intended to help make this matching process easier for you.

The first challenge, obviously, is to find scientific articles that you can look at to start the matching process. If you (or your children, employees, etc.) have Internet access, a good place to start with your search is with Supporting Documentation Materials for HACCP Decisions on the OSU website (<http://meatsci.osu.edu/HACCPsupport.html>). On this site, you can search for potential articles by entering key words (e.g., ham, slaughter, ground beef, fresh sausage, cook, chill, etc.) that describe your process. If you don't have access to the Internet, you might ask if your inspector could go on-line with you on their computer to help you search for articles or you could use a hard copy, that you can get from FSIS (http://www.fsis.usda.gov/Science/Resources_&_Information/index.asp). The information in the OSU Supporting Documentation manual is arranged according to the process categories defined by FSIS: Red Meat Slaughter; Poultry Slaughter; Raw Product – Not Ground; Raw Product - Ground; Fully Cooked, Not Shelf Stable; Heat Treated, Shelf Stable; Heat Treated, Not Fully Cooked, Not Shelf Stable; Not Heat Treated, Shelf Stable; Secondary Inhibitors, Not Shelf Stable; Thermally Processed – Commercially Sterile.

The OSU Supporting Documentation Materials are formatted as a table, with a series of columns. The first column, labeled "Process Step" identifies the point or step of each process flow chart, in which scientific or regulatory documentation is available. The second column identifies the potential hazards that have been addressed in scientific articles, for each process step. The third column, labeled "Process Parameters," describes the conditions that are applied in various scientific publications. This table is designed such that a processor can go to the processing point or step that is of interest, then move across to the potential hazards and process parameters, that best match their particular process. Upon identifying one or more process parameters that are appropriate for their operation, the fourth column, labeled as "Decision Criteria," will describe the results of the available research, or the regulatory requirements, relevant to your process step and potential hazard. In the fifth, or last, column, labeled "Scientific Documentation," the actual source of the information, described in the three columns to the left, is listed. Where available, a website is given to allow internet access to publications. If a website is not given, please contact me for a copy of articles that you need.

There are other sources of scientific articles, such as the University of Wisconsin's Center for Meat Processing Validation (<http://meathaccp.wisc.edu/index.html>), and the International HACCP Alliance (<http://haccpalliance.org/sciencelibrary.html>).

At this point, let's assume you have found an article or two that appear to apply to your situation. Now where do you start in evaluating each article? Unfortunately, these articles are not written

for easy reading. However, the good news is that you may not have to read the entire article to determine if it works for your situation.

The first step in evaluating articles is to find and read the abstract and/or the conclusions, which give you a brief snapshot of what the research involves. The abstract will be found at the beginning of the article and is a brief summary of the methods used and the results obtained from the research. In this short paragraph, you should be able to learn about the type of processing used in the research (e.g., cooking, vacuum packaging, slaughter, etc.) to give you a general indication if this article applies to what you are doing. You could also go to the end of the article to see if the Conclusion section gives you more information on what was done in this research. The Conclusion section is normally fairly short and will concentrate on the results of the research, such as how many logs of pathogens were killed during cooking or application of acid rinses, etc. However, the Conclusion section may be combined with the Discussion section, which would make it a longer section to glean information from.

After reading the Abstract and/or the Conclusions, if the article appears to apply to your process, then the next step would be to look for the Materials and Methods section of the article, for more specific details on how this product was processed. If the article doesn't appear to apply to your process, move on to the next article.

At this point, you have the information that you need to determine if the article is a good match. If you don't do this on a regular basis the matching process can be a big challenge. In hopes of making this process easier to do or understand, I have developed another table (Table 1.) that is designed to help processors identify their product characteristics and processing details that are important to compare to the research methods. This table would also be helpful when discussing articles with inspection personnel. You would need a separate copy of this table for each article that you are considering to use.

In developing the evaluation form in Table 1., I had to think of all of the possible parameters that would be important for all of your different plans, so as you read down the first column, some or many of the parameters listed in the first column may not apply to your process. If it would help, I will make additional evaluation forms that are tailored for individual process categories and hopefully, less confusing (Look for these at: <http://meatsci.osu.edu/currentprog.html>). Regardless of which form you use, identify the parameters that apply to your process and fill in the boxes with the information that applies to your product/processes and that of the article that you are evaluating.

The first 6 items in the first column of Table 1 are related to your product characteristics. As mentioned earlier, not all of these may apply to your product or be important to the safety of your product. And you may think of others that need to be added to the table. Under "Pathogen of Concern," you would select one (or more?) of these pathogens that are relevant to your product and were studied in the article that you are considering.

Table 1. Form for Evaluating the Relevance of Research Articles

Product/Process Parameters	Your Product Characteristics	Research Product Characteristics	
Meat species (beef, pork, chicken, etc.)			
% salt			
% nitrite			
pH			
Water activity (a_w)			
Product dimensions or weight			
Pathogen of concern			
Fresh pork: Salmonella			
Fresh chicken: Salmonella			
Fresh beef: <i>E.coli</i> O157:H7			
Cooked products: <i>L. monocytogenes</i>			
Cooked products: <i>C. perfringens</i>			
Dry products: Salmonella			
Process step of concern/CCP			
Nature of biological hazard			
contamination			
growth			
survival			
Final Internal Temperature			
Cooling rate			
130-80°F			
80-45°F			
Regulatory guideline for process			
Actual results (Log reduction, etc)			
Calculated results (Pathogen Modeling Program, AMI Lethality Equation, U.			

WI Validation Center)			
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The “Process step of concern/CCP” refers to the point or step in your process that you have identified as a critical control point (CCP) (e.g., grinding, packaging, cooking, etc.). The “Nature of biological concern” is asking only for a check mark in the proper box that indicates whether you are most concerned with pathogen contamination (from the environment, etc.), pathogen growth (during storage or processing times), and survival (during cooking, drying, etc.).

The “Final internal temperature” could apply to endpoint cooking temperatures, as well as critical limits for fresh product. The cooling rate refers to the time limit targets used for each of two temperature limits. You (or the article) may use a different combination of times and temperatures than those given.

The details that you enter into this table should make it more obvious if the important parameters of the article match what you are doing. Also, this information will make it easier for you to justify to inspection personnel why an article is relevant or for inspection personnel to explain to you why they disagree with the articles relevance.

Examples of the regulatory guideline row would include: 6.5 log reduction of Salmonella during cooking, 1 log growth or less of *C. perfringens* during chilling, etc.

The final two rows of Table 1 provide spaces for entering the results published in the article and calculated from various models and equations. At this point, you are not likely to have actual pathogen data for your product.