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Antibacterial activity of *Syzygium aromaticum* L. leaf essential oil against *Staphylococcus aureus* ATCC 25923

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ABSTRACT

Introduction: *Syzygium aromaticum* L., known as clove, had been widely used for many purposes and was rich in potent natural drug compounds. Currently, the flowers of the plant have been commercialized as a drug and food preservative, but not their leaves. Exploring natural resources is important to get new potent but economically friendly drugs, such as natural antibiotics. Clove leaf essential oil has many natural compounds promising to develop as a novel antibacterial agent. This study aimed to determine the active compound and investigate the antibacterial activity of clove leaf essential oil against *Staphylococcus aureus* ATCC 25923.

Methods: Clove leaf essential oil was extracted from the leaves by distillation process. The phytochemical study for the investigation of active compounds in clove leaf essential oil was carried out using Gas Chromatography-Mass Spectrometry. The antibacterial activity of the essential oil against *Staphylococcus aureus* ATCC 25923 was investigated using disc diffusion methods, with concentrations of clove leaf essential oil at 50%, 25%, 12.5%, 6.25%, and 3.125%. The study used 1% dimethyl sulfoxide as a negative control and 0.1% ampicillin as a positive control.

Results: The phytochemical study showed that clove leaf essential oil contains Eugenol (36,76%), 3-Allyl-6-methoxyphenol (30,67%), and Caryophyllene (23,89%). The antibacterial activity assay showed that the highest concentration of essential oil, which is 50%, had an inhibition zone diameter of 22 mm. Meanwhile, the concentration of 25 and 12.5% showed their activity with a zone inhibition diameter of 20 and 14 mm, respectively. The combination of ampicillin and essential oil showed no significant increase in inhibition zone diameter, explaining that the combination was not synergistic.

Conclusions: This study revealed that clove leaf essential oil is promising to develop as a new antibacterial agent due to its potent activity against *Staphylococcus aureus* ATCC 25923.

KEYWORDS: antibacterial; clove leaf; essential oil; *Staphylococcus aureus*; *Syzygium aromaticum*