I. INTRODUCTION

1.1. Background

For centuries, people have utilized natural raw materials for human health because of their unique chemical composition and structure. Wood and its bark are among the most important raw materials due to their distinct chemical composition and structure. The bark of a living tree serves as the first line of defense against invading insects and fungi (Pásztory et al., 2016).

Tree bark is currently used in only a few applications, including industrial fuel, soil amendment, and ground cover (Wagner et al., 2019). Despite this, the inner bark contains a powerful defense system based on phenolic chemicals, which are found in practically all types of plant tissue (Stokland et al., 2012). Plants produce phenolic chemicals in response to environmental and physiological stresses such as disease and insect attack, UV radiation, and wounding (Khoddami et al., 2013). Antimicrobial activities have also been discovered in numerous plant phenols (Puupponen et al., 2001).

Antibiotic-resistant microorganisms have become a growing issue in recent years. Existing antibacterial medications have become less effective, if not ineffective, as a result of the emergence of resistance. Combining other molecules with failed antibiotics is one of the recommended ways for combating antibiotic resistance, and it appears to restore the required antibacterial action. These compounds could be non-antibiotic medications having antibacterial capabilities, allowing for new treatment techniques to be developed. Phytochemicals have shown to have significant antibacterial properties in this scenario, and several studies have used natural compounds to overcome bacterial resistance (Khameneh, et al., 2019). As a result, scientists are concentrating their efforts on plants in the hopes of discovering new antimicrobial compounds. Antimicrobials are important in the realm of medicine and have transformed it in several ways (Arora & Sood, 2017).

Secondary metabolites have a high concentration of antibacterial compounds, particularly alkaloids and polyphenols (Othman et al., 2019), which means they inhibit both gram positive and gram negative bacteria and can be utilized to increase food shelf life. Because it may be taken from a variety of sources, including plants, animals, and microorganisms, it is commonly referred to as natural antimicrobials (Karunaratne & Pamunuwa, 2017). Due to the variability in the composition of phytochemical molecules in plants, extracting all of the phytochemicals with a single extracting solvent is extremely

difficult and unclear. Polar components are extracted using polar solvents, as opposed to nonpolar components, which are extracted using nonpolar solvents. Likewise, when different polarity solvents are used, the extraction yield also varies (Nawaz et al., 2019). In terms of antimicrobials, according to Wagner et al. (2019) methanol extract of larch bark suppressed the growth of *Staphylococcus aureus*. Sainath et al. (2009) also discovered that methanolic and water extracts of *Saraca indica* stem bark were highly efficient against the majority of bacteria tested, especially *Bacillus* species and *Pseudomonas aeruginosa*.

Aside from that, not all tree bark is thoroughly investigated because there are still many unknown/unidentified plants that only native people use, making bioprospecting especially important. Bioprospecting is known as the exploration of biodiversity for new resources of social and commercial value. It has multiple goals, including biodiversity conservation, sustainable natural resource management, and economic development (Beattie et al., 2011). It is critical to analyze novel ingredients because as the world grows, so does the demand for functional food and new alternatives. By analyzing them, people can gain new knowledge about their functions as well as the effects of those specific compounds, and thus a new alternative can be discovered.

For its food and health benefits, native tree bark is currently widely used by the local community in Papua. There are two species of tree bark that were analyzed in this report, the Moi tribe (the native people) of Sorong, Papua, called them as *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen*. *Kayu Bawang* is known to be used as food seasoning and flavoring due to the aroma and rich taste that is similar to garlic. *Kayu Kamlowelen* is used as a tea to treat mild flu symptoms, to increase stamina, and as a blood booster. Because those barks are commonly used as a food ingredient by native Papuans, but few people are aware of it, this raw material is very interesting to be studied. Therefore, this study was carried out to determine one of the food functions, the potential antimicrobial activity of the Native Papuan tree bark and phytochemical compound that might act as the antimicrobial agent or preservative. While Gabriela Lysette Rahardja conducted the antioxidant properties in her thesis report titled "Analysis of Antioxidant Properties and Phytochemical Identification of the Native Papuan Tree Bark."

1.2. Objective

The objective of this study were:

a. To identify the effect of solvent polarity to the extraction yield,
b. To identify the potential antimicrobial activity of *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark extracts in different solvents and different concentration,

c. To identify the type of phytochemical on the potential antimicrobial activity of *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark extracts in different solvents.

1.3. Hypothesis

a. **Ho:** Difference in solvent polarity will not affect the extraction yield of K*ayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark.

Ha: Difference in solvent polarity will affect the extraction yield of *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark.

b. **Ho:** *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark extracts in methanol, acetone, ethyl acetate, chloroform, and hexane, and higher concentration will exert antimicrobial resistance effects on *E. coli* and *S. aureus.*

Ha: *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark extracts in methanol, acetone, chloroform, ethyl acetate, and hexane, and higher concentration will not exert antimicrobial resistance effects on *E. coli* and *S. aureus*.

c. **Ho:** Difference in solvent polarity will extract different types of phytochemicals of *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark extracts in different solvents.

Ha: Difference in solvent polarity will not extract different types of phytochemicals of *Kayu Bawang Gisikisik* and *Kayu Teh Kamlowelen* tree bark extracts in different solvents.

1.4. Scope of Research

Two types of tree bark samples used in this study were collected by the locals in Sorong, West Papua, called *Kayu Bawang* and *Kayu Kamlowelen*. The samples were dried and extracted using maceration for 7 days using different polarity solvent, with three technical replicates. The analysis that were conducted are extraction yield determination, antimicrobial analysis, and phytochemical analysis. The data was then analyzed using descriptive analysis. This study is also part of Gabriela Lysette Rahardja thesis report in”Analysis of Antioxidant Properties and Phytochemical Identification of the Native Papuan Tree Bark”.