

Brine Shrimp Toxicity of Essential Oils from *Musa* spp.

Mohd Alhafiizh Zailani*¹ & Abdul Razzak Fikri Sharkawi²

¹Centre for Pre-University Studies, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia; ²Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

*Corresponding author: zmalhafiizh@unimas.my

Received: 17 January 2019

Accepted: 19 March 2019

Published: 30 June 2019

ABSTRACT

Essential oils of seven *Musa* spp.'s fruits namely, *Musa acuminata* colla 'gros michel' (PE), *Musa acuminata* colla 'lakatan' (PB), *Musa acuminata* colla 'sucrier' (PM), *Musa acuminata* × *balbisiana* 'horn plantain' (PT), *Musa acuminata* × *balbisiana* colla 'saba' (PN), *Musa acuminata* colla 'inarnibal' (PO) and *Musa acuminata* colla 'red' (PJ) were extracted by hydrodistillation method using Clevenger apparatus. The essential oils were analysed using GC-FID and identified using Kovat Indices compared with published information. PE gave the highest yields of oils compared to the other species with yield of 0.43% and 0.28% for its peels and flesh, respectively. The most abundant groups present in most of the essential oils are ester and alcohol groups. The brine shrimp toxicity of PT, PM, PN and PO essential oils were tested and showed toxicity against brine shrimp in dose dependent manner. It can be concluded that the essential oils showed some biological activities which may be a potent medicine in curing tumor. This study implies that the presence of ester and alcohol groups are a good marker for the biological activities of plants. Further studies should focus on the potential of the essential oils of *Musa* spp. as an antitumor medicine.

Keywords: *Artemia salina*, banana, essential oil, hydrodistillation

Copyright: This is an open access article distributed under the terms of the CC-BY-NC-SA (Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License) which permits unrestricted use, distribution, and reproduction in any medium, for non-commercial purposes, provided the original work of the author(s) is properly cited.

INTRODUCTION

Essential oils are very valuable natural product that are used as raw materials in many fields such as food preservation, pharmaceuticals, alternative medicine, perfumes, cosmetics, aromatherapy, spiritual uses, spices and nutrition (Buchbauer, 2000).

The presence of chemical constituent in the essential oil are very valuable due to their biological activities such as antibacterial (Dutra *et al.*, 2019), antifungal (Sienkiewicz *et al.*, 2015), anti-inflammatory (Murbach *et al.*, 2014; Koh *et al.*, 2002), anti-lice (Di *et al.*, 2012), anti-tumour (Calcabrini *et al.*, 2004), antioxidant (Aazza *et al.*, 2014) and act as insect repellent (Gkinis *et al.*, 2003).

Musa spp. commonly known as banana, is a tropical plant that has been consumed since many years ago by mankind and animals for its nutrients and delicious taste. In Malaysia, *Musa* spp. is known as *pisang*. It is one of local favorite fruits, which is used for cooking and

making desserts.

Musa spp. comes from Musaceae family and approximately 1200 species of varieties are reported (Guylène *et al.*, 2008). Analytical research on the volatile compound of *Musa* spp. had been carried out for more than 55 years with various extraction methods (Shiota, 1993; Brat *et al.*, 2004; Aurore *et al.*, 2011). Generally, volatile compound of *Musa* spp. consists of three major components, which are ester, alcohol, and carbonyl groups (ketones and aldehydes) (Jordán *et al.*, 2001; Pérez *et al.*, 1997). This chemical constituent that is present in *Musa* spp. is valuable, especially in traditional and alternative medicine in countries such as India, Pakistan, United States and Asian countries such as Malaysia, Thailand, Philippines and Indonesia because of the biological activities of the fruit (Pari & Umamaheswari, 2000; O'Hara *et al.*, 1998; Orhan, 2001). Thus, the objective of this study was to evaluate the brine shrimp toxicity and antibacterial properties of this plants' essential oils which were extracted using hydro-distillation technique.