

CHARACTERISATION OF ENDOPHYTIC BACTERIA FROM NAM-NAM PLANTS (*Cynometra cauliflora*) FOR ANTIBACTERIAL ACTIVITY AND PRODUCTION OF PLANT GROWTH PROMOTING FACTORS

RABIATUL ADAWIYAH KHALIL¹, SHARIFAH AMINAH SYED MOHAMAD^{1,2*},
NUR RAHIMATUL HAYATI ABDUL RAHMAN³, NURUL AIDA KAMAL IKHSAN³,
NORFATIMAH MOHAMED YUNUS¹, OLAIDE OLAWUNMI AJIBOLA⁴,
NURLIANA ABD MUTALIB² and MOHD CAIRUL IQBAL BIN MOHD AMIN⁵

¹School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA,
40450 Selangor, Malaysia

²Atta-ur-Rahman Institute for Natural Products Discovery, Universiti Teknologi MARA Selangor Branch,
Puncak Alam Campus, 42300 Selangor, Malaysia

³Centre of Foundation Studies, Universiti Teknologi MARA Selangor Branch, Dengkil Campus,
43800 Dengkil, Selangor, Malaysia

⁴Faculty of Resource Science and Technology, Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak, Malaysia

⁵Centre for Drug Delivery Technology, Faculty of Pharmacy, Universiti Kebangsaan Malaysia,
Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia

*E-mail: sharifah459@uitm.edu.my

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ABSTRACT

Plant-beneficial microorganisms also known as endophytes colonize the inside healthy tissues of living plants and form mutualistic relationships with them. Endophytes are important components of the plant microbiome and give a variety of benefits to their hosts. Nam-Nam plant (*Cynometra cauliflora*), is an indigenous tree to Peninsular Malaysia with various medicinal properties. This study aimed to isolate and characterize endophytic bacteria from different parts of Nam-Nam plants such as leaves, stems, and roots. The ethyl acetate extracts from the endophytic bacteria were tested for their antibacterial activity against 7 bacterial pathogens. Plant growth promotion traits including starch hydrolysis, phosphate solubilization, nitrogen fixation, and indole-3 acetic acid (IAA) production were screened among the endophytic bacteria isolates. Molecular identification by 16S rRNA gene sequencing was performed for isolates with good antibacterial activity and plant growth promotion traits. A total of 33 endophytic bacteria comprising 27 Gram-negative and 6 Gram-positive bacteria were isolated. The antibacterial activity was demonstrated by 7 isolates in which R1L3 and TKL2 extracts exhibited significant activity against *Bacillus cereus*, *Escherichia coli*, and *Proteus vulgaris*. Production of IAA was exhibited by 15 isolates wherein R1S4 produced the highest IAA (20.62 µg/mL). Analysis of the 16S gene sequence revealed that R1R2, TKS2/R1L3, and R1S4/R1S5 belonged to *Methylobacterium radiotolerans*, *Mycobacteroides abscessus*, and *Sphingomonas sp.*, respectively. The findings from this study showed that Nam-Nam plants harbored endophytic isolates with the potential to be established as a source of natural compounds that can be used to develop new anti-infection agents in the future. This is the first study to report on antibacterial activity and IAA production by endophytic bacteria from the Nam-Nam plants.

Key words: Nam-Nam plants, *Cynometra cauliflora*, antimicrobial activity, indole-3-acetic acid

INTRODUCTION

Endophytes are plant-beneficial microorganisms that colonize the healthy internal tissues of living plants and develop mutualistic interaction with the plants. Endophytes are considered essential components of plant micro-bionetwork which provide several

benefits to their host both directly and indirectly. The indirect growth-promoting attributes include suppressing plant diseases, induction of plant systemic resistance, protection against pests and herbivores, and phytoremediation. Several direct growth promotion effects are the production of phytohormones, alleviating abiotic stress, bio-fertilization, and plant nutrient availability (Eid *et al.*, 2021). Endophytic bacteria have been identified from diverse types of

* To whom correspondence should be addressed