UNIVERSITI TEKNOLOGI MARA

THE PHYTOCHEMICAL STUDY OF *JUNIPERUS* SPECIES

NURATTYLIYA SYAFIRA BINTI KEMRI

Dissertation submitted in partial fulfilment of the requirements for the Bachelor of Pharmacy (Hons.)

Faculty of Pharmacy

2017

ABSTRACT

This study is to introduce the *Juniperus* species of *Cupressaceae* or *Cypress* family. The historical uses of this herb include the relief of flatulence, act as urinary antiseptic, diuretic, emmenagogue, aid in digestion, treatment of diabetes, bladder infection, cough, abdominal disorder, and skin infections. The research objectives are to provide the knowledge about the pharmacological activities of *Juniperus* species based on the literature review, to perform extraction of juniper berries using methanol, to screen the chemical compounds in methanol extract of juniper berries using the thin layer chromatography (TLC) as well as to identify the isolated compounds using Nuclear Magnetic Resonance (NMR). From the literature review, the phytochemical compositions of *Juniperus* species in which the monoterpenes present essential oil, amentoflavone of flavanoids, podophyllotoxin of lignans and elements in terpenoids such as sesquiterpenoids and bicyclic diterpenoids were mentioned. The pharmacological activities of *Juniperus* species include antibacterial, antioxidant, wound healing and anti-inflammatory activity, antidiabetic and neuroprotective potential of the species. The retails and community pharmacy also provide this herb as essential oils, herbal supplements and tea, skin and personal care products which comprise of body cream and lotion, body balm, moisturiser cream, shampoo and soap. In the methodology, the extraction, chromatographic analysis and spectroscopic analysis of juniper berries using NMR were performed. Finally, the methanol extraction of juniper berries could lead to isolation of flavonoids and other natural organic compounds having oxygenated carbons.

ACKNOWLEDGEMENT

I would like to express my deepest appreciation to all those people who provided me the possibility to complete this research proposal. A special gratitude to my supervisor, Prof. Madya Dr. Ibtisam Binti Abdul Wahab for her stimulating suggestions, encouragement and guidance in coordinating my project especially in writing the proposal. I sincerely thank my co-supervisor, Dr. Hannis Fadzillah Binti Mohsin who has also offered her support and guidance in carrying out this project work. I would like to extend my appreciation to Faculty of Pharmacy for giving me the opportunity of carrying out a final year project and providing the facilities for the research. I also wish to express my gratitude to all my family members especially my parents for their love and emotional support throughout the journey of doing this research project. Special thanks should be given to Ms. Siti Arissa Binti Romly, the greatest companion through ups and downs for her time and patience and for being the best supporter of all. I would also like to thank all laboratories assistants; Mr. Rahimi and Mr. Syukri for their assistance at the lab and last but not least, many thanks go to the team members of the same supervision for their helps, stimulating discussions and opinions. I am so grateful to work in a team with them. For those who had contributed, directly or indirectly to this research project, thank you.

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

Herbs and medicinal plants are the richest bio-resources of drugs. They are employed in traditional and modern medicine, food supplements as well as chemical entities for the development of new drug molecules. The medicinal plants are capable and useful for healing or curing human diseases besides providing health benefit because of the presence of phytochemical constituents. Phytochemical constituents are biologically active, naturally occurring chemical compounds found in plant. These compounds are known as secondary plant metabolites and primarily, they have the protective effect towards plants in term of protecting from damages and diseases aside from contributing to the plant's colour, flavour and aroma. The plant chemicals also help to protect the plant cells from environmental hazards such as pollution, ultraviolet exposure, stress and pathogenic attack (Kurmukov, 2013). Some examples of secondary metabolites are terpenoids, alkaloids and flavonoids. These compounds can be isolated from the plant itself with the mean of extraction before they are employed for further investigation by various experimental methods. Extraction in context of pharmaceutical means the separation of medicinally active portion of plant tissues using selective solvent through standard procedure (Tiwari et al., 2011).

Among all phytochemical studies of various natural herbs and plants conducted, *Juniperus* species have become the subject of interest among researchers owing to its versatile applications. Junipers are plants under the division of Coniferophyta or coniferous plant in the genus *Juniperus* which belongs to the *Cupressaceae* or *Cypress* family. Junipers are well known by most people for the names such as juniper or common juniper. The Italian called them Ginepro while in France they are known as Genévrier. They are also known as Enebro in Spain, Reckholder in Switzerland while in Germany and Switzerland, local people recognise them as Gemeiner Wachholder (Grieve, 2016). *Juniperus* species contain various chemical constituents including coumarins, flavonoids, lignans and terpenoids (Seca