

I. INTRODUCTION

1.1 Background

Antimicrobial is used to describe substances that can inhibit the growth or kill bacteria (bacteriostatic or bactericidal) and molds (fungistatic or fungicidal) (Zheng *et al.*, 2013). Infectious diseases caused by bacteria, such as *Microbacterium*, *Staphylococcus*, *Streptococcus*, *Enterococcus*, and others, can be treated using antibiotics. Antibiotics can also be used for preventing infection, especially in postoperative patients.

The number of irrational use of antibiotics due to lack of public knowledge about antibiotics causes multidrug-resistant bacteria to increase globally. Antibiotic resistance is a condition where the effect of antibiotics as anti-infective is not useful or pathogenic bacteria become insensitive. The problem is the failure of drug therapy for the use of antibiotics (Pratiwi, 2008).

The increasing of antibiotics resistant bacteria has prompted researchers to find the new sources of antibiotics, by using endophytic microbes (Lestari, 2017). Endophytes are generally any organisms that under normal circumstances are contained within tissues of living plants (usually autotrophs) without causing noticeable symptoms of disease, and the host tissues remain intact and functional (Mariusz, 2019).

For a long period of time in history, plants have been valuable and indispensable sources of natural products for the health of human beings and they have a great potential for producing new drugs (Nascimento, 2003). Mangroves are

a unique group of vascular plants that occur in saline coastal habitats and are known to tolerate extreme environmental conditions. Some mangrove plants are used for a wide range of conditions, including bacterial and fungal diseases (Abel *et al.*, 2016).

Some mangroves develop mechanisms that allow them to actively remove salt from the tissues, while others develop a respiratory root system to help obtain oxygen for their root system (Rusila *et al.*, 2006). Some Mangrove plants are used for various conditions, including bacterial and fungal diseases (Abel *et al.*, 2016).

According to a study by Sogandi *et al.* (2017) Ethanol extract of *Sonneratia caseolaris* leaves forms an inhibition zone of 22.48 mm at 100% extract concentration and acts as an antibacterial agent against the growth of *E. coli*. Based on research by Vivi *et al.* (2015) Endophytes isolated from the mangrove plant *Rhizophora apiculata* have antibacterial activity against the growth of *Pseudomonas aeruginosa* and *Staphylococcus aureus*

Apar Mangrove Park located in the marine conservation area of Pariaman City, West Sumatra. In this park, two types of mangroves have been identified, namely *Rhizophora apiculata* and *Sonneratia caseolaris*. The endophytic fungi information from these plants has not been obtained in this area, so it is necessary to research the potential of endophytic fungi in mangrove plants that produce antimicrobials.

1.2 Problem Formulation

1. Do isolates of endophytic fungi of mangrove plants *Rhizophora apiculata* and *Sonneratia caseolaris* have antimicrobial activity?
2. How the partial morphological characteristics of the endophytic fungal isolates of mangrove plants *Rhizophora apiculata* and *Sonneratia caseolaris* that have antimicrobials activity?

1.3 Research Objectives

1. To obtain isolates of endophytic fungi from mangroves *Rhizophora apiculata* and *Sonneratia caseolaris* that have antimicrobials activity.
2. To determine the partial character of the endophytic fungal isolates of the mangrove plants *Rhizophora apiculata* and *Sonneratia caseolaris* that have antimicrobials activity.

1.4 Benefits of Research

The benefit of this research is to provide scientific information about antimicrobial activity and morphological characteristics of endophytic fungi of mangrove plants *Rhizophora apiculata* and *Sonneratia caseolaris* in Apar Mangrove Park, Pariaman, West Sumatra.