

***In-vitro* and *in-vivo* hypoglycemic effect of water extract of *Averrhoa carambola* L. (Star fruit)**

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Over the past decades there has been a dramatic increase in the prevalence of diabetes and obesity. Hyperglycemia is one of the main factor that affect these health disorders. Recently, literature has emerged indicating star fruit as a tool for managing hyperglycemia. However, its effects on inhibiting carbohydrate digestion have not been properly investigated. The purpose of this research was to investigate the inhibitory effect of water extract (WE) of *A.carambola* on pancreatic alpha amylase activity *in vitro* and hypoglycemic effect of WE *in vivo*.

Fruit juice of *A.carambola* was lyophilized to obtain the WE and it was tested for *in-vitro* α -amylase inhibition using the chromogenic DNSA (3, 5-dinitrosalicylic acid) method, *in-vitro* DPPH free radical scavenging activity and hypoglycemic effect in normoglycemic, male Sprague Dawley rats. In the *in-vivo* long term rodent study, treatment group was orally fed with WE (128 mg/ kg b.w) and the control group was given distilled water. The blood samples were collected from the rats on 0th, 4th and 8th week and analyzed for fasting glucose levels. In addition, preliminary qualitative phytochemical analysis was performed on WE.

The yield of WE was 4.00%. *A.carambola* WE (20.3%) showed moderate *in-vitro* inhibitory effects on α -amylase compared to acarbose (86.7%). Whereas the IC₅₀ values of WE was 2.204 ± 0.028 mg/mL. WE exhibited strong DPPH radical scavenging activity with EC₅₀ value of 244.2 ± 2.43 μ g/mL. Moreover, *in vivo* study showed that 128 mg/ kg dose of WE reduced fasting blood glucose level in treated rats (105.5 mg/dL) compared to control group (126.97 mg/dL) during 8 weeks of the study. Furthermore, presence of alkaloids, flavonoids, phenols and tannins, diterpenes, terpenoids, fats and oils were identified in the extract.

Our *in vitro* study demonstrated an appreciable α -amylase inhibition, hence this may possibly be one of the mechanisms for the hypoglycemic effect exhibited by WE of *A.carambola* in this study. Therefore, these results indicate that water extract of *A.carambola* may be useful in controlling blood glucose level. These findings suggest that the WE of star fruit may be a potential candidate for the search of phytochemicals as potent oral hypoglycemic agents.

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