

งานวิจัย เรื่อง Two new cycloartane-type triterpenoids and one new flavanone from the leaves of *Dasymaschalon*

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Chemical Composition, Antimicrobial and Antioxidant Activities of Essential Oil and Methanol Extract from the Stems of *Dasymaschalon rostratum* Merr. & Chun

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Abstract

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Chemical Composition, Antimicrobial and Antioxidant Activities of Essential Oil and Methanol Extract from the Stems of *Dasymaschalon rostratum* Merr. & Chun

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Abstract—The present study provides the first information on the chemical composition, antimicrobial and antioxidant potentials of the essential oil and methanol extract from the stems of *Dasymaschalon rostratum* Merr. & Chun. Gas chromatography and gas chromatography-mass spectrometry analysis revealed that the main components of the *D. rostratum* essential oil were β -caryophyllene (27.4%), β -pinene (12.8%), α -copaene (11.7%), α -pinene (8.4%), and α -humulene (6.2%). The antimicrobial assay showed that the essential oil had better activity against all tested microorganisms with lower minimum inhibitory concentration (MIC) ≤ 500 $\mu\text{g/mL}$ compared with methanol extract. In turn, methanol extract was distinguished by the higher antioxidant potential in comparison to the essential oil in both DPPH and ABTS assays with IC₅₀ values of 119.3 and 76.2 $\mu\text{g/mL}$, respectively. Furthermore, the total phenolic content of methanol extract was determined as 32.5 $\mu\text{g/mg}$. The results of the present investigation demonstrated significant variations in the antimicrobial and antioxidant activities of the essential oil and methanol extract from the stems of *D. rostratum*. In addition, complementary investigations should be conducted to identify phenolic compounds of these plant extracts as well as to evaluate the antimicrobial mechanisms of essential oil against bacteria and fungi.

Keywords: *Dasymaschalon rostratum*, terpenes, minimum inhibitory concentration, DPPH, ABTS

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INTRODUCTION

The genus *Dasymaschalon* (Hook. f. & Thomson) Dalla Torre & Harms (Annonaceae) comprises about 26 species widely distributed in the tropical and subtropical regions from southern China, Indo-China to Malesia [1]. Some *Dasymaschalon* species such as *Dasymaschalon rostratum*, *D. glaucum*, and *D. sootopensis*, have been used as a traditional medicine to treat liver disorders, malaria, rheumatic pain, renal problems, stomachache, and constipation [2, 3]. Previous phytochemical studies on *Dasymaschalon* species have revealed the presence of secondary metabolites such as alkaloids, flavonoids, and triterpenoids [4–7]. Pharmacological studies have shown the bioactivities of these metabolites, such as antibacterial, anti-inflammatory, anti-HIV, anti-tumor, and antiparasitic activities [5, 6, 8].

Currently, essential oils and extracts of some medicinal plants are of growing interest both in the

industry and scientific research because of their antimicrobial, antioxidant, antiviral, and anti-parasitic activities [9–11]. There is ample evidence that plants rich in antioxidant components can reduce the effect of oxidative damage caused by free radicals and protect the body against oxidative-related diseases such as atherosclerosis, coronary heart diseases, aging, and cancer [12]. In addition, with the increase in bacterial resistance to antibiotics, there is considerable interest in developing safe and natural antimicrobial agents for infection control or food preservation [13]. In this regard, it is very important to find out new sources of antimicrobials and antioxidants from endemic medicinal plants in each country.

Dasymaschalon rostratum Merr. & Chun (synonym: *Desmos rostrata* (Merr. & Chun) P.T.Li) is a species of the genus *Dasymaschalon* found in China and Vietnam [3, 14]. The plant can grow up to 4 m tall and is found in sparsely forested slopes at altitudes of about 300–1000 m [15]. Previous phytochemical research of *D. rostratum* has led to the isolation of

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absorbance values with those of gallic acid reaction. The mean (\pm SD) results of triplicate analyses were expressed as μg gallic acid equivalents per mg of sample.

Statistical Analysis

All assays were carried out in triplicates and the results were expressed as mean \pm SD. Statistical analysis was performed on the data by SPSS 13.0 (SPSS Inc., Chicago, USA) with statistical significance determined at $P < 0.05$.

CONCLUSIONS

In summary, this study provides information on the chemical composition, antimicrobial and antioxidant activities of the essential oil and methanol extract from the stems of *D. rostratum*. The essential oil contained β -caryophyllene (27.4%), β -pinene (12.8%), α -copaene (11.7%), α -pinene (8.4%), and α -humulene (6.2%) as major components. In addition, the essential oil had better antimicrobial activity against the tested microorganisms than the methanol extract. However, the methanol extract was distinguished by the higher antioxidant potential in comparison to the essential oil in both DPPH and ABTS assays. Furthermore, there is a relationship between the total phenolic content and antioxidant activity. The amount of total phenolic compounds in the methanol extract of *D. rostratum* was noted to be 32.5 $\mu\text{g}/\text{mg}$, while phenolic compounds were not detected in the essential oil. Our results showed significant variations in the antimicrobial and antioxidant activities of the essential oil and methanol extract from the stems of *D. rostratum*. In addition, further investigations concerning the evaluation of antimicrobial mechanisms against essential oil against bacteria and fungi as well as the identification of phenolic compounds in these plant extracts are required.

COMPLIANCE WITH ETHICAL STANDARDS

The authors declare that they have no conflicts of interest.

This article does not contain any studies involving animals or human participants performed by any of the authors.

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