SOLID PHASE MICRO EXTRACTION FIBERS FOR ACTIVE OR PASSIVE SAMPLING OF METHYL BROMIDE DURING FUMIGATIONS

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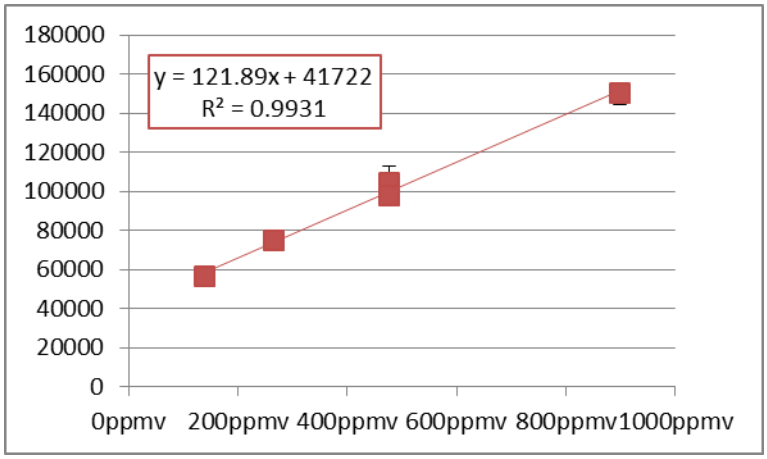
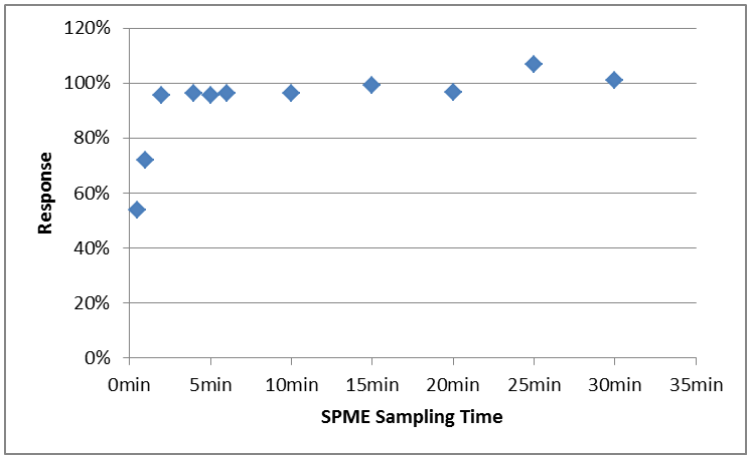
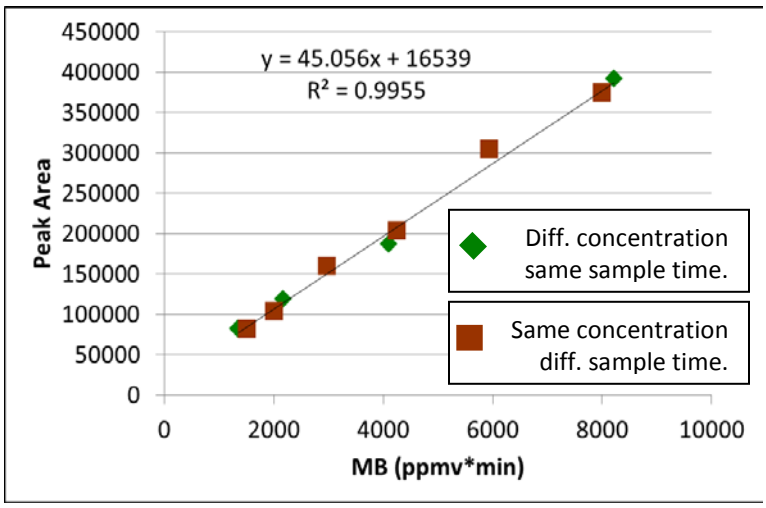
Abstract. The high diffusivity and volatility of methyl bromide make it an ideal compound for Solid Phase Micro Extraction (SPME)-based sampling of air prior to gas-chromatographic quantification. SPME fibers can be used as active methyl bromide samplers, with high capacities and an equilibrium time of 1-2min, or they can be used passively to determine the time weighted average methyl bromide concentration. We report the use of SPME fibers to determine the mass of methyl bromide that breaks through a sorbent column, measure the concentration of methyl bromide in the head space of a vial of methyl bromide-impregnated activated carbon, and predict the spatial distribution of methyl bromide as related to worker exposure in storage spaces following postharvest fumigations.



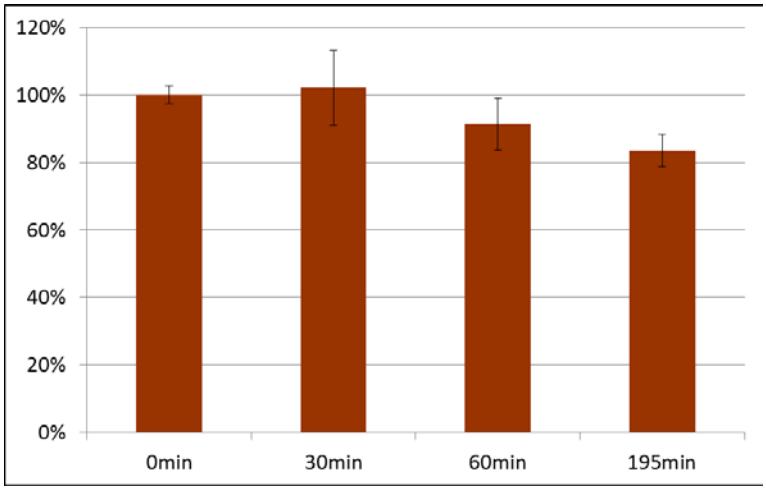
When used for active sampling, SPME fibers show linear response to methyl bromide and a several orders of magnitude signal enhancement over direct sampling of the air.



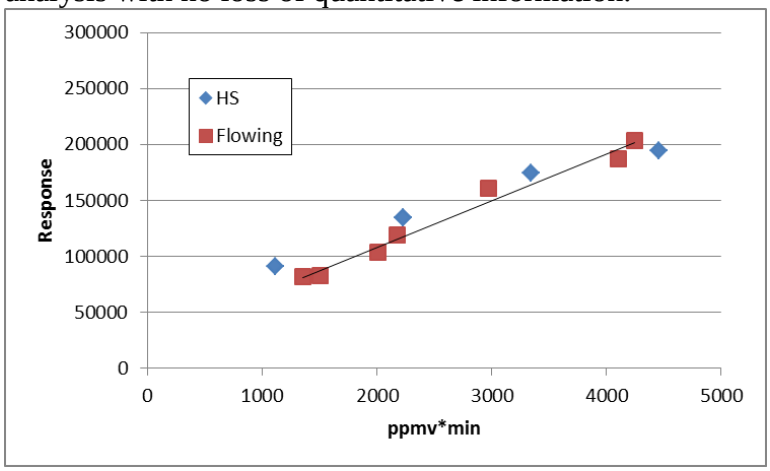
The fibers reach equilibrium with the concentration of MB in the air in ~2min.



When the SPME fiber is not directly exposed to the sample stream, the amount of MB adsorbed is proportional to exposure (CxT).



When inserted into a septum after analysis, the SPME fibers can be stored for up to 60min before analysis with no loss of quantitative information.



The SPME response to passively sampling a flowing system is the same as when sampling vial headspace.