

## INTRODUCTION

### 1.1 Background

Known as a natural mechanism of bodily defense, inflammation is a form of response towards injury (Sangeetha & Vidhya, 2016) characterized by several primary signs; redness (*rubor*), swelling (*tumor*), heat (*calor*), pain (*dolor*), and loss of function (*functio laesa*) (Punchard, Whelan, and Adcock, 2004), in which have the potential to be harmful. Inflammatory response triggered by a complex cascade of biochemical events, involving multiple constituents, such as; local vascular response, multiple tiers of the immune system, and various cells surrounding the site of injury (Leelaprakash & Dass, 2011). Due to these facts, inflammation could result in protein denaturation, causing the denatured proteins to lose their biological functions. The loss of biological function may cause membrane instability since its stability relies highly upon the integration of proteins in which took part in its structure.

Inflammation itself has been known to be a significant threat to human health. According to WHO, chronic inflammation ranked the highest in human health threat in the world. Even so, both acute and chronic inflammation are considered a threat, shown by the various kinds of inflammation-related diseases, such as rheumatoid arthritis, chronic obstructive pulmonary disease (COPD), diabetes, cardiovascular diseases, and allergies).

Inflammation is treatable with various drugs over the counter, with the most used type being NSAIDs. NSAIDs works by inhibiting the enzyme COX, thus inhibiting the biosynthesis of Prostaglandins (Rouzer & Marnett, 2009). Due to the non-specific inhibition of COX, the treatment is not immune to adverse effects. One of the major adverse effects is gastric ulcers; due to the inhibition of COX-1 present in the gastric mucosa (Punchard, Whelan, & Adcock, 2004). Due to the

adverse effect, a suitable treatment is needed that is not only effective but also cause a less adverse effect.

Traditional herbal medicine is deemed to be the answer to this problem. Traditional medication is defined as the knowledge, skill, and practices based on the theories, beliefs, and experiences indigenous to different cultures; used in the maintenance of health, or in the prevention, diagnosis, improvement, and treatment of both physical and mental illnesses using holistic approach, emphasizing on health rather than the disease itself (Benzie & Wachtel-Galor, 2011). The medication came from different sources, but mostly derived from animals and plants, its medication was not found immediately, as humans only used plants and animals solely to fulfill their nutritional needs. Only after the discovery of their medicinal properties that people start to use them as a material for disease cure and health improvement (Azmir et al., 2013). Traditional herbal medicine has been used in multiple countries and cultures around the world from a long time ago, including Indonesia.

Itchy Leaves or Daun Gatal in Indonesian (*Laportea decumana*) is a plant native to the island of Papua. Belonged to the family *Urticaceae*, it grew across the island on multiple landscapes. The main feature of the plant is the presence of stinging hairs across the body and it has been used traditionally within generations as a treatment to various conditions, such as; headache, stomachache, muscle and joint pains and bruises (Simaremare et al., 2014). There are six known species of *Laportea* known to exist in Indonesia; *Laportea interrupta*, *Laportea decumana*, *Laportea sinuate*, *Dendrocnide peltate*, *Laportea aestuans*, and *Laportea sp.* (Simaremare et al., 2014; Simaremare et al., 2018). Other than those, there are more plants within the *Laportea* genus across the world, mainly found in India and the region of Africa, although there is lack of scientific evidence on whether *Laportea decumana* has anti-inflammatory properties or not, there is evidence that the plant is positive for alkaloids, glycosides, and steroids/

triterpenoids (Simaremare et al., 2014). Other than that, it is found that *Laportea aestuans* is indeed containing anti-inflammatory compounds. Due to this face, we can expect that *Laportea decumana* will exhibit similar behavior as both plants are within the same species.

This experiment utilizes maceration method as the method of extraction using methanol as the solvent. Maceration is a method of extraction in which involves soaking of crude ingredients in a determined solvent with occasional agitation. It is suitable for small scale extraction. The phytochemical analysis will be done using qualitative methods after in order to determine the phytochemical components contained in the obtained extract, continued with inhibition of BSA denaturation test to emulate the condition of inflammation; in which involves protein denaturation. The results then will clarify on what phytochemicals are there in the extract along with addition of further evidence on whether *Laportea decumana* has the potential to be anti-inflammatory medication or not.

## **1.2 Objectives**

The objective of this research is to observe the phytochemicals available in *Laportea decumana* methanol extract and determine whether the extract has the potential to be anti-inflammatory or not by using BSA protein denaturation testing.

## **1.3 Scope of research**

The scope of this research includes the extraction of *Laportea decumana* using maceration method with methanol as solvent, phytochemical analysis of the extract obtained using qualitative method, and anti-inflammatory testing of the extract using inhibition of albumin denaturation testing.

#### 1.4 Hypothesis

**H<sub>0</sub>:** Methanol Extract of *Laportea decumana* will not have the potential to have greater anti-inflammatory property compared to NSAIDs.

**H<sub>1</sub>:** Methanol Extract of *Laportea decumana* will have the potential to have greater anti-inflammatory property compared to NSAIDs.