

Determination of Caffeine and Paracetamol in Bristol Harbour Water by LC/MS/MS

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Introduction

Anthropogenic inputs such as caffeine and paracetamol can be used as possible chemical markers of sewage pollution as their presence can be presumed to result from human sewage inputs.

In this present investigation we determined the concentrations of caffeine and paracetamol at five sample points within Bristol Floating Harbour, UK and compared these with the levels of *Escherichia coli* (*E. coli*) present.

Methods

Following solid phase extraction the concentrations of caffeine and paracetamol were determined by liquid chromatography tandem mass spectrometry methodology using an Agilent 1260 Infinity HPLC system coupled to an Agilent 640 Triple Quadrupole Mass Spectrometer (figure 1). *E. Coli* measurements were undertaken by Bristol City Council.

(a)

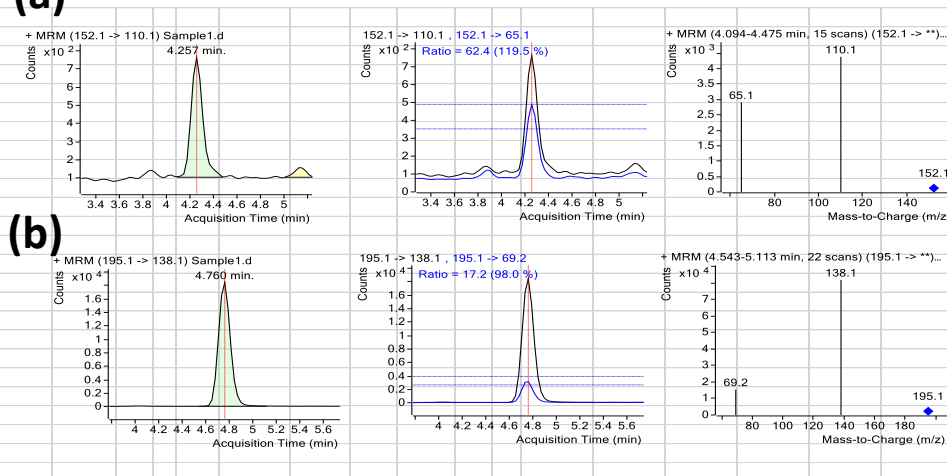


Figure 1. LC/MS/MS behaviour of (a) paracetamol and (b) caffeine concentrations in Bristol Floating Harbour water.

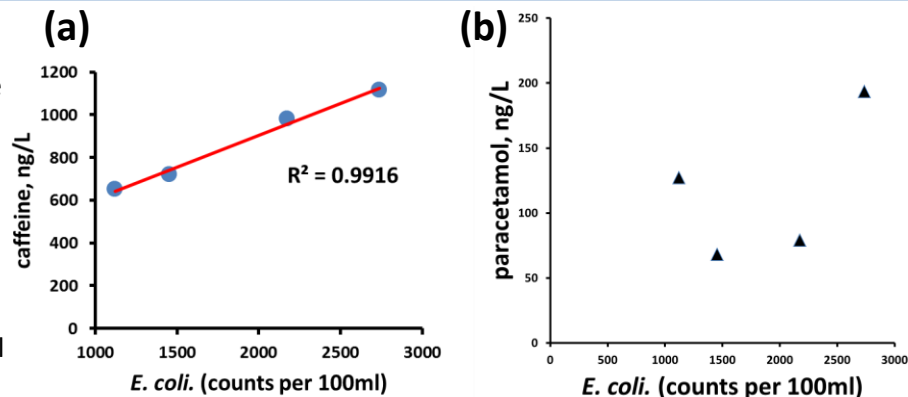


Figure 2. Relationship between *E. Coli* counts and (a) caffeine and (b) paracetamol concentrations in Bristol Floating Harbour water.

Results and Discussion

Both caffeine and paracetamol were found to be present in all water samples investigated at concentrations between 0.650 – 1.11 µg/L and 68.1 – 193 ng/L respectively. Figure 2 shows the relationship between caffeine and paracetamol and *E. Coli*. A strong relationship was found for concentrations of caffeine and *E. Coli* in the water samples investigated. Concentrations of paracetamol showed a poor relationship with *E. Coli* counts.

Conclusions

- Caffeine was shown to have a strong positive relationship with *E. Coli* levels.
- Paracetamol was showed poor relationship with *E. Coli* levels.
- All samples investigated were found to contain both caffeine and paracetamol.