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High Pressure Processing (HPP) Does Not Affect Texture and Sensory Attributes of Smoked Hams Cured by Conventional and Alternative Methods

Y. Yeh^{1*}, H. Thippareddi², and A. S. De Mello¹

¹Agriculture, Nutrition, and Veterinary Sciences, University of Nevada, Reno, NV, USA;

²Poultry Science, University of Georgia, Athens, GA, USA

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Objectives

High Pressure Processing (HPP) is a post-lethality treatment applied on RTE meats to reduce or eliminate *Listeria monocytogenes*. Previous research showed that HPP can affect texture and sensory attributes by modifying the myofibrillar structure and inducing lipid oxidation. Additionally, the increasing demand for natural and organic products created niche markets for uncured and alternatively cured hams. This experiment evaluated the effects of HPP on texture profile, WBSF, and sensory attributes of uncured, and conventionally and alternatively cured hams.

Materials and Methods

Thirty-two boneless pork top rounds (m. semimembranosus and m. adductor) were obtained from a commercial USDA inspected plant. Eight samples were assigned to 1 of 4 curing treatments. Treatments included conventional curing with nitrite (TRT1), alternative curing with celery powder (TRT2), uncured with apple cider, wine, and garlic (TRT3), and alternative curing with celery powder and buffered vinegar (TRT4). Samples were injected to 110% of green weight with a brine solution, immersed for 3 d, and smoked for 10 h at 107°C until the final product reached at least 71.1°C at the geometric center. From each sample, a total of four 2.54 cm thick slices were obtained. Two were treated with HPP at 87,000 psi for 3 min (HPP) and 2 were assigned as HPP control (NOHPP). Texture profile analysis (TPA) was performed on 3 cubes (2.54 cm²) from each slice and WBSF was analyzed from six 1.27 cm cores. A consumer sensory panel (480 panelists, 16 sessions, 30 panelists per session) evaluated color, odor, flavor, texture,

and overall desirability by using a numerical scale (1 = Dislike extremely and 9 = Like extremely). Panelists also scored off-flavor intensity from 1 = No off-flavor to 9 = Off-flavor extremely intense. Data was analyzed by using PROC GLIMMIX of SAS (SAS Inst. Inc., Cary, NC) as a split plot design where curing treatment was the whole plot and HPP the sub plot.

Results

HPP did not affect hardness, adhesiveness, springiness, gumminess, chewiness and WBSF of smoked hams. However, a significant effect of HPP was observed for cohesiveness (0.38 for NOHPP and 0.34 for HPP; $P < 0.0001$). No interaction between TRT and HPP was observed for any texture profile attributes. Curing treatment only affected springiness (6.21^a, 6.28^a, 5.78^b, and 5.90^{ab}, for TRT1, 2, 3, and 4, respectively; $P = 0.03$). For sensory analysis, interaction between TRT and HPP main effects were observed on odor ($P = 0.02$) and off-flavor ($P = 0.006$). No single effect of HPP was observed on other sensory attributes. Curing treatment affected color, flavor, texture, and overall desirability ($P < 0.0001$). Overall TRT1 and TRT4 had better scores when compared to TRT2 and TRT3.

Conclusion

HPP did not affect texture and WBSF of smoked hams cured by conventional and alternative methods. Hams cured conventionally and alternatively with celery powder and buffered vinegar had better color, flavor, and overall desirability. Uncured hams had the lowest overall desirability when compared to cured hams.