

**UNIVERSITI TEKNOLOGI MARA**

**THE STUDY OF ANTIOXIDANT AND SUN  
PROTECTION PROPERTIES OF *CASSIA ALATA*  
LEAVES (GALENGGANG)**

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## ABSTRACT

Synergistic effects of antioxidant and sunscreen agents have been intensively studied in recent years with regard of capability of UV radiation induced formation of reactive oxygen species (ROS). High level of ROS can lead to development of diseases such as heart diseases, malaria, neurodegenerative diseases, AIDS, cancer and in the aging process. Antioxidants are substances that can prevent and repair the damage done by the ROS. This study had investigated the antioxidant activity and the *in vitro* sun protection factor (SPF) of *Cassia alata* leaves extract in a gel formulation. 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) method was used to determine the antioxidant activity of methanol (CAME) and aqueous extract (CAAE) of *C. alata*. The sun protection factor was analyzed by using the diffuse transmittance method. Both extracts showed moderate antioxidant activity where CAME and CAAE need 31.62  $\mu\text{g/mL}$  and 100  $\mu\text{g/mL}$  respectively to achieve 50 % effective concentration ( $\text{EC}_{50}$ ). In SPF assay, CAAE and CAME of *C. alata* had the highest SPFs, i.e. 4.71 and 2.54, respectively at concentration 10  $\mu\text{g/mL}$ .

# CHAPTER 1

## INTRODUCTION

Long period of exposure to the sun rays may cause skin damages such as burning sensation, itching and darkened. Even though oxygen is an essential element for life, it can also be a reason for the destruction of tissue and impair its ability to function normally (Kehrer *et al.*, 1993). Scientifically, ultraviolet light will induce the formation of reactive oxygen species (ROS) and free radicals while oxygen is involved in the oxidation process to produce energy to fuel biological processes such as ATP production which occur in mitochondria. During this process, ROS are formed due to various exogenous and endogenous factors (Krisnaiah *et al.*, 2007). These ROS will react with membrane lipids and amino acids, causing the peroxidation of fatty acids and inflammation. Hence, it will accelerates the skin's intrinsic aging process and leads to photo aging, which is characterized by wrinkles, dyspigmentation, laxity, sallowness, and roughness. These ROS have deleterious effects as it can interacts with cellular components including DNA bases and forms damaged bases or strand breaks (Atoui *et al.*, 2005). As a result, it can lead to the development of diseases such as heart diseases, malaria, neurodegenerative diseases, AIDS, cancer and in the aging process (Sian, 2003).