

Biochemical Characterization and Effects of Selected Plant Extracts on Pancreatic Cells

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The phytochemical analysis of the plants dill *Anethum graveolens*, betel (*Piper betel*), coriander (*Coriandrum sativum*), cinnamon (*Cinnamomum zeylanicum*), wheat grass *Triticum aestivum* and jackfruit (*Artocarpus heterophyllus*) leaves was carried out to evaluate the antioxidant potential. Alcoholic extracts of the leaves were subjected to *in vitro* antioxidant activity screening models such as inhibition of lipid peroxidation, nitric oxide and superoxide radical scavenging activity, reduction of ferric ions, metal ion chelating activity, as well as hydrogen peroxide and hydroxyl radical scavenging activity. Ascorbic acid was used as the standard for superoxide anion radical scavenging, reduction of ferric ions and hydrogen peroxide scavenging activities. Ethylenediaminetetraacetic acid (EDTA) was used as the standard for metal ion chelating activity. Butylated hydroxytoluene (BHT) was used as the standard for anti-lipid peroxidation activity and gallic acid was used as the standard for nitric oxide scavenging activity. In all the models studied, the extracts showed potent antioxidant activity, thereby indicating their potential to treat or prevent certain medical conditions.

The comparative effects of the antibacterial properties of lectins isolated from the seeds of *A. heterophyllus* (jackfruit), *Canavalia ensiformis* (jack bean), *Lens culinaris* (lentil) and *Pisum sativum* (pea) were tested against the bacteria *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* and *Pseudomonas aeruginosa*. The results showed that the jackfruit lectin had potent anti-bacterial activity against *S. aureus*, *B. subtilis*, *E. coli* and *P. aeruginosa*. Pea and jack bean lectins were found to be effective bacteriostatic agents. Lentil lectin showed the lowest antibacterial activity.

The evaluation of the inhibitory activities of methanolic extracts of breadfruit (*Artocarpus altilis*), *C. zeylanicum*, *P. betel* and *A. heterophyllus* on wheat α -amylase and baker's yeast α -glucosidase was carried out at varying concentrations. α -Amylase and α -glucosidase inhibitors are used to achieve greater control over hyperglycemia in type 2 diabetes. The present study was undertaken to screen α -amylase and α -glucosidase inhibitors from natural sources like plants in order to minimize the toxicity and side effects of the inhibitors currently used to control hyperglycemia. The extracts also showed a considerable inhibition of haemoglobin glycosylation compared with standard gallic acid. The results of the work indicate that the selected plants possessed considerable *in vitro* anti-diabetic activity with *A. heterophyllus* showing the maximum increase in 10 mM glucose concentration (78.42% at 2000 μ g/mL). The results indicate good potential of these extracts to manage hyperglycemia.

The inhibitory activity of methanolic extracts of *A. heterophyllus*, *A. altilis*, *P. betel* and *C. zeylanicum* on potato (*Solanum tuberosum*) tyrosinase was carried out at varying concentrations. Tyrosinase or phenol oxidase is a copper-containing mono-oxygenase which acts as the principal enzyme for the synthesis of melanin in melanocytes. Melanin overproduction results in undesirable hyper-pigmentation of the skin. The present study was undertaken to screen novel tyrosinase inhibitors from natural sources like plants which would help minimize the toxicity and side effects of the drugs currently used to treat skin disorders. The results showed that the methanolic extracts of *P. betel* showed the maximum anti-tyrosinase activity followed by *C. zeylanicum* and *A. altilis*, whereas *A. heterophyllus* extract exhibited poor anti-tyrosinase activity.