ELEMENTAL ANALYSIS AND HYPOGLYCAEMIC EFFECT STUDIES ON SOME MYANMAR INDIGENOUS MEDICINAL PLANTS USED IN THE TREATMENT OF DIABETES MELLITUS

Ph.D. DISSERTATION

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ABSTRACT

Elemental Analysis on some Myanmar Indigenous medicinal plants used in the treatment of Diabetes Mellitus was conducted by Gamma Spectrometer, EDXRF, AAS and Flame Photometry. The samples studied were, Tha-gya-ma-gaik (*Orthosiphon aritatus*), Kyet-hin-gha-thee (*Momordica charantia*), Sin-don-ma-nwe (*Tinospspora cordifolia*), Set-ka-don (*Trewia nudiflora*), Thin-baw-ma-hnyo (*Catharanthus roseus*), Say-ta-pin-sin-ta-zee, Nay-kyar-ca-lay(*Wedelia calendulaceae*),Pe-nan-thar (*Trigonella foenum-graecum*), Se-ga-gyi (*Andrographis peniculata*), Kyet-thun-ni (*Allium cepa*) Tha-bye-chin (*Eugenia operculata*), Sar-ca-lay-myet-seed (*Cardiospermum halicocabum*), Ma-ha-go-ni (*Swietenia mahagoni*) and Nan-thar-ni (*Pterocarpus santalinus*).

The results indicated that all samples contain K, Ca and Mg as major elements Na, Cl, Cd and Fe as minor elements and Al, Si, P, S, Sc, Ti, Mn, Ni, Cu, Zn, As, Br, Rb, Sr, Y, Zr and Pb as trace elements. Tha-gya-ma-gaik (*Orthosiphon aritatus Bl.*) and Set-ka-don(*Trewia nudiflora Linn.*) were selected for the study on their Hypoglycaemic Effect. In this study, the ashed form of Tha-gya-ma-gaik and Set-ka-don medicinal plants were studied for the first time to in vivo antihyperglycaemic test with wistar strain rat model. Study on Phamacological activities, Set-ka-don (*Trewia nudiflora Linn.*) medicinal plant is also the first report of the finding of the hypoglycaemic activity on adrenaline-induced hyperglycaemia animal model using rats. Oral administration of water extract, ethanol extract of Tha-gya-ma-gaik (leaves) and water extract and fresh juice of Set-ka-don (leaves) were studied with adrenaline-induced diabetic rats. The results indicated a significant effect of hypoglycaemic activities on the wistar strain rat model. From the results, Set-ka-don ashed sample was found to exhibit the best result for hypoglycaemic effect.

By EDXRF analysis method, Set-ka-don-ash sample contains K (2.423%), Ca(5.020%), Mg (0.742%) as major elements and P(0.262%), Zn (0.008%), Fe(0.232%), Sr(0.046%), Rb(0.006%) and Zr(0.002%) as minor and trace elements. Similarly, by EDXRF assay method, Tha-gya-ma-gaik ash sample contain K(4.6912%), Ca(3.046%) and Mg(1.151%) as major elements, P(0.711%), Cl(1.444%), as minor elements and S(0.159%), Cu(0.007%), Zn(0.017%), Fe(0.064%), Sr(0.021%), Rb(0.012%) and Zr(0.001%) as trace elements. However, by utilizing adrenaline-induced diabetic rats, hyperglycaemic inhibition of ash and water extract of both plant materials were compared. The percent hyperglycaemic inhibition of Set-ka-don ash (33.24%) is compared to Tha-gya-ma-gaik ash (29.96%), and percent hyperglycaemic inhibition of water extract of Set-ka-don (32.38%), is compared to water extract of Tha-gya-ma-gaik (29.66%). Phytochemical Examinations were carried out on water extracts of (Set-ka-don and Tha-gya-ma-gaik) two medicinal plants. Set-ka-don showed the presence of Alkaloids, Flavonoids, Glycosides, Phenolic groups, Saponins, Steroids and Tannins, whereas, Tha-gya-ma-gaik showed Alkaloids, Flavonoids, Glycosides, Phenolic groups and Tannins. Evaluation of acute toxicity were carried out on ashed samples of Set-ka-don (leaves) and Tha-gya-ma-gaik (leaves). It was observed that both ashed samples were not toxic at the dose level of 2 g/kg orally. All these observations indicate that due to the presence of active principles such as Alkaloids, Flavonoids in Set-ka-don and due to the concentration of major elements such as K, Mg, Ca and minor elements such as P, Zn, Fe, Sr, Rb and trace element Zr, all joint action by organic and inorganic constituent of Set-ka-don have caused hyperglycaemic effect on diabetic patients. Thus, the present work revealed that the use of Set-ka-don in Traditional Medicinal Formulation for the Treatment of diabetes mellitus has been justified.

Finally, the Findings, Limitations and Suggestions concerning this work are presented in this thesis.