

CHAPTER I

INTRODUCTION

1.1 Background

Burns caused by radiation, heat, chemicals, electricity or friction can cause damage to tissues including the skin (American Burn Association, 2019). Heat burns consist of three causes, which is burns due to hot liquids (scald), flames (flame burn), or hot solids (contact burn) (World Health Organization, 2018).

Silver sulfadiazine (SSD) is a broad spectrum antibiotic and is not easily resistant, so it is used as the gold standard for the treatment of superficial burns. However, the results of several studies, SSD has the effect of inhibiting wound healing in vivo as well as cytotoxic effects on keratinocytes and fibroblasts in vitro.

Traditional medicine such as Aloe vera (Liliaceae family) has long been widely used in community. According to the study of Hosseinimehr, et al. demonstrated aloe vera more effective in healing partial burns in rats compare to SSD. Glucomannan and acemannan in aloe vera are the active chemical compounds which can stimulate proliferation and fibroblast activity. (Aulia, Pane, 2022).

The use of aloe vera is an indication for the treatment of burns in several studies, there are several studies that have compared the efficacy of this Aloe vera and SSD in the treatment of burns in animals. Aloe vera has antimicrobial effects and can promote wound healing and reduce infection in burns.

According to Muller et al, study showed that SSD delayed wound contraction in burn injury. SSD when added to Aloe vera reversed this effect and wound half-life, and the healing time was longest in the 1% SSD group and the shortest in the SSD/Aloe vera group. These data indicate compared to SSD alone, Aloe vera has a synergistic effect in wound healing.

Oxidative stress is a condition that describes an imbalance between free radicals and cellular antioxidants. Free radicals change the components of cell membranes and produce toxic compounds such as MDA (Malondialdehyde) which are formed as a result of lipid peroxidation. Free radicals play a role in damage to biomacromolecules such as proteins, carbohydrates, lipids and nucleic acids. One of the markers that shows an increase in free radicals in cell membranes due to oxidative damage. The higher the MDA level, the more oxidative damage that occurs and has a negative impact on health. (Dunnill *et al*, 2017)(Herdiani, Putri, 2018)(Suryohudoyo, 2007)

The body has the ability to form endogenous antioxidants that aim to counteract free radicals, for example GPx (Glutathione Peroxidase), Superoxide Dismutase (SOD) and catalase enzyme activity. When excessive lipid peroxidation occurs in the body, the SOD enzyme is one of the enzymes that functions to counteract free radicals. Metal minerals such as manganese (Mn), zinc (Zn), and

copper (Cu) play an important role in helping SOD enzyme activity to work optimally.

Based on the statement above, it is necessary to conduct research to determine the benefits of Aloe vera extract and Silver Sulfadiazine on MDA and SOD levels to assess oxidative stress and free radical formation as well as endogenous antioxidant activity in rats with Mid-Dermal burns and whether there are significant differences in MDA levels and SOD between the negative control and the group given Aloe Vera extract and Silver Sulfadiazine.

1.2 Problem Formulation

Can the administration of aloe vera extract affect the levels of MDA and SOD in mice with Mid-Dermal burns compared to silver sulfadiazine.

Can the administration of aloe vera extract added with silver sulfadiazine affect MDA and SOD levels of rats with Mid-Dermal burns compared to aloe vera extract alone or silver sulfadiazine alone.

Is there a significant difference in MDA and SOD levels between the negative control and the group given aloe vera extract and Silver Sulfadiazine.

1.3 Research Objectives

1.3.1 General Purpose

To determine the effect of aloe vera and silver sulfadiazine extracts on MDA and SOD levels in rats with Mid-Dermal burns.

1.3.2 Specific Purposes

Knowing the effect of aloe vera extract on MDA and SOD in rats with Mid-Dermal burns. Knowing the effect of Silver Sulfadiazine on MDA and SOD in rats

with Mid-Dermal burns.

Knowing the effect of aloe vera extract added Silver Sulfadiazine on MDA and SOD in rats with Mid-Dermal burns

1.4 Hypothesis

Aloe Vera Extract and Silver Sulfadiazine will decrease MDA levels and increase SOD levels in mice with Mid-Dermal burns.

1.5 Research Benefits

1. For health institutions

Complementing research references regarding the effects of Aloe Vera extract and SSD for further research so that other researchers can study and explore more deeply.

2. For writers/researchers

As a learning tool to increase knowledge and insight in conducting research in the health sector.

3. Benefits of scientific / knowledge

Provide scientific information regarding the results of the study of the effects of Aloe Vera extract and SSD on SOD and MDA levels.