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Evaluating the Effects of Oat Fiber and Modified Corn Starch on the Characteristics of Smoked Sausage Utilizing Mechanically Separated Chicken

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Objectives

There is increasingly a demand for affordable, all-natural products in the food service industry. The objective of this study is to evaluate a blend of clean label functional ingredients for use in an affordable smoked sausage for food service.

Materials and Methods

Researchers at Auburn University used texture profile analysis (TPA) and consumer sensory panels to evaluate sausages made with 3 blends of oat fiber (OF) and modified corn starch (MCS) over 4 wk of storage. All sausages were made with mechanically separated chicken (MSC; 0.0625% $NaNO_2$, 1.75% salt) in a hog intestine casing. Treatments included a positive control (0.43% sodium phosphate), negative control (no sodium phosphate, OF, or MCS), 90:10 blend (3.15% OF, 0.35% MCS), 50:50 blend (1.75% OF, 1.75% MCS), and 10:90 blend (0.35% OF, 3.15% MCS). All treatments included 18% water, 1.7% seasoning, 1.3% vinegar, and 0.5% salt. Two trials were conducted to evaluate the treatments. Sausages were formulated and then cooked in a smokehouse in 2 batches, dividing by trial, in which every treatment was equally represented and uniformly positioned. Five sausages were selected randomly from each treatment for each trail for sensory and 1 sausage was randomly selected for TPA. Following cooking and chilling, sausages were vacuum sealed and stored at 1°C ± 2°C in a cardboard box. Three sensory sausages were reheated in an oven to 79.4°C, cut into 2.54 cm segments, and cut in half lengthwise for sensory analysis while the remaining 2 were evaluated for objective color and pH using a Hunter Colorimeter and a pH Stab probe. Treatments were given a unique, random 3-digit code. Thirty consumer sensory panelist evaluated juiciness, cohesiveness, flavor, texture, and overall acceptability on a 9-point rating scale. TPA sausages (not reheated) were cut into three 2.54 cm segments and evaluated using a TA-XT2i Texture Analyzer and 25 mm cylinder press. Parameters evaluated include hardness, springiness, cohesiveness, gumminess, chewiness, and resilience. Data were analyzed using the least squared means function of Proc GLM procedure of SAS 9.4 (SAS Inst. Inc., Cary, NC). Sensory, texture, pH, and color evaluations were performed every 7 d contingent on microbial and sensory analysis of spoilage.

Results

Sensory panelist found no difference ($P > 0.05$) in texture among treatments within the same week or among weeks with the exception of 90:10 ($P \leq 0.05$) by week. The treatments with OF:MCS blends were less juicy ($P \leq 0.05$) than controls and were more cohesive ($P \leq 0.05$) within weeks. Adding OF at 3.15 and 1.75% had a negative effect on flavor acceptability and overall acceptability. TPA analysis indicates numerous significant ($P \leq 0.05$) week by treatment interactions for OF:MCS blends for all parameters measured. All treatments experienced an increase in pH between wk 0 and 1 and a decrease between wk 2 and 3. No differences ($P > 0.05$) were observed for a* over weeks. L* and b* showed differences ($P \leq 0.05$) over weeks.

Conclusion

Sensory properties of the 90:10 and 50:50 blend were lower than other treatments, but the 50:50 blend performed that best for TPA analysis. Further research evaluating the sensory, texture, pH, and color parameters is needed across an additional 9 wk of product storage to make recommendations on the best blend of OF:MCS for an optimal product.

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