# 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.

# *Identification and quantification of preservative chemicals in common household products*

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