UNIVERSITI TEKNOLOGI MARA

# 1. SCREENING FOR ANTIOXIDANT ACTIVITY OF LOCAL HERBS AND SAMPLE PREPARATION

# 2. TIME RESPONSE FOR DEVELOPMENT OF TOXICITY OF OXIDATIVE STRESS INDUCED BY XANTHINE AND XANTHINE OXIDASE

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## CONTENT

# ABSTRACT

Nineteen types Malaysian herbs were investigated for their antioxidant capacity by the radical scavenging assay measured by photochemiluminescence. The highest antioxidant capacity was found in *Eugenia Polyanthum* (daun salam), followed by *Diplazium Esculentum* (pucuk paku).

Oxygen free radicals (OFRs) generated during biological processes are reportedly involved in the pathogenesis of several disease states. Xanthine solution (0.025 mg/ml) was prepared in normal saline. A system for generation of OFRs in *vivo* that was commonly employed was obtained by injection of X (0.25 mg/kg) and XO (0.025 mg/ml) to mice via the tail veins. This study was conducted as a replacement for the initial study planned which was to look at the toxicity of *Diplazium Esculentum* extract. The objective of the present study was to determine the time response for development of oxidative stress (as evidenced by lipid peroxidation) and also to document effects of X+XO on several blood parameters. Mice were administered with X+XO (i.v) and sacrificed at 0, 1, 6 and 24 hours later. Another group of mice given only normal saline was also sacrificed at 0 hour to act as control for the group given X+XO and killed at 0 h. Results of the study showed that the development of lipid peroxidation by X+XO is dependent upon time. Lipid peroxidation in the lungs develops after 6h while that in the liver developed after 1h of X+XO administration but was resolved by 24h while lung lipid peroxidation continued to occur. Upon necropsy, mice given X+XO showed heamorrhage in the lungs although the weight of lung relative to the body weight was not changed. X+XO did not cause lipid peroxidation in the kidney or heart. When blood was analysed, X+XO was not found to change the liver maker enzyme indicating that the liver lipid peroxidation did not lead to leakage of glutamate oxalo-acetate transaminase (GOT) and glutamate pyruvate transaminase (GPT) into the blood. X+XO administration however, did cause some muscle damage initially and also some increase in protein catabolism as evidenced by an increase in Blood Urea Nitrogen (BUN). In summary, X+XO is an effective system and can be used to induce lipid peroxidation *in vivo*.

# CHAPTER 1

# INTRODUCTION

Traditional vegetables of the Malays in Malaysia (locally called 'ulam') comprise more than 120 species representing various families, from shrubs to large trees (Mansor, 1988 cited from Abas et al., 2006). The leaves, shoots or rhizomes of the vegetables are eaten fresh as salads or cooked (Norhanom, et al., 1999 cited from Abas et al., 2006). Besides the fruits and vegetables that are recommended for good health, the supplementation of the human diet with herbs, especially those that contain high amounts of compounds capable of deactivating free radicals (Madsen & Bertelsen, 1995; cited from Capecka et al., 2005), may have beneficial health effects (Lutomski, 2001 cited from Capecka et al., 2005). Chemical constituents with antioxidant activity are found in high concentrations in plants (Mazza & Oomach, 2000). They play a considerable role in the prevention of various degenerative diseases (Challa, Ahmad, & Mukhtar, 1997; cited from Capecka *et al.*, 2005).

A growing body of evidence indicates that secondary plant metabolites play critical roles in human health and may be nutritionally important. (Hertog et al., 1993 cited from Asami et al, 2003). Of special interest are the plant-based phenolic metabolites which possessed antioxidant activities and a wide range of pharmacologic properties including anticancer, antioxidant, and platelet aggregation inhibition activity (Rice-Evan, 1995).

The benefits resulting from the use of natural products rich in bioactive substances has promoted the growing interest of the pharmaceutical, food and cosmetic industries as well as of individual consumers in herbal produce ( Capecka *et al.*, 2005).