



## Sorghum Bran as an Antioxidant in Pre-Cooked Ground Pork and Poultry Products

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### Objectives

Pre-cooked pork and poultry products high susceptibility to lipid oxidation is a major concern to the processed meat industry. The development of off-flavors, such as cardboard, painty, fishy, and warmed-over flavor (WOF), from lipid oxidation limits the frozen shelf-life of these products to less than 6 mo. To retard lipid oxidation, antioxidants such as synthetic antioxidants, butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT), or natural antioxidants such as rosemary extract are common antioxidants added to products to increase shelf life. With an increase in demand for more natural ingredients, recent research has shown that plant-based tannin producing sorghum bran is a quality inhibitor of lipid oxidation. The objective was to evaluate antioxidant effectiveness, pH, color, and sensory of powdered High Tannin and Onyx sorghum bran in a ground pork and ground chicken products.

### Materials and Methods

Ground pork (20% lipid) and dark meat chicken thighs, respectively, were ground, mixed and equally divided into one of 11 treatments: 1) control-no added ingredients; 2) BHA and BHT at 0.01% of the meat weight; 3) rosemary at 0.2%; 4, 5, 6, and 7) 0.125, 0.25, 0.50, and 0.75% Onyx sorghum bran, respectively; and 8, 9, 10, and 11) 0.125, 0.25, 0.5, and 0.75% high tannin sorghum (HTS), respectively. Patties and crumbles were cooked to 70°C and packaged aerobically on Styrofoam trays overwrapped with polyvinyl chloride film and stored at 4°C for 0, 1, 3, and 5 d under continuous exposure to 1,600 lx, fluorescent lighting. Products were re-heated to 70°C and served to a trained sensory panel on d 1 and d 3. On each storage day, re-heated chicken patties and

pork crumbles were evaluated for TBARS, pH, instrumental color, and subjective color measurements. Data were analyzed as a factorial arrangement by Analysis of Variance using the general linear model (GLM) procedure of SAS (Version 6.12; SAS Inst. Inc., Cary, NC) with a predetermined significance level of  $P \leq 0.05$ .

### Results

In control pork crumbles and chicken patties, TBARS values increased with storage ( $P < 0.0001$ ). By d 5 of storage, Onyx 0.5%, Onyx 0.75%, HTS 0.5%, and HTS 0.75% had lower TBARS values than control and rosemary extract-treated samples ( $P < 0.002$ ). Treatments affected subjective color, CIE color values  $L^*$  and  $b^*$  for both cooked products. The higher the percentage of sorghum added resulted in higher subjective color scores, and the products were darker and less yellow ( $P < 0.05$ ) than the control and rosemary extract-treated samples. Pork crumbles with higher sorghum bran levels were redder ( $P < 0.0001$ ) than control crumbles. Heated oil, sorghum, warmed over, gritty, cardboardy, refrigerator stale, painty, brown roasted, astringent, sweet, sour, and nutty flavor aromatics differed across treatments ( $P < 0.05$ ) in the pork crumbles. Sorghum, brown roasted, bitter, umami, heated oil, refrigerator stale, and sweet differed ( $P < 0.05$ ) across treatments in the chicken patties.

### Conclusion

The addition of higher levels of sorghum bran impacted flavor attributes compared to controls but resulted in darker cooked product color. Both varieties of sorghum bran retarded lipid oxidation equal to BHA/BHT but was significantly more effective than rosemary extract ( $P < .05$ ) in cooked pork crumbles and chicken patties without negatively affecting sensory attributes.