UNIVERSITI TEKNOLOGI MARA

THE EXTRACTION OF BLACK, WHITE AND RED PEPPERS (*PIPER NIGRUM L.*)

FAIRUS NADIANA BINTI SAUDI

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ABSTRACT

Piper nigrum L. is an evergreen climber plant that originated from the southeastern India. This plant produces a berry-like fruit which is known as peppercorn. The types of peppercorns produce by this plant is differentiated by stages of ripening and processing methods. The most common peppercorns are black and white peppers. This study was carried out to review the chemical constituents of black and white peppers based on the literature and to isolate the chemical compounds from both types of peppers. Major alkaloid present in *P. nigrum L.* is piperine. The samples of black peppers come from different origins which include India, Pakistan and Vietnam. Meanwhile, the sample of white pepper was from Sarawak. All samples were macerated in dichloromethane. Thin layer chromatography (TLC) was conducted to screen the compounds present in the crude extract. Preparative TLC is used to isolate the compounds from black pepper sample from India. Further analysis was conducted for the purified compound by using Nuclear Magnetic Resonance (NMR) spectroscopy. Based on the TLC profiles of all the samples, alkaloid was present in the samples of black and white peppers. However, alkaloid was absent in dichloromethane extract of red pepper. From the H-NMR, the compound from white pepper sample was identified as piperine.

Keywords: alkaloid, extraction, *Piper nigrum L.*, and piperine

CHAPTER 1

INTRODUCTION

1.1 Background of study

The word *pepper* is derived from many ancient words including *pippali* from Sanskrit, *piper* from Latin, *pipor* from Old English, *pfeffer* from German, *poivre* from French and *peper* from Ducth (Parthasarathy, 2008). Malaysia is one of the countries that actively produce and export black and white pepper to all over the world. According to International Pepper Community, during 2012 Malaysia exported 10,454 metric tons (mt) of pepper, comprising 8 404 mt of black and 2 050 mt of white pepper. Malaysia earning from pepper export in 2012 is 77 million USD (International Pepper Community, 2013).

Both black and white peppers come from the same species that is *Piper nigrum L.* (Fujiwara et al., 2001). This species can commonly be found in India and some parts of Middle and Southeast Asia which have tropical or subtropical climate. The black and white peppers differ based on the harvesting process. The color difference comes from how ripe the berries were when they were harvested. However, most people do not realize that fact. *Piper nigrum L.* is commonly refer as black pepper thus causing the confusion. Black and white pepper may have different chemical composition due to the present or absent of certain part of the plant due to the manufacturing process.

Other than black and white peppers, there are several other varieties of peppercorns from *P. nigrum*. Different varieties result from picking the peppercorn at different stages of ripening and processing methods. Examples of other variety of peppercorn from *P. nigrum*