ANALYSIS OF VOLATILE COMPOUNDS IN PEPPERMINT BY USING SOLID PHASE MICROEXTRACTION (SPME) TECHNIQUE AND GAS CHROMATOGRAPHY-MASS SPECTROMETRY (GC-MS)

NOOR FARHAN BIN JAAFAR

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This Final Year Project Report entitled "**Analysis of Volatile Compounds in Peppermint by using Solid Phase Microextraction (SPME) Technique and Gas Chromatography-Mass Spectrometry (GC-MS)**" was submitted by Noor Farhan Bin Jaafar, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty Applied Sciences, and was approved by

Pn. Haliza Bte Kassim
Supervisor
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Cik Sabrina Bte M.Yahya
Project Coordinator
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Dr. Yusairie Bin Mohd
Head of Programme
B. Sc. (Hons.) AppliedChemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: 16/12/2008

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ABSTRACT

ANALYSIS OF VOLATILE COMPOUNDS IN PEPPERMINT BY USING SPME TECHNIQUE AND GC-MSD

The objectives of this study are to extract the volatile compounds in peppermint leaf by using SPME methods, to identify the major volatile compounds in peppermint leaf by using GC-MSD, to determine the optimum SPME condition and to evaluate if the SPME technique is feasible to be used as an extraction technique for peppermint analysis using GC-MSD. The volatile compounds of peppermint leaves were analyzed using SPME technique combined with GC-MSD (Agilent gas chromatography model 6890N coupled to a mass selective detector 5973 inert). Compounds were separated on a cross-linked fused silica capillary column HPS-MS (30m x 250μm x 0.25μm). The head pressure of the carrier gas helium (high purity, 99.9999%) was 50 kPa. SPME was done using 85μm polyacrylate (PA) fiber (Supelco. Inc.Bellefonte, PA, USA). The fiber was exposed to the sample headspace for 10 minutes at 45^0C and immediately transferred onto the GC injection port with desorption time of 5 minutes at 250°C. GC-MSD analysis of the components of peppermint leaves revealed the presence of major compounds of peppermint such 2-Cyclohexen-1-one, 2–methyl-5-methylethenyl, Cyclohexanone, 2,3-Diaminobut-2-enedinitrile, Acetonitrile, 2-(2H-tetrazol-2-yl), 1-butyne, 4-methoxy, 1,3-Cyclobutanedicarbonitrile, Silane, Phenyl and 1,2-Cyclooctadiene. The aromatic or volatile compounds were identified by matching their mass spectra with the aromatic compounds spectral library. In the determination of the optimum SPME condition, three important parameters was considered such as extraction temperature, extraction time and desorption time. For optimized extraction temperature, the temperature values that were chosen for analysis are 50°C, 60°C and 70°C as variables parameter. To determine the optimum extraction time, three readings of extraction time was chosen for analysis which is 6, 8 and 10 minutes as variables parameter. For optimized desorption time, three values of desorption time that were chosen as variables parameter which 3, 5 and 7 minutes. From this analysis, the optimum extraction temperature and time that was obtained is 60^0C and 8 minutes respectively. For desorption time, the time were obtained is 5 minutes. The using of SPME coupled with GC-MSD, the profile of volatile components in peppermint leaves can be easily identified. SPME method offers important advantage in the analysis of leaves sample namely fast, simple and solvent free.