

# Potential of methanol extract from the stem bark of mangrove *Rhizophora mucronata* against bacteria *Escherichia coli* and *Aeromonas hydrophilla*

Mahmiah<sup>1</sup>, Gimam<sup>1</sup>, Nanik Siti Aminah<sup>2</sup>, Mulyadi Tanjung<sup>2</sup>

<sup>1</sup> University of Hang Tuah Surabaya, Indonesia

<sup>2</sup> Faculty of Science and Technology, University of Airlangga, Indonesia

E-mail: mahmiah@hangtuah.ac.id

**Abstract.** *Escherichia coli* and *Aeromonas hydrophilla* are well known pathogenic bacteria causing diseases in both human and animals. Since the popular antibacterial drugs in the market lead to resistance, other alternatives antibacterial need to be searched from the active ingredient found in marine and terrestrial vegetation. The potential use of secondary metabolites from marine vegetation is currently being developed. One of marine vegetation that has been expected to have antibacterial activity is mangrove. This study aims to provide information related to the phytochemical and antibacterial activity of methanol extract of the bark of mangrove *Rhizophora mucronata*. The phytochemical screening and disc testing methods were used in this study. The results showed that the methanol extract of *R. mucronata* contained phenolics, alkaloids, and terpenoids. Furthermore, the positive outcome of active antibacterial potential of the methanol extract against *E. coli* and *A. hydrophilla* has been indicated by inhibition of discs in a clear zone at 7,56 and 7,00 mm.

## 1. Introduction

Mangrove is an estuary plant living in a high salinity habitat, influenced by temperature, wind, wave, and ocean current. This extreme environmental condition leads the plant to produce various secondary metabolite compounds that function as a protective effect to surrounding environment. The secondary metabolite compounds contained in these mangroves can potentially be developed as antibacterial, antiviral, and antioxidant agents. [1] explains that mangrove plants in Indonesia are the largest in the world, both in terms of territory ( $\pm 42,550 \text{ km}^2$ ) and number of species ( $\pm 45$  species). On the basis of this mangrove, Indonesia certainly has a high species diversity and possibly potential as a medicinal material.

*Escherichia coli* and *Aeromonas hydrophilla* are pathogenic bacteria causing various diseases in human, fish and other animals. The use of antibiotic drugs such as chloramphenicol has been proven to cause resistance to these bacteria. Therefore, it is necessary to develop alternative antibiotics as antibacterial agents derived from terrestrial and aquatic plants.

One of the alternative aquatic plants that have antibacterial potentials is mangrove plant. Research on antibacterial activity of mangrove plants has been shown on the leaves extract of *Avicennia marina* and *R. stylosa* living in Sudanese waters. These plants demonstrated the potential reactions to inhibit the activity of *E. coli* and *Candida albicans*. The antibacterial activity of the plants was suspected

