Manuscript Submission to Research Journal of Chemistry and Environment

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Kam, 18 Jul 2019, 10.45

Dear Prof. **Dr. Jyoti Garg,**
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On the behalf of this email, I would like to submit my article to the Research Journal of Chemistry and Environment. The details of manuscript are described below

Name of the Journal: Research Journal of Chemistry and Environment
Number of Authors: 4
Title of Manuscript: Antibacterial Activity of Various Medicinal Plants in North Sumatera Against Common Human Pathogens
Corresponding author: Tita Juwita Ningsih

Please kindly find my draft of manuscript and the declaration/copyright form attached below.

I really hope that my manuscript will be considered to be processed any further, as I will be very glad to follow all the steps. Also, please feel free to contact me for further inquiries.

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Dr. Tita Juwitaningsih
Department of Chemistry, Universitas Negeri Medan, Indonesia

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Your manuscript ID is: WRA-RJCE-2019-0534

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Thank you for submitting your manuscript to the Research Journal of Chemistry and Environment.

Sincerely,
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Research Journal of Chemistry and Environment

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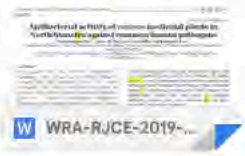

Antibacterial activity of various medicinal plants in North Sumatra against common human pathogens

Juwitaningsih Tita[1]*, Jahro Iis Siti[1], Sari Sri Adelila[1] and Rahayadi Yaya[2]
1. Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan, Jl. Willem Iskandar Pasar V, Medan Estate, Medan 20221, INDONESIA
2. Lab. of Natural Products, Institute of Bioscience, Universiti Putra Malaysia, 43400UPM Serdang, Selangor Darul Ehsan, MALAYSIA
*juwitaningsihtita@gmail.com

Abstract
The necessity for new antibiotic compounds is becoming urgent, given the increasing number of bacteria that are resistant to one or several antibiotics. This study was aimed to assess the potential of 24 North Sumatra, Indonesia medicinal plants as a source of antibacterial compounds. Maceration with acetone solvents was used to extract the content from the medicinal plant samples. Then, antibacterial activity tests were conducted via in vitro on 6 pathogenic bacteria. The antibacterial screening was carried out using the M02-A11 Clinical and Laboratory Standard Institute (CISI) diffusion method followed by the determination of Minimum Inhibitory Concentration (MIC) with Microdilution Methods M07-A9 (CSSI) and determination of Minimum Bactericide Concentration (MBC). Phytochemical tests were carried out on extracts which showed high activity.

The results confirmed that most of the sampler showed antibacterial activity against 4 to 5 of test bacteria. Strong antimicrobial activity was shown by Phyllantus urinaria L extract against S. saprophyticus and Cassia angustifolia plant extracts against B. cereus and S. saprophyticus bacteria, each with a concentration of 312.5 μg/mL. The C. angustifolia is bacteriostatic, whereas P. urinaria L is bactericidal with an MBC value of 1250 μg/mL. Furthermore, P. urinaria contains alkaloids, flavonoids, terpenoids, saponins and tannins and so does C. Angustifolia.

Keywords: Screening, Medicinal plants, North Sumatra, Antibacterial activity, Pathogens.

Introduction

The development of bacterial strains that are resistant to one or several antibiotic has become a serious problem that must be addressed immediately[5,19,20]. Therefore, in the last decade, the demand for new antimicrobial substances has increased[9,20]. The existence of these phenomena is increasingly encouraging the importance and need for research to find new compounds that have the potential as effective drugs. One approach to obtain antimicrobial compounds is carried out through studies of compounds derived from plants[10,13].

Natural materials have been used since ancient times and have traditionally been used for the treatment of various diseases[5] as well as treatments that have been carried out in the Indian Olive Traditional Ayurveda and Unani treatment systems[3]. In Indonesia, especially in North Sumatra, the Batak ethnic groups have used plants as traditional medicine. However, this vast utilization has not been researched and analyzed optimally.

Therefore, this research is intended to examine the potential (exploring antibacterial plants) of North Sumatra medicinal plants as a source of candidate drug compounds, as well as a form of scientific support for traditional medicine.

Material and Methods

Plant material: Samples of various North Sumatra medicinal plants were obtained from traders of medicinal plants in the traditional market of Pancur Batu, North Sumatra, Indonesia. The selection was based on the number of plants used as traditional medicine. Furthermore, the sample was identified in Medan Herbarium, Indonesia.

