2016 Reciprocal Meat Conference – Meat and Poultry Quality

Meat and Muscle Biology™

Application of Food Grade Coatings to Prevent Mite Infestion in Dry Cured Ham Processing Facilities

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Keywords: coated nets, dry cured hams, food grade coatings, ham mite
Meat and Muscle Biology 1(2):54 **doi:10.221751/rmc2016.051**

Objectives

The ham mite (*Tyrophaus putrescentiae* Schrank) is the predominant target pest for dry cured ham during aging. Methyl bromide is currently the only effective fumigant for controlling mite infestations in the dry-cured ham industry. However, methyl bromide is being phased out of all industries based on the Montreal Protocol. The objective of this research was to find viable, effective and economical alternatives for the dry cured ham processing facilities.

Materials and Methods

Food grade coatings (patent pending) were made from combinations of 1) propylene glycol (PG), xanthan gum (XG), and water or 2) PG, propylene glycol alginates (PGA), carrageenan (CA) and water. Trials were conducted in the summers of 2014 and 2015 in 4 commercial processing facilities and a simulated aging house at Mississippi State University. Whole hams were dipped in coatings or applied to hams with a high pressure spray nozzle and aged for 5 to 8 mo. Difference from control sensory tests (6 to 10 trained panelists, 3 reps per plant) were conducted on ham slices that were removed from the treatment hams to determine the impact of the coatings on sensory quality.

To make the coatings more applicable to the dry-cured ham industry, ham nets were infused with the coatings mentioned above and tested for their efficacy at controlling mite infestation. On the laboratory benchtop, 20 mites were inoculated onto single ham cubes (2.5cm × 2.5cm × 2.5cm) that were wrapped with ham nets that were treated with different coatings (n = 5/trt). Total numbers of mites were counted after 14 d of storage at 25°C and 70% relative humidity.

Completely randomized design was utilized and Tukey's test was used to separate the means for data analysis.

Results

Control and treated hams from the commercial trials in both years received sensory scores between 1.6 and 3.2 on the 5 point scale where 1 = no difference and 5 = very large difference. In 3 out of 5 plants, the CA + PGA and low concentration PG treatment hams were not different ($p > 0.05$) from the blind control treatments. However the high PG treatment was not different ($p > 0.05$) from the control in 2 out of 5 plants (only in trial 1). In addition, the XG and low concentration PG treatment was only different ($P > 0.05$) from the blind control in 1 out of 5 plants in both trials. This indicates that the coatings did not impact the flavor in some of the plants but did impact the flavor in the other plants. This may have been due to differences among the plants in non-meat ingredients that were used, aging temperature and humidity, and aging time.

For coating infused nets, the mite infestation tests showed that cubes wrapped with nets that were treated with coatings had significantly lower numbers of mites, varying from 3 to 62, after 2 wk, while cubes from the negative control and the positive control with untreated nets had up to 554 mites each. This demonstrates that the treated nets inhibited the reproduction of mites on hams, with some nets performing better than others.

Conclusion

The food grade coatings may be applicable for some, but not all, processors. In addition, the coating infused ham nets demonstrate the potential to control mite infestations and should be scaled up for commercial testing.

