

Research Notes

Passport Food Safety Solutions



BoviBrom well below OSHA personal exposure limits in air monitoring study.

STUDY OVERVIEW

To determine exposure to DBDMH and its by-product during application of BoviBrom® to beef carcasses in the hot box¹ and near the carcass wash², air samples were collected using either an SKC low-flow pocket pump model 210-1002 or an MSA Escort Elf high-flow pump. Standard method of air monitoring technology procedures were used to capture data. Appropriate sampling medias were used, including silver-impregnated membrane filters, PTFE filters, charcoal tubes and treated XAD-7 tubes. All sampling pumps were pre- and post-calibrated. Direct HOBr readings were recorded using a Sensidyne Model 20S detector tube system with Gastec tubes No8La. These tubes are recommended for measuring chlorine, but are also recommended by the manufacturer for measuring HOBr. The sensitivity of these tubes for HOBr is approximately 25-50 ppb.

RESULTS

The monitoring data indicated that no significant level of any monitored substance was detected in the air. Calculated exposure levels were well below the published exposure limits for the substances. In addition, HOBr levels were measured periodically at several locations using a direct read instrument (detector tubes). Using this technique, it was determined that HOBr was not present in any significant amount in the air.

CONCLUSION

- Based on the observations and data collected, the application of BoviBrom through the carcass wash did not indicate an exposure concern
- The potential for exposure is low and risk to employees is minimal

TABLE 1		Industrial Hygiene Exposure Monitoring Results ¹			
Sample Location ^a	Sampling Media ^b	HOBr	Bromide-containing Aerosols	Bromoform	Other Halogenated Hydrocarbons ^c
Carcass Wash Entrance	Ag Membrane Filter (NIOSH 6011)	ND (<1 ppb)	ND (<1 ppb)	NA	NA
Field Blank	Ag Membrane Filter (NIOSH 6011)	ND	ND	NA	NA
Carcass Wash Exit	Charcoal Tube (NIOSH 1003)	NA	NA	ND (<6 ppb)	ND (<30 ppb)
Field Blank	Charcoal Tube (NIOSH 1003)	NA	NA	ND	ND

ND = none detected; the minimum detectable air concentration was: HOBr – 1 ppb; bromide – 1.0 ppb; bromoform – 6 ppb; other brominated hydrocarbons – 30 ppb.

NA = Not applicable to sample collected.

Established exposure limits are:

Bromoform – both OSHA and ACGIH list 0.5 ppm (500 ppb) as the 8-hour time-weighted average exposure limit.

HOBr – the OSHA and ACGIH 8-hour time-weighted average exposure limit is 0.1 ppm (100 ppb).

Bromide – There are no established exposure limits for bromide ion.

^aAll samples were area samples collected using pre-calibrated pumps.

^bHOBr vapor was collected on silver (Ag) membrane filters (SKC 225-9006). Bromide ion-containing aerosols were collected on PTFE pre-filters included in the Ag membrane cassette. Bromoform and other brominated hydrocarbons were collected on charcoal tubes (SKC 226-09). All samples analyzed at ENTEK Environmental Laboratories, 14285 Airline Highway, Baton Rouge, LA 70817. ENTEK is an AIHA-accredited laboratory.

^cOther brominated hydrocarbons calculated as bromoform.

TABLE 2		Industrial Hygiene Exposure Monitoring Results ²			
Sample Location ^a	Sampling Media ^b	HOB ^r	Bromide-containing Aerosols	Bromoform/Other Halogenated Hydrocarbons ^c	Organic Amines ^c
Hot Box, East End Bay 3	Ag Membrane Filter (NIOSH 6011)	3.1 ppb	ND (<0.5 ppb)	NA	NA
Hot Box, West End Bay 3	Ag Membrane Filter (NIOSH 6011)	2.9 ppb	ND (<0.5 ppb)	NA	NA
Blank	Ag Membrane Filter (NIOSH 6011)	ND	ND	NA	NA
Hot Box, West End Bay 3	Ag Membrane Filter (NIOSH 6011)	2.0 ppb	ND (<0.5 ppb)	NA	NA
BoviBrom [®] Feeder Area	Ag Membrane Filter (NIOSH 6011)	1.7 ppb	ND (<0.5 ppb)	NA	NA
Hot Box, East End Bay 3	Charcoal Tube (NIOSH 1003)	NA	NA	ND (<4 ppb/ <4 ppb)	NA
Blank	Charcoal Tube (NIOSH 1003)	NA	NA	ND	NA
Hot Box, West End Bay 3	Charcoal Tube (NIOSH 1003)	NA	NA	ND (<4 ppb/ <4 ppb)	NA
BoviBrom Feeder Area	Charcoal Tube (NIOSH 1003)	NA	NA	ND (<4 ppb/ <4 ppb)	NA
Hot Box, East End Bay 3	Treated XAD-7 (OSHA 2060)	NA	NA	NA	0.17 ppm
Blank	Treated XAD-7 (OSHA 2060)	NA	NA	NA	ND
BoviBrom Feeder Area	Treated XAD-7 (OSHA 2060)	NA	NA	NA	0.22 ppm

ND = none detected; the minimum detectable air concentration was:
HOB^r – 1 ppb; bromide – 0.5 ppb; bromoform – 3 ppm; other brominated hydrocarbons – 3 ppm.

NA = Not applicable to sample collected.

Established exposure limits are:

Bromoform – both OSHA and ACGIH list 0.5 ppm (500 ppb) as the 8-hour time-weighted average exposure limit.

HOB^r – the OSHA and ACGIH 8-hour time-weighted average exposure limit is 0.1 ppm (100 ppb).

Bromide – There are no established exposure limits for bromide ion.

Organic Amines – i.e. methyl amine 5 ppm.

^aAll samples were area samples collected using pre-calibrated pumps.

^bHOB^r vapor was collected on silver (Ag) membrane filters (SKC 225-9006). Bromide ion-containing aerosols were collected on PTFE pre-filters included in the Ag membrane cassette. Bromoform and other brominated hydrocarbons were collected on charcoal tubes (SKC 226-09); organic amines were collected on treated XAD-7 tubes. All samples analyzed at ENTEK Environmental Laboratories, 14285 Airline Highway, Baton Rouge, LA 70817. ENTEK is an AIHA-accredited laboratory.

^cOther brominated hydrocarbons calculated as bromoform. Organic amines calculated as methyl amine.



1 Data on file. Industrial Hygiene Report Feb. 14, 2011.

2 Data on file. Industrial Hygiene Report Dec. 2, 2009.