

VALIDATING THE SAFETY OF YOUR JERKY PROCESS

Regulators expect processors to be able to have proof that the temperatures and times achieved in products during cooking are sufficient to destroy any pathogens which might be present. Getting internal temperatures on jerky is just about impossible because of the thinness of the product. Therefore, validating the safety of a jerky process is more challenging than demonstrating adequate cooking in sausages or cured meats where a smokehouse temperature probe can be easily placed in the product during cooking.

I have received a number of calls about verifying jerky processes, and I think it can be done fairly simply, in either of two ways:

1. Cut a strip of jerky thick enough so that a smokehouse probe can be placed into it. This "monitoring" piece of jerky will be much thicker than the usual product, but a temperature/time profile can now be obtained. The result will be a "worst case scenario," since thinner jerky will heat faster than this strip. If you make ground formed jerky, you may be able to do the same thing by placing the probe between two jerky strips placed on top of one another. Once the product temperatures and cooking times are measured, compare them to the USDA's "Safe Harbors" provided in Appendix A. Does your product meet any of the product time/temperature combinations listed – from 131 °F for 121 minutes – to 158 °F instantaneous? If so, you have a validated (proof of safety) process.
2. Several years ago we worked with our Food Research Institute on campus to verify the safety of procedures for the manufacture of ground and formed jerky in home dehydrators. With the attention given to *E. coli* O157:H7 in undercooked ground beef, consumers were calling and asking about the safety of making jerky in small home dehydrators.

Tests were conducted as prescribed by the USDA to validate a process. 10,000,000 cells per gram of this pathogen were added to the starting batter. A good home dehydrator was used to heat and dry the strips (1/6 inch thick) at operating temperatures of 125°, 135°, 145°, and 155 °F. Samples were evaluated at time intervals during drying for the number of surviving pathogens. A safe process was one that reduced the number of original added cells (10,000,000 per gram) to less than 100 per gram (a 5 log kill). The experiment was repeated three times. Below are total processing times required at given operating temperatures to provide the desired 5 log kill:

Smokehouse or Dehydrator operating temperatures	Hour at this temperature
125 °F	10 hours
135 °F	9 hours
145 °F	7 hours
155 °F	4.5 hours

If your process satisfies any of the above house temperatures/processing time conditions, it could be regarded as being validated as effective in destroying 100,000 cells of pathogens such as *E. coli* O157:H7 or *Salmonella*. This likewise is a conservative estimate of safety since the numbers of these pathogens typically found in meat is much lower than 100,000 per gram, and the effective heating of a commercial smokehouse would be much greater than a home dehydrator.