

## Waters® Alliance® LC/MS System



### Key Words

Carbamates  
Endocrine Disruptors  
Environmental screening

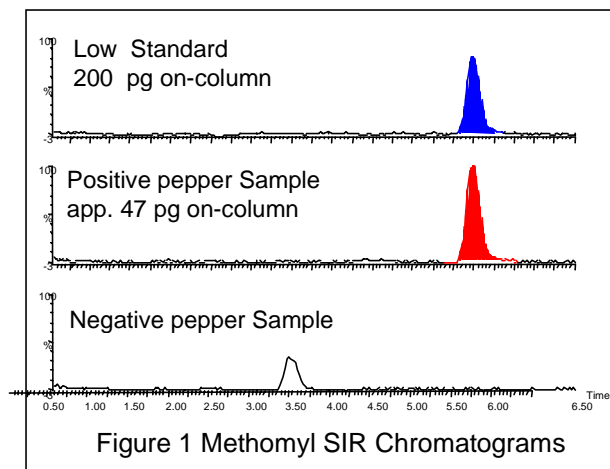
## Carbamates II: Analysis of Bell Pepper Extracts

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**The analysis of N-methyl carbamates** has received renewed interest in light of their implication as potential endocrine disruptors. The work presented here expands on previous work performed to evaluate instrumental response with standards. In this case, two “real-world” samples were analyzed.

The first experiment looked at bell pepper extracts which had incurred levels of carbamate pesticides. These were analyzed by LC/MS as well as by traditional post-column derivatization with fluorescence detection.

Oxamyl, Methomyl and Carbaryl were observed in these samples. All other analytes showed a negative response. **Figure 1** shows representative Methomyl SIR chromatograms from a low standard as well as a negative and positive sample. All traces in this figure are normalized to the same intensity. The use of selected ion monitoring provides excellent sensitivity and specificity, illustrated by the very clean baseline in the negative sample.

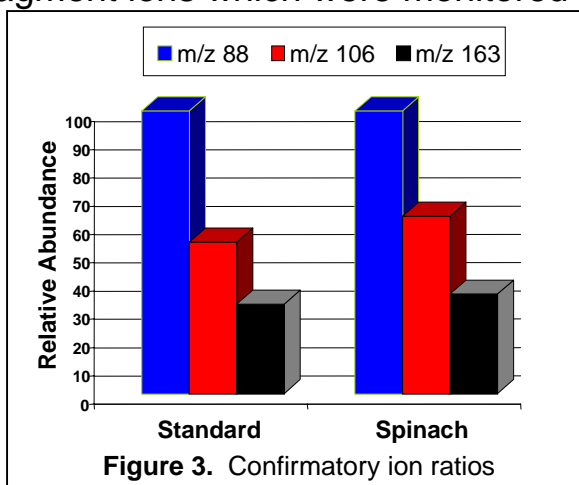


## Carbamates II: Analysis of Bell Pepper Extracts

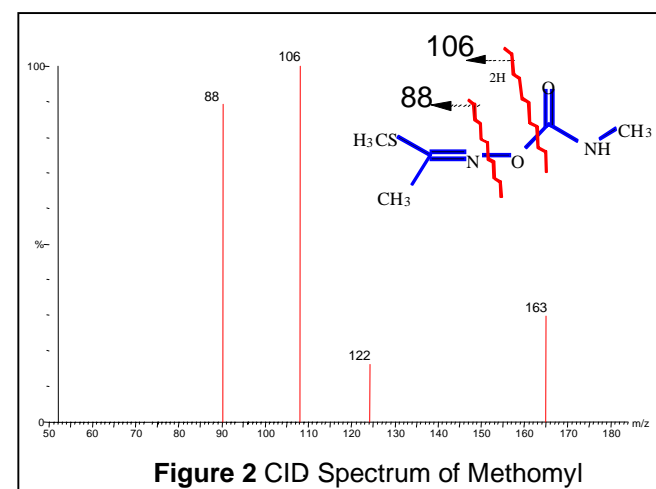
Sample ID	Methomyl		Oxamyl		Carbaryl	
	PCFD (ppb)	LC/MS (ppb)	PCFD (ppb)	LC/MS (ppb)	PCFD (ppb)	LC/MS (ppb)
329	46	46.5	-	-	-	-
330	411.5	342.5	-	-	-	-
332	32.5	40.5	-	-	-	-
336	-	-	32.4	48.0	14.2	13.5
340	-	-	54.1	76.0	136.7	154.5

**TABLE 1**

The second experiment investigated the reproducibility of CID fragmentation for both standards as well as extracts of spiked spinach. In a separate set of experiments, extracts of spiked spinach were analyzed under in-source collisionally-induced dissociation (CID) conditions in order to generate fragment ions which were monitored to provide confirmation.



The samples were also analyzed by conventional post-column derivatization with fluorescence detection. The mean calculated concentrations obtained by both methods are compared in **Table 1**. As may be seen, there is good agreement between the two techniques, which suggests that quantitation is not compromised by the presence of a complex matrix.



**Figure 2** shows the CID spectrum of Methomyl and proposed fragment ions. 10 replicate injections each of spiked spinach extract and a standard mixture were made, and the relative ion abundances compared. **Figure 3** shows the relative intensities for both the standard and spiked matrix. As may be seen, there is good agreement between both data sets. These results demonstrate the utility of LC/MS to the analysis of these compounds in complex matrices.