Plants extract preparation: As much as 100 g of 24 dried sample samples were extracted by macerating process with 500 ml of 100% (v / v) acetone for 3 x 24 hours at room temperature. Then, it was filtered with filter paper. The filtrate was evaporated using a rotary at a temperature of 50°C to obtain a crude extract.

Antibacterial agents: The sample was dissolved in 10% dimethyl sulfoxide. The sample which was not soluble in 10% DMSO was dissolved in 100% DMSO to obtain a sample concentration of 10.000 μg/mL. Chloramphenicol concentration as a standard antibiotic is 500 μg/mL. 10% and 100% DMSO did not show antibacterial activity.

Antibacterial strains and inoculums preparation: The six pathogenic bacteria which were going to be tested consisted of 4 gram positive bacteria of *Bacillus cereus* ATCC 1178, *Salmonella enterica* ATCC 14028, *Staphylococcus saprophyticus* ATCC (49907), *Propionibacterium acne* ATCC (27853) and 2 gram negative bacteria of *Escherichia coli* ATCC 25922 and *Citrobacter freundii* ATCC 8090.

Bacterial suspension (inoculum) was prepared based on the growth method. Briefly, three to five bacterial colonies that grow well and have the same type of culture were chosen to use sterile needle loops and then suspended into 4-5 mL of 0.9% NaCl. The bacterial suspension was then incubated at 37°C for 24 hours. The incubation results were then

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27 Des 2019, 13.28

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Thank you for your kind consideration and I hope to hear from you soon

Kind Regards
Dr. Tita Juwitaningsih

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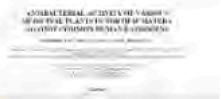

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PHYTOCHEMICAL, ANTIBACTERIAL, ANTIOXIDANT AND ANTICANCER ACTIVITY STUDY OF *M. CANDIDUM* LEAF ACETONE EXTRACT

Tita Juwitaningsih[1*], Iis Siti Jahro[1], Ida Duma Riris[1], Elvira Hermawati[2], Yaya Rukayadi[3]

[1]Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan, Jl. Willem Iskandar, Pasar V Medan Estate, Medan 20221, North Sumatera, Indonesia
[2]Organic Chemistry Division, Faculty of Mathematics and Natural Sciences, Institut Teknologi Bandung, Jalan Ganesha 10, Bandung 40132, Indonesia
[3]Lab. of Natural Products, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.

*Email: juwitaningsih@gmail.com
Mobile No.: +628126522646
Address for Postal Correspondence: Komp. Dosen Unimed No. 11, Lau Dendang, Medan, Indonesia

ABSTRACT

M. Candidum has been frequently used as a traditional medicine to treat various diseases such as diarrhea, dysentery, haemorrhoids, cuts and wounds, toothache, and stomach ache. This research was aimed to identify the activity of *M. Candidum* acetone extract as an antibacterial, antioxidant, anticancer and phytochemical. Antibacterial activity test was performed in vitro against each of the two Gram-positive and Gram-negative bacteria by paper disc diffusion method followed by determination of the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values. The antioxidant activity of extract was tested against 2,2-diphenyl1-picrylhydrazyl (DPPH), while the cytotoxic activity of the extract was evaluated against MCF-7 cells. Furthermore, identification of secondary metabolite content was determined by ^{1}H-NMR spectroscopy. Activity test results revealed that acetone extract of *M.Candidum* leaf was activity against four pathogenic bacteria, such as *P. acne* ATCC (27853), *S. saprophyticus* ATCC (49907), *S. mutans* ATCV (35668), *C. freundii* ATCC 8090) with inhibition diameter of 5.70 ± 0.17 - 11.23 ± 0.23 with MIC values of 1250 - 2500 µg / mL and MBC between 1250 -> 5000 µg / mL. In conclusion, *M.Candidum* acetone extract has antioxidant and cytotoxic activity with IC_{50} value = 22.4761 µg / mL and IC_{50} = 601.89µg / mL respectively. In addition, the results of phytochemical tests indicated that *M. candidum* acetone extract contained terpenoids and aromatic compounds.

Keywords: *M. Candidum*, antibacterial, antioxidant, anticancer, fitokimia.

INTRODUCTION

Natural compounds play an important role in the development of medicinal substances. Many compounds that came from natural ingredients have transformed into drug candidates, and even most of the drugs used today are derived from natural compounds, such as Quinine, theophylline,

Dear Author,

It is a pleasure to accept your manuscript entitled "**ANTIBACTERIAL ACTIVITY OF VARIOUS MEDICINAL PLANTS IN NORTH SUMATERA AGAINST COMMON HUMAN PATHOGENS**" in its current form for publication in the **Research Journal of Chemistry and Environment.**

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