UNIVERSITI TEKNOLOGI MARA

INVESTIGATING THE EFFECTS OF *Pandanus amaryllifolius* LEAF EXTRACT IN RATS WITH FRUCTOSE-INDUCED METABOLIC SYNDROME

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MSc

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Natural plant-derived medicine may prevent obesity, hypertension, insulin resistance, hyperglycaemia and dyslipidaemia; together these conditions are known as metabolic syndrome (MS), the worldwide health problems on the rise. The excessive intake of refined carbohydrate, specifically fructose in daily consumption is causing MS prevalence to increase in Malaysia. In this study, the ability of *Pandanus amaryllifolius* (PA) leaf water extract to reverse MS features in fructose-induced rat model is being investigated. Thirty healthy adult male Wistar rats weighing between 150 to 180g were randomly divided into three groups which included Control (C; n=6), PA leaf water extract (PAE; n=6) and Metabolic Syndrome (MetS; n=18). Food and fluid were given *ad libitum* for eight weeks. These three groups differed in fluid intake whereby the rats in group C received tap water, PAE group received 10% PA leaf water extract and MetS group received 20% fructose drinking water (FDW). After eight weeks, the MetS group were further subdivided into three subgroups namely MetS1 (n=6), MetS2 (n=6) and MetS3 (n=6). MetS1 subgroup was sacrificed as the control for MS. MetS2 and MetS3 subgroups were treated with tap water and 10% of PA leaf water extract respectively for another eight weeks. The parameters for physiological and metabolic changes such as dietary intake (food intake, fluid intake and total calorie intake), obesity [percentage of total body weight gain, body mass index (BMI) and abdominal circumference (AC)], hypertension (systolic and diastolic blood pressure), hyperglycaemia (fasting plasma glucose), dyslipidaemia [triglyceride (TG), total cholesterol (TC), high density lipoprotein (HDL) and low density lipoprotein (LDL)], adipose tissue (total weight of adipose tissue and number, perimeter, diameter and area of adipocytes) and inflammatory biomarkers (NFκβ p65, TNFα, leptin and adiponectin) were measured. The intake of 20% FDW induced full blown MS symptoms, including obesity, hypertension, dyslipidaemia and hyperglycaemia in male Wistar rats. Subsequently, treatment with PA leaf water extract improved obesity parameters including BMI, abdominal adipose tissue deposition and adipocyte size, fasting plasma glucose, TG and HDL levels with neutral effects of inflammatory biomarkers. In conclusions, administration of PA in MS rat model helps to attenuate most of the MS features as well as improves obesity. Therefore, PA can be suggested as a useful dietary supplement to improve MS features induces by fructose.

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"Allah will bring about, after hardship, ease" – (65:7)

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