

UNIVERSITI TEKNOLOGI MARA

**WOUND HEALING AND SKIN TIGHTENING
PROPERTIES OF POLYHERBAL CREAM**

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ABSTRACT

Centella asiatica, *Glycyrrhiza glabra*, *Areca catechu*, *Curcuma longa* and *Embllica officinalis* are herbal plants that were reported to have significant activity in skin tightening and wound healing. All five herbal extracts are incorporated into a cream base. Its physicochemical properties were assessed including rheology, cream texture and rate of separation (stability). The biological activities of the herbal extracts were also assessed for antioxidant and antibacterial activities. In addition, wound healing activity of the polyherbal cream was also assessed. Rheology profile showed that all formulations were stable due to higher G' (storage modulus) as compared to G'' (loss modulus). All creams had good spreadability characteristic and were stable after tested on the accelerated stability for three month. Meanwhile, the antioxidant activity of all extracts was assessed by using the DPPH assay showing that all herbal extracts exhibited antioxidant activity starting from *A. catechu* > *C. longa* > *G. glabra* > *E. officinalis* > *C. asiatica* in decreasing sequence. The antibacterial analysis revealed that the extract of *E. officinalis* and the extracts of mixed herbs exhibited the highest antibacterial activity towards both *S. aureus* and *E. coli*. Meanwhile, *C. asiatica* and *G. glabra* exhibited intermediate antibacterial activity towards both bacteria. Other than that, *C. longa* and *A. catechu* exhibited selective inhibition against *S. aureus* only. Both antioxidant and antibacterial activities of herbal extracts help in accelerating wound healing and skin tightening process. For the wound healing and skin tightening effects, the rat group treated with polyherbal cream portrayed the highest and significant tensile strength ($p < 0.05$) as compared to other groups - which were treated with the *C. asiatica* cream, chlorhexidine cream and blank cream. On the basis of this experiment and all analyses conducted, it can be concluded that the polyherbal cream formulation has potential in wound healing and skin tightening as indicated by the increase in its tensile strength.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Herbal medicine has a long story back in the whole world. Even in this ‘green’ age, usage of traditional medicine is gradually accepted by people for the application in daily life such as supplementary food, drinks and especially skin care or cosmetic products. There are four different types of herbal medicine which are herbs, herbal materials, herbal preparation and finished herbal products (WHO, 2000). Cosmetic products are defined as “any substance or preparation intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odours and/or protecting them or keeping them in good conditions” (Kole et al., 2005).

Recently, interests in herbal cosmetics are escalating rapidly because of the natural ingredients that are considered safer than chemicals that are currently used. According to WHO (2000), herbal plants are well established and acknowledged to be safe and effective as they are accepted by national authorities. Some plant extracts have the properties that help to avoid free radicals, to protect the skin from degradation by enzyme, to improve production of collagen and increase tightness of the skin (Binic et al., 2013). *Centella asiatica*, *Glycyrrhiza glabra*,