

UNIVERSITI TEKNOLOGI MARA

**IN VITRO ANTIDIABETIC EFFECT OF
STIGMASTEROL AND CHLOROGENIC ACID**

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ABSTRACT

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder characterized by hyperglycaemia associated with disturbance in metabolism of carbohydrates, proteins and fats due to insulin insensitivity or inadequate insulin production from pancreas. Inhibition of carbohydrate hydrolyzing enzymes such as α -amylase and α -glucosidase can be the key for delaying the process of breaking down the carbohydrate, reduce post-prandial blood glucose absorption and reduce elevation of blood glucose level. Phytochemicals such as stigmasterol and chlorogenic acid are among the many that are obtained from plants, which may have antidiabetic property. This study was aimed to determine the inhibitory effect of stigmasterol and chlorogenic acid against α -amylase and α -glucosidase activity. Metformin was used as standard drug reference to replace acarbose. Stigmasterol has the strongest inhibitory effect against α -amylase with IC_{50} value of 3.50 ± 2.39 μ g/ml and chlorogenic acid was the most potent in inhibiting α -glucosidase with IC_{50} value of 36.67 ± 14.43 μ g/ml. However, Stigmasterol and chlorogenic acid have strong inhibitory effect against α -amylase and α -glucosidase activity more than metformin ($IC_{50}=326.67 \pm 64.29$ μ g/ml and $IC_{50}=406.67 \pm 5.78$ μ g/ml, respectively). In conclusion, this study suggest stigmasterol and chlorogenic acid can function as organic α -amylase and α -glucosidase inhibitors and have the possibility to effectively suppress postprandial hyperglycemia in patients with T2DM. However, potential indication of these two compounds need to be confirmed by conducting in vivo antidiabetic animal models and later on clinical trials for their effective utilization as therapeutic agents.

CHAPTER 1: INTRODUCTIONS

1.1 INTRODUCTIONS

Diabetes mellitus (DM) is one of the most common non-communicable disease in the world (Shaw, Sicree, & Zimmet, 2010). According to the National Health and Morbidity Survey (2011) conducted Ministry of Health Malaysia, the prevalence of diabetes in Malaysia had increased of 15%, from 15.2% (2011) to 17.5% (2015) in relativity, as compared to the relative increase of 31.0% between 2006 which the prevalence was 11.6% in 2011. From the statistic, this increase was mostly contributed by the increased proportion of undiagnosed diabetes, which is similar in 2011. Relatively, nowadays data indicates that “undiagnosed diabetes remains at 9.2%. The prevalence of type 2 diabetes mellitus among Malaysian adults ≥ 30 years old increased from 15.2% in 2009 (NHMS III, 2006) to 20.8% in 2011 (NHMS IV, 2013). This increase is caused by population growth, aging, urbanization, and increase prevalence of obesity and physical inactivity (Wild et al., 2004). This multifactorial endocrine disorder is characterised by chronic elevation in plasma glucose level associated with disturbance in carbohydrate, protein and fat metabolism due to defects in hormone insulin synthesis and/or insulin action. It is a progressive metabolic disorder of glucose metabolism when it leaves untreated can lead to several complication including macrovascular and microvascular changes (Mitra, Dewanjee, & Dey, 2012).