

CHAPTER 1

Introduction

1.1 Background

Skin issues are common problems encountered in daily life. One of the effects that could cause skin issues is the exposure to ultraviolet rays and pollution on the skin is a trigger for the emergence of several diseases that can attack human skin. The oxidative effect caused by exposure to UV radiation and pollution can cause skin inflammation and premature aging (Petruk G, et.al, 2018). Even though this is not a disease or chronic health disorder, it has a tremendous psychological impact on everyone. As the outermost organ, the skin is directly exposed to oxidants such as UV-radiation, drugs, air pollution, cigarette smoke, alcohol and exposure to certain substances. As a result, the skin looks dry and thin, fine lines or wrinkles appear, skin pigmentation appears, it does not look tight, dull and not fresh. These signs bring the condition of our skin to the aging process. The aging process is a physiological process that occurs in all organs of the human body, including the skin. Skin aging occurs by several factors, one of the most basic of which is free radicals. Free radicals are atoms or molecules that are highly reactive with unpaired electrons (Winarsi, 2007). In the skin, free radicals that are produced in excess will damage the collagen in the skin cell membrane, so that the skin loses its elasticity and causes wrinkles (Salavkar, S. M., Tamanekar, R. A., & Athawale, R. B., 2011).

Free radicals can be prevented by using antioxidants. Antioxidants are substances that the body needs to neutralize and protect the skin from damage caused by oxidation caused by free radicals. Antioxidants have a small molecular weight, but are able to inactivate the development of free radicals. Antioxidants are normally present in the body. However, the availability of these antioxidants is limited, so they are unable to neutralize all free radicals that enter the body, resulting in cell and tissue damage. There are many antioxidant products available on the market,

both in the form of oral and topical preparations, both made from synthetic and natural ingredients, but the consumption of synthetic antioxidants in the long term can cause toxic and carcinogenic effects (Rachmani, 2009).

Plants have long been recognized as a source of life for people, as a source of food, fuel, clothes, medicine, and other necessities. Plants have been used for medicinal purposes for thousands of years. However, its application is not extensively documented (Susiarti S., 2015). Noni fruit has been used as food and traditional medicine by Polynesian people for more than 2000 years. The fruit prevents and treats a variety of diseases in the traditional pharmacopeia. It is largely used to activate the immune system and therefore combat bacterial, viral, parasite, and fungal infections; it is also used to inhibit tumor development and growth, particularly malignant tumors. Noni juice is also said to be antioxidant and anti-inflammatory. (McClatchey, W., 2002).

Another natural product often used in cosmetics and as a health supplement is propolis. Propolis is a natural resinous mixture made by honeybees from plant parts, buds, and exudates. Scientists discovered that the presence of phenolic acids, their esters, and flavonoids, which have the highest antiradical activity, is responsible for propolis's pharmacological activities (Galeotti F., Maccari F., Fachini A., Volpi N., 2018). The antioxidant and antibacterial activities of propolis samples collected in Palestine and Morocco were found to be related to their high total phenolic and flavonoid contents (Touzani S., et al., 2021). The Ukrainian researchers used a variety of approaches to standardize propolis. Chromatographic studies revealed a high diversity of phenolic molecules, which are thought to be the main bioactive compounds in propolis and have been proposed as standardization markers (Yarnykh T., et al., 2020).

The use of noni and propolis extract directly on the skin is not practical, therefore it is necessary to make a suitable preparation so that it is easy to use. One of the alternative preparations that can be used is topical preparations such as creams. Cream is a semi-solid preparation in the form of an emulsion that contains at least 60% water and is meant for external usage (Anisa, 2013).

Cream preparations, in general, have the ability to stick to the area where they are employed for an extended period of time before being rinsed or removed (Anwar, 2012). The cream can be moisturized and easily spread evenly, easily penetrate the skin, easy to wipe and wash with water (Anisa, 2013). The cream was chosen because it offers benefits such as being easy to apply to the skin, easy to wash after application, may be used on skin with moist wounds, and is equally dispersed (Anisa, 2013).

1.2 Objectives

Objective of this research is listed below:

- To determine antioxidant activity of *Morinda citrifolia* extract in combination with propolis extract
- To formulate the combination of *Morinda citrifolia* extract with propolis extract into cream

1.3 Research Hypothesis

Combination of propolis and noni fruit extract will enhance the antioxidant characteristics. Additionally, the noni fruit extract combined with propolis can be formulated as a cream preparation.

1.4 Research Scope

This study will focus on formulating and evaluating the anti oxidant cream. Specifically, the scope of work that would be employed in this study includes:

- Antioxidant testing of noni extract and propolis
- Formulation and Evaluation of *Morinda citrifolia* in combination with propolis into antioxidant cream