

UNIVERSITI TEKNOLOGI MARA

**CHEMICAL CONSTITUENTS AND
BIOLOGICAL ACTIVITIES OF
SYZYGIUM FILIFORME VAR.
FILIFORME STEM BARK**

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Thesis submitted in fulfillment
of the requirements for the degree of
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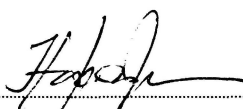
August 2015

AUTHOR'S DECLARATION

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ABSTRACT

The stem bark of *Syzygium filiforme* var. *filiforme* from family of Myrtaceae was investigated for its chemical constituents and biological activities. About 3 kg of the stem bark was extracted successively using solvent of different polarity. Various chromatographic methods were used to isolate and purify compounds from dichloromethane and methanol extracts such as vacuum liquid chromatography, glass column, centrifugal thin layer chromatography, thin layer chromatography and preparative thin layer chromatography. This study resulted in the isolation of five pentacyclic triterpenoids and two phytosterols which are 2α , 3β , 23-trihydroxyolean-12-en-28-oic acid (arjunolic acid, **SF1**), 2α , 3β -dihydroxylup-20(29)-en-28-oic acid (alphitolic acid, **SF2**), 3β -hydroxylup-20(29)-en-28-oic acid (betulinic acid, **SF3**), 3β -hydroxyurs-12-en-28-oic acid (ursolic acid, **SF4**), ursolic acid 3-methyl ester (**SF5**), β -sitosterol (**SF6**) and stigmasterol (**SF7**). Structural identification was accomplished using spectroscopic methods such as ultraviolet (UV), infrared (IR), mass spectroscopy (MS), 1D and 2D nuclear magnetic resonance (NMR) (HMBC and HMQC). The methanolic extract showed moderate activities with IC_{50} values of 44.7 ± 6.42 $\mu\text{g/mL}$ compared to ascorbic acid ($IC_{50} = 7.9\pm 1.20$ $\mu\text{g/mL}$) for DPPH assay but good activity for α -glucosidase assay with IC_{50} values of 6.31 ± 0.90 $\mu\text{g/mL}$ compared to 1-deoxynojirimycin ($IC_{50} = 103.79\pm 6.36$ $\mu\text{g/mL}$). Dichloromethane and hexane extracts showed weak activity on DPPH assay but dichloromethane extract showed good activity for α -glucosidase assay. Major compounds **SF1**, **SF2**, **SF3** and **SF4** were tested for DPPH and showed no promising activity. **SF1**, **SF2**, **SF3** and **SF4** were also tested for α -glucosidase assay but only **SF1** and **SF3** gave moderate activity with IC_{50} values of 562.34 ± 11.80 and 501.19 ± 8.20 μM , respectively. The crude extracts and major compounds were also tested on antibacterial activity against *Escherichia coli*, *Staphylococcus aureus* and *Bacillus subtilis*. The methanolic and hexane extracts showed inhibition on tested organisms but no inhibition from dichloromethane extract. **SF1** showed inhibition against *E. coli*, *B. subtilis* and *S. aureus* with minimum inhibition concentration at 1800 $\mu\text{g/mL}$, 900 $\mu\text{g/mL}$ and 450 $\mu\text{g/mL}$, respectively. **SF2** showed inhibition against *S. aureus* at 900 $\mu\text{g/mL}$. Then, **SF4** showed inhibition against *E. coli* at 1800 $\mu\text{g/mL}$ and no inhibition showed by **SF3** on tested bacteria. The MBC values of hexane extract, **SF1** and **SF4** against *E. coli*. Methanol and hexane extracts showed inhibition on *S. Aureus* with MBC values of 1000 and 1100 $\mu\text{g/mL}$, respectively. Meanwhile, **SF1** and **SF2** showed MBC values of 560 and 1000 $\mu\text{g/mL}$, respectively against same bacteria. Finally, there are only hexane extract and **SF1** showed inhibition at high concentration against *B. subtilis* with MBC values 1800 and 1100 $\mu\text{g/mL}$, respectively.

TABLE OF CONTENTS

	Page
AUTHOR'S DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF SCHEMES	xi
LIST OF SYMBOLS	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Research Background	1
1.2 Problem Statement	2
1.3 Objectives of Study	3
CHAPTER TWO: LITERATURE REVIEWS	4
2.1 The Family Myrtaceae	4
2.1.1 The Botany and Morphology of the Myrtaceae	5
2.1.2 Traditional and Medicinal Uses of Myrtaceae Plants	6
2.2 The Botany, Morphology and Medicinal Uses of <i>Syzygium</i> Genus	8
2.3 <i>Syzygium filiforme</i> var. <i>filiforme</i>	10
2.4 Chemical Constituents of <i>Syzygium</i> Species	11
2.4.1 Terpenoids	11
2.4.2 Flavonoids	16
2.5 Biological Activity of <i>Syzygium</i> Species	18
2.6 Biosynthesis of Triterpenoids	21

CHAPTER THREE: EXPERIMENTAL	24
3.1 General Procedures	24
3.1.1 Spectroscopic Techniques	24
3.1.2 Chromatographic Methods	24
3.1.3 Preparation of Anisaldehyde	25
3.1.4 Phytochemical Screening	25
3.1.4.1 Terpenes Screening and Detection	25
3.1.4.2 Flavonoids Screening and Detection	26
3.1.5 Plant Material and Extraction	26
3.1.6 Fractionation and Isolation	27
3.1.7 Spectral Data	30
3.2 Biological Assays	33
3.2.1 Diphenylpicrylhydrazyl (DPPH) Assay	33
3.2.2 Antidiabetic Assay	33
3.2.2.1 Reagents and Test Samples for <i>in vitro</i> α -Glucosidase Inhibitory Activity	34
3.2.2.2 α -Glucosidase Inhibitory Assay	34
3.2.3 Antibacterial Assays	35
3.2.3.1 Chemicals and Reagents	35
3.2.3.2 Microorganism Strains	35
3.2.3.3 Micro-dilution Broth Plate Method	35
CHAPTER FOUR: RESULTS AND DISCUSSION	37
4.1 Isolation of Triterpenoids of <i>Syzygium filiforme</i> var. <i>filiforme</i>	37
4.2 Structural Elucidation of Triterpenoids	37
4.2.1 Triterpenoid SF1 , Arjunolic Acid	38
4.2.2 Triterpenoid SF2 , Alphitolic Acid	47
4.2.3 Triterpenoid SF3 , Betulinic Acid	55
4.2.4 Triterpenoid SF4 , Ursolic Acid	64
4.2.5 Triterpenoid SF5 , Ursolic Acid 3-Methyl Ester	72
4.2.6 Triterpenoid SF6 , β -Sitosterol	80
4.2.7 Triterpenoid SF7 , Stigmasterol	85
4.3 Biological Activities of <i>Syzygium filiforme</i> var. <i>filiforme</i>	90