Methyl bromide use to combat mite infestation in dry-cured ham during production

G. Rentfrow[1], D.J. Hanson[2], M.W. Schilling[3*], W.B. Mikel[3]

[1] Department of Animal and Food Science; University of Kentucky, Lexington, KY
[2] Department of Food Science; North Carolina State University, Raleigh, NC
[3] Department of Food Science, Nutrition and Health Promotion; Mississippi State University, Mississippi State, MS

Twenty dry cured ham processing plants were surveyed (17 of these 20 plants were audited) in North Carolina (12 plants), Virginia (3 plants), and Kentucky (5 plants) to determine the extent of ham mite (Tyrophagus putrescentiae) and red legged beetle (Necrobia rufipes) infestations in dry cured ham products. Sixty-five percent of the plants that were surveyed report using methyl bromide as a fumigant to control mite and/or red legged beetle infestations in their hams. Methyl bromide usage was 67, 60, and 67 % for plants in North Carolina, Kentucky, and Virginia, respectively, and it was approximated that a total of 5,000 kg of methyl bromide is used annually at these 20 plants. It was also reported that fumigation occurs from 1 to 5 times per year when methyl bromide is used by a plant.

Since seven plants that were surveyed did not report problems with mite or beetle infestations, an attempt was made to determine why these plants do not report problems. There were a total of 15 processors that aged hams for less than 5 months and 7 processors that aged hams for 6 months or longer. Six out of seven processors who aged hams for longer than five months reported problems with ham mites and/or red legged beetles. In North Carolina, 6 out of the 11 plants with aging times less than 5 months reported infestation problems. In Virginia, 2 out of 3 of the plants that aged hams for less than 5 months reported problems with mites, but these 2 processors also produce ham that is aged for 6 months or longer. In Kentucky, the only plant that solely produces hams aged for less than 5 months reported no infestation problems, and one plant that ages their hams for 6 months reported no problems with infestations. From these results, it is apparent that aging times of longer than 5 months causes an increased risk for infestation with mites and beetles. However, aging for shorter times than 5 months does not assure processors that infestation problems will not occur, and long aging times ($\geq$ 6 months) are necessary to obtain desired flavor and product quality that meets niche markets. Of the 6 plants that had short aging times (< 5 months) and did not report infestation problems, producers stated that sanitation and fly control were the best methods for preventing infestations. From plant audits, it was

apparent that methyl bromide was the only method that was utilized as an effective means for eliminating existing mite and red-legged beetle infestations. However, it was also apparent that preventative measures are being taken to reduce the risk of infestations in both short (< 5 months) and long aged hams (≥ 6 months). All plants with aging periods less than 5 months that did not report infestation problems had aging times of around 3 months, excellent sanitation, and fly control. However, some plants with excellent sanitation and fly control still have infestations. Therefore, these methods are not full proof.

Another preventative measure that should be included in every plant is an integrated pest management (IPM) program, clearly outlining the steps that are taken to prevent infestations and the purpose of each step. Items that could be included in an Integrated Pest Management (IPM) program are immaculate sanitation in the processing room, wrapping ham in breathable paper during curing, and extreme cleanliness and sanitation in the aging rooms. Other items in an IPM program should include mowing the lawn often (weekly), preventing the grass from growing within 3 feet of aging houses, using gravel to form a barrier between the grass and the aging houses, using fans or exhaust systems to cause air to circulate and exit the aging rooms, and putting sealant on wood racks so that bugs cannot harbor in the wood. It is also crucial to keep all pallets and other items used in the plant from coming into contact with the ground when stored outdoors (any environment that can place bugs in contact with the environment that the hams are in). There should be no unnecessary items stored outside of the facility and all necessary items should be stored appropriately as well as be kept as clean and sanitary as possible. It was also demonstrated at one facility that samples that were frozen at 6 months of aging did not have infestation problems. It is clear from audits and surveys that methyl bromide is the only current method that can destroy mites and beetles that have already infested hams, but that a hurdle approach in integrated pest management programs may be able to help prevent infestations from occurring. Other fumigants such as sulfuryl fluoride need to be evaluated for their safety and effectiveness on dry cured ham, but methyl bromide use is necessary until an alternative fumigant is identified that can destroy ham mites and red legged beetles without compromising the safety or deteriorating the quality of the ham.