CHAPTER 1

INTRODUCTION

1.1. Project Background

Centella asiatica is a herbaceous perennial plant that belongs to the Apiaceae family, generally referred to as the Umbelliferae. It is also known by the names Gotu Kola, Bua-bok, Tiger grass, and Indian Pennywort (Arribas-López et al., 2022). Extract from *C. asiatica* has also been used traditionally to treat keloids. Besides that, *C. asiatica* leaves extract has been asserted in skin care products to increase collagen production and reorganize the damaged tissue, restoring tissue firmness and skin elasticity and enhancing skin look. Wounds treated with an ethanolic extract of *Centella asiatica* can epithelialize more quickly and contain more collagen (Arribas-López et al., 2022).

Due to the biologically active triterpenes and saponins found in the Centella plant, the chemical components of the plant play a significant role in both medical and nutraceutical uses. *Due to the triterpenoid and saponin that make up the majority of Centella asiatica primarilyl components, this plant is primarily thought to have a variety of medical properties*. The proportion of collagen and cell layer fibronectin is significantly increased by terpenoids (TTF). The encouragement of scar maturation by type I collagen formation, reduction in inflammatory response, and creation of myofibroblasts are the most beneficial outcomes (Bylka et al., 2013). The main triterpenes including asiatic acid, madecassic acid, asiaticoside, and madecassoside, are regarded to constitute the biologically active components of this plant. Based on the tissue and ecotype utilized for their extraction, whether alcoholic or aqueous, the amount of these bioactive chemicals in the plant varies (Hashim et al., 2011). Triterpenoid substances such as two glycosides (asiaticoside and madecassoside) and their corresponding aglycones (asiatic acid and madecassic acid) have been identified as active components from the leaves. According to

Kepekçi et al (2021), the saponin glycoside asiaticoside is the bioactive compound responsible for the wound healing function. Also, madecassoside's antioxidant ability to enhance collagen production and angiogenesis may help *Centella asiatica* exert its wound healing abilities (Kepecki et al., 2021). Therefore, in this study *Centella asiatica* extracts will be tested for their ability on the wound healing properties with measuring HAS2 gene that have potential application in skin repairing support and on keratinocytes t in the HaCaT cell line.

The experiment will be conducted with *Centella asiatica* extraction using dried leaves. Then, the triterpenoid phytochemical screening will be performed to detect the presence of triterpenoid extracts. The extract will be tested using HaCaT cell culture. After that, a cytotoxicity test will be tested on confluent cells in extract in which concentration it is toxic or not. Furthermore, wound healing assay will be performed to investigate cell migration and wound healing. Next, HAS2 gene expression in the HaCat mRNA transcript will be determined using qPCR analysis.

1.2. Objectives

To evaluate the wound healing properties of *Centella asiatica* extracts through wound healing assay and by measuring *HAS2* gene expression in HaCaT cells

1.3. Scope of Work (Activities)

This project will evaluate the wound healing properties of *Centella asiatica* extracts by measuring *HAS2* gene expression in HaCaT cells. The scope of work of this research is:

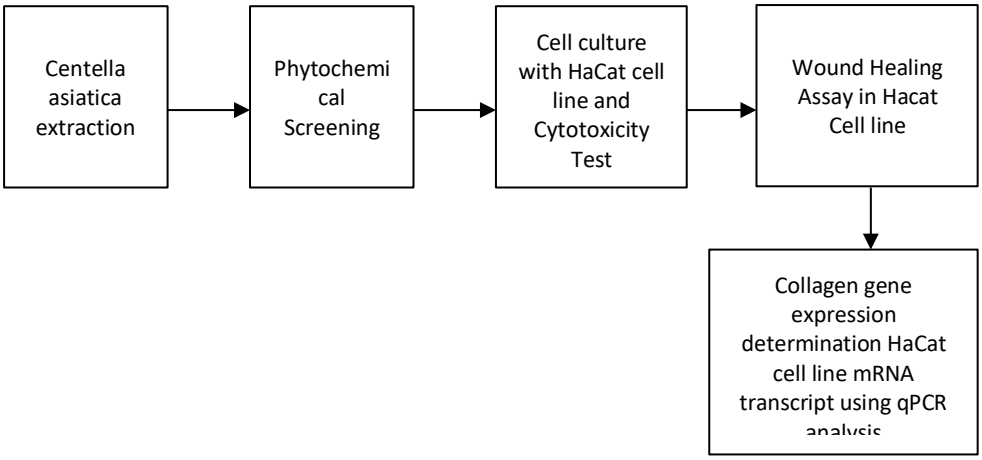

Figure 1. Flowchart for the proposed research.

1.4. Hypothesis

Centella asiatica extract has a wound healing property, shown by its ability to induce HAS2 gene expression in HaCaT cells.