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Comparison of Essential Oil of Lemongrass (*Cymbopogon Citratus*) Extracted with Microwave-Assisted Hydrodistillation (MAHD) and Conventional Hydrodistillation (HD) Method

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ABSTRACT

The increasing demand of essential oil has opened up wide opportunities for global marketing which leads to the requirement of its competitive product in market that comes with all the advantages in term of cost, quality and its production time. Microwave-assisted hydrodistillation (MAHD) method is an advance extraction technique that takes advantage of microwave heating with the conventional hydrodistillation (HD). This research was carried out to study the effect of different MAHD parameters which were water to plant material ratio (6:1, 8:1,10:1), microwave power (200 W,250W) and extraction time (30min,60min, 90min,120min) in extraction of essential oil from Lemongrass (*Cymbopogon Citratus*). Its extraction yield and major constituents were analyzed and the results were compared with those of conventional HD. The optimum parameters were found at water to plant material ratio of 8:1, microwave power of 250W and 90 minutes of extraction and the yield obtained under this condition was 1.46%. The gas chromatography/mass spectrometric (GC-MS) analysis showed that the content of main constituents which were neral, geranial and myrcene were almost similar in the essential oil extracted using MAHD and conventional HD. This has proved that the use of microwave irradiation did not adversely influence the composition of essential oils. Overall, the results obtained indicate that MAHD method provided a good alternative for the extraction of essential oil from Lemongrass (*Cymbopogon Citratus*).

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INTRODUCTION

Essential oils are natural products obtained from plants. It is estimated that the global number of plants is of the order of 300,000 and about 10% of these contains essential oils and could be used as a source for their production (Husnu, K.C.B. and B. Gerhard, 2010). Their extracts are formed by combination of diverse and complex volatile mixtures of chemical compounds, with predominance of terpene associated to aldehydes, alcohols, and ketones that accumulated in various structure of the plant (Tajidin, N.E., 2012). In industry, the essential oils are typically extracted from fresh or partially dried leaves using numerous method of extraction. The most common extraction method will be hydrodistillation. Medicinal plants extracts are mainly applied in pharmaceuticals, food, cosmetics, and perfumery industry which is primarily to utilize their active substance benefits. The Asian continent with its diversity of climates appears to be the most vital producer of essential oils. China and India play a major role followed by Indonesia, Sri Lanka, and Vietnam with (Husnu, K.C.B. and B. Gerhard, 2010).

Lemongrass (*Cymbopogon Citratus*), a perennial plant with long and thin leaves, is one of the largely cultivated medicinal plants for its essential oils in parts of tropical and subtropical areas of Asia, Africa and America (Chantal, S., 2012). It contains 1-2% of essential oil on dry basis (Carlson, L.H.C., 2001). The chemical composition of Lemongrass (*Cymbopogon Citratus*) essential oil is varying widely upon genetic diversity, habitat and agronomic treatment of the culture. The leaves of Lemongrass (*Cymbopogon Citratus*) present lemony characteristic flavor due to its main content, citral which present great importance to the industry. Citral, a combination of neral and geranial isomers, is used as a raw material for the production of

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