UNIVERSITI TEKNOLOGI MARA

IN VITRO ANTIOXIDANT ACTIVITY OF ANTHOCYANIN FROM *ARECA CATECHU* EXTRACT

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ABSTRACT

Formation of reactive oxygen species in plants whether during stressful periods or in a normal cellular function such as in aerobic respiration, would cause damaging effect to the plants cells. Thus, antioxidants such as anthocyanin are crucial for the protection of these plants cells from the reactive oxygen species's effect. Most plants have anthocyanins, flavonoid compounds responsible for the coloration of their fruits and leaves. Anthocyanins from a variety of fruits and vegetables have been shown to possess potent antioxidant activity *in vitro* of scavenging free radicals. *Areca catechu* or betel palm is one of local plants abundantly found in Malaysia. This study is carried out to evaluate anthocyanin content in the extract of seeds and leaves of Areca catechu and to measure the total anthocyanin antioxidant activity. For evaluation of the concentration of anthocyanin, the absorbance of the extracts was taken at 527 nm. The calculation of anthocyanin content was then carried out using Beer's law, with an extinction coefficient of 33 000 (cyanidin-3glucoside). The two extracts are compared for their anthocyanin concentration and scavenging activity. The one with higher scavenging activity is the one higher with higher anthocyanin concentration. This shows that the antioxidant activity is due to the anthocyanin which was the major component in the extracts. The results obtained showed that there are higher antioxidants activity and lesser activity of DPPH free radical when the concentration of anthocyanin is increased *in vitro*. From this study, it has also been found that, the total anthocyanin content in the leaves extract was higher compared to the seeds extract.

Keywords: Reactive oxygen species; Anthocyanin; *Areca catechu*; Antioxidant activity

CHAPTER 1

INTRODUCTION

1.1 Background of study

The production of harmful by-products is an unavoidable consequence of aerobic respiration. These harmful by-products were formed when oxygen react with the electron transport components such as terminal oxidases and cytochrome *c* oxidase during normal cellular function such as aerobic respiration. Molecular oxygen, which normally has two unpaired electron in its outer orbital, looses an electron and thereby become unstable and reactive. The products of these sequential reduction of molecular oxygen which include superoxide (O_2^-), hydrogen peroxide (H_2O_2), hydroxyl (HO^-), peroxyl (ROO^-) and alkoxyl (RO^-) are termed reactive oxygen species (ROS) (Wojtaszek, 1997).

ROS is routinely generated at low levels in non-stressed plant cells in chloroplasts and mitochondria of plant cells especially during the oxidation process (Wojtaszek, 1997).The presence of even low concentrations of ROS can be deleterious to the function of DNA as they can cause mutations, inhibition of protein synthesis, alteration in enzyme activity and increase of membrane permeability.