

**THE EXTRACTION AND DETECTION OF
ZINGIBERENE IN ZINGIBERACEAE FAMILY BY USING
HEADSPACE SOLID PHASE MICROEXTRACTION (HS-SPME) WITH
GAS CHROMATOGRAPHY – MASS SPECTROMETRY (GC-MS)**

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ABSTRACT

THE EXTRACTION AND DETECTION OF ZINGIBERENE IN ZINGIBERACEAE FAMILY BY USING HEADSPACE SOLID PHASE MICROEXTRACTION (HS-SPME) WITH GAS CHROMATOGRAPHY – MASS SPECTROMETRY (GC-MS)

Extraction conditions for the extraction and detection of zingiberene in zingiberaceae family by using headspace solid phase microextraction (HS-SPME) with gas chromatography – mass spectrometry (GC-MS) were optimized. SPME fiber coated with polydimethylsiloxane (PDMS) was used in this study. The effect of SPME extraction parameter such as extraction temperature, extraction time and desorption time on the peak area of zingiberene compound were studied. Optimum conditions for SPME technique in extracting zingiberene compound were 70 °C for extraction temperature, 10 minutes for the extraction time and 80 seconds for the desorption time. Using the optimized SPME condition, the compositions of zingiberene in ginger, turmeric and galangal were studied. Among them, ginger has the highest relative amount of zingiberene based on the peak area. Using the optimization condition also, the detection of zingiberene in three commercial ginger-containing products was conducted. Zingiberene can be detected in ginger tea brand A, but not in lotion brand A and brand B.

CHAPTER 1

INTRODUCTION

1.1 Background of research

Zingiberaceae, or the ginger family, is a family of flowering plants consisting of aromatic perennial herbs with creeping horizontal or tuberous rhizomes. It comprises about 52 genera and more than 1300 species, distributed throughout tropical Africa, Asia and America. Other notable members of this plant family are turmeric, cardamon, and galangal. They are commonly consumed as a delicacy, medicine or spice for over 2000 years (Bartley and Jacobs, 2000).

Ginger (*Zingiber officinale Roscoe*) is one of the most important traditional Chinese herbs and is well-known for its medicinal and flavouring potential. As for Malays, ginger has been used by our great-great grandparents as a traditional medicine to cure some illness. The unrelated ailment include arthritis, rheumatism, sprains, muscular aches, pains, sore throats, cramps, constipation, indigestion, vomiting, hypertension, dementia, fever, infectious diseases, helminthiasis, catarrh, gingivitis, toothache, asthma, stroke and diabetes (Tapsell *et al.*, 2006; Wang and Wang, 2005). Besides, ginger has long been used as a traditional remedy for treating sickness, including nausea and vomiting associated with early pregnancy (Tiran, 2012).