

Development of an Analytical Method for the Determination of Methy Tert-Butyl Ether(MTBE) and Tert-butanol(TBA) in Ground Water by Head Space Gas Chromatography-Mass Spectrometry.

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MTBE is added to gasoline to enhance the octane number of gasoline and TBA is major degradation intermediate of MTBE in environment. A simplified headspace analysis method was adapted for simultaneous determination of MTBE and TBA in ground water samples. The sample 5ml and 2g NaCl were placed 10ml vial and the solution was spiked with fluorobenzene as an internal standard and sealed with cap. The vial was placed in a heating block at 80 °C for 50min. The detection limits of the assay were 0.01ng/ml for MTBE, and 0.39ng/ml for TBA. A regression line of peak area ratio for target compounds to internal standard on concentration using a least-squares fit demonstrated a linear relationship with correlation coefficient being greater than 0.9964. The reproducibility of the assay was very good. For five independent determination at 10ng/ml, the relative standard deviations were less than 10.1%.

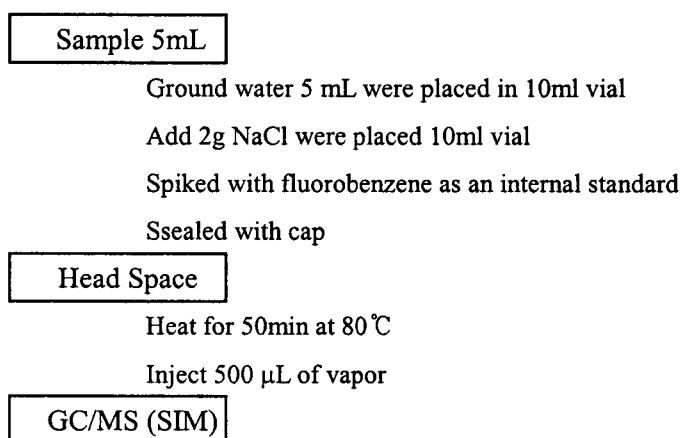
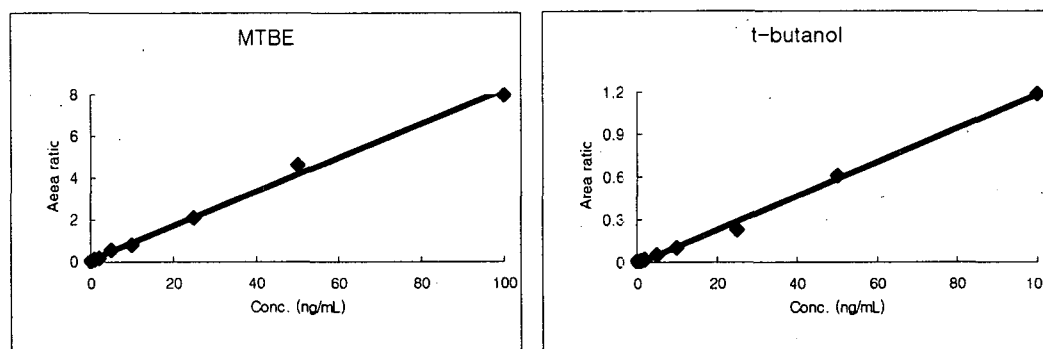


Figure 1. Diagram of whole experiment procedure

Table 1. GC-MS conditions for the determination of the target compounds

Parameter	Condition			
Column	HP-5MS(30m×0.2mmI.D.× 0.25 μ m F.T)			
Carrier	He at 1.0mL/min			
Oven Temp.	35 $^{\circ}$ C (5 min) \rightarrow 5 $^{\circ}$ C/min \rightarrow 70 $^{\circ}$ C		250 $^{\circ}$ C (5 min)	
Split Ratio	1 : 15			
Injector Temp.	230 $^{\circ}$ C			
Transfer Temp.	280 $^{\circ}$ C			
	Group	Start Time(min)	Compound	Selected Ions, m/z
Selected Ion	1	1.0	TBA	57, 59
Group	2	1.82	MTBE	41, 57, 73
	3	2.5	Fluorobenzene(ISTD)	96

**Figure 2.** Calibration curves of MTBE and TBA in ground water**Table 2.** Precision and accuracy of target compounds spiked in the conc of 10 ng/mL in water

Compound	Precision & Accuracy	
	Measured Values (ng/mL)	Mean \pm SD (RSD%)
MTBE	9.7, 9.5, 8.7, 9.3, 9.6	9.36 \pm 0.4 (4.2%)
TBA	7.82, 8.78, 9.00, 9.93, 10.09	9.12 \pm 0.92 (10.1%)

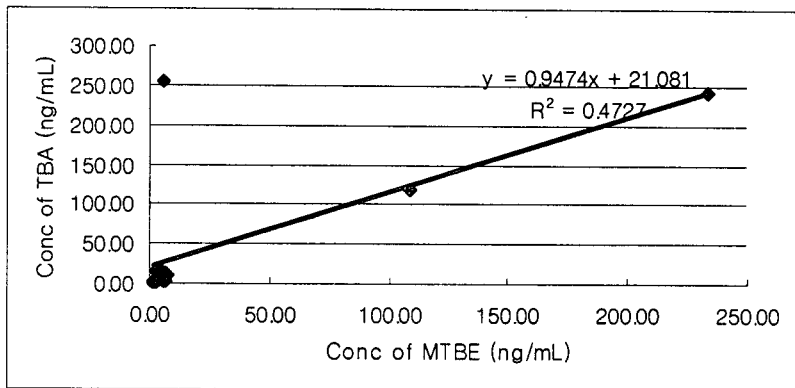


Figure 3. Co relationship between MTBE and TBA measured in ground water contaminated as gasoline