Identification and quantification of preservative chemicals in common household products

Session 3 Post-laboratory Exercise

During Session 3, you should have obtained GC or GC-MS chromatograms for:

1. Your mixture of standards
2. Your procedural blank
3. Your extract

You should now be in a position to complete the following tables.

Table 1: Standards:

Group	Chemical	Retention time	Peak area
	Methyl Paraben		
	Ethyl Paraben		
	Internal standard		
	Propyl paraben		
	Butyl paraben		

Table 2: Procedural blank:

Group	Chemical	Retention time	Peak area
	Methyl Paraben		
	Ethyl Paraben		
	Internal standard		
	Propyl paraben		
	Butyl paraben		

Table 3: Product:

Group	Product identification	Chemical	Retention time	Peak area
		Methyl Paraben		
		Ethyl Paraben		
		Internal standard		
		Propyl paraben		
		Butyl paraben		

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Questions:

1. Given that you injected exactly the same mass of each of your parabens standards, use your results summarised in Table 1 to calculate the response factors of each paraben (relative to your internal standard).

Example

Standard	Peak area From table 1	Relative response factor
Methyl Paraben	500	0.5
Ethyl Paraben	750	0.75
Internal standard	1000	1
Propyl paraben	1500	1.5
Butyl paraben	2000	2

Example: Rel.Response $_{Methylparaben}$ = Peak area $_{Methylparaben}$ / Peak area $_{internal\ standard}$

2. Since you added exactly the same mass of each of your parabens standards to your procedural blank, use the results in Table 2 and the relative response factors for each paraben to calculate the relative extraction efficiencies of your method (relative to your internal standard, Ethyl Paraben).

Example

Standard	Peak area From Table 2	Relative response factor	Relative extraction efficiency
Methyl Paraben	1700	0.5	3.4
Ethyl Paraben	1000	0.75	1.33
Internal standard	1000	1	1
Propyl paraben	1000	1.5	0.67
Butyl paraben	500	2	0.25

Example: $EE_{Methylparaben}$=[Peak area $_{Methylparaben}$ / Peak area $_{internal\ standard}$] / Rf $_{Methylparaben}$

3. Using your data from your extracts (Table 3) along with the relative response and extraction efficiencies, calculate the concentrations of each paraben in the product you have investigated.

Example: [Methylparaben]=[Peak area $_{Methylparaben}$ / Peak area $_{internal\ standard}$] / EE $_{Methylparaben}$

4. Decide whether your product complies with the 76/768/EEC council directive and complete a report as per the template provided.

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