In vitro investigation of antidiabetic properties of *Nauclea orientalis* and *Gmelina arborea* plants

D.N.M. Weerasooriya[1], G.R.N. Rathnayake[2], C.P. Udawatte[1], L.C.P.T. Liyanaarachchie[3,*] and L. Jayasinghe[2].

[1]Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka.
[2]National Institute of Fundamental Studies, Kandy.
[3]Faculty of Allied Health Sciences, University of Peradeniya.
**ulbj2003@yahoo.com*

Diabetes mellitus exerts a threat to global health and economy with annual increase in the number of affected subjects. Natural remedies are gaining popularity due to the adverse effects of currently used antidiabetic medicines. This study was conducted to evaluate antidiabetic properties of stem barks of *Nauclea orientalis* and *Gmelina arborea* plants *in vitro*. Hexane, ethyl acetate and methanol extracts of plant materials were prepared employing sequential extraction by ultra-sonication. Extracts were subjected to α-amylase and α-glucosidase enzyme inhibitory assays and cytotoxicity evaluation by brine shrimp lethality assay. Qualitative phytochemical screening was conducted to identify the chemical classes in each plant. Ethyl acetate extracts of both plants were fractionated and antidiabetic properties of selected fractions were evaluated. Methanol extract of *G. arborea* showed high inhibition of α-amylase enzyme and α-glucosidase enzyme with IC_{50} 131.7 ± 14.2 µg/ml and 36.7 ± 6.9 µg/ml, respectively. Acarbose was used as the positive control for both α-amylase enzyme inhibitory assay (IC_{50} 6.4 ± 0.2 µg/ml) and α-glucosidase enzyme inhibitory assay (IC_{50} 41.3 ± 1.3 µg/ml). Third fraction obtained from the silica gel column chromatography of ethyl acetate extract of *N. orientalis* showed the highest inhibition for α-amylase with IC_{50} 38.2 ± 6.1 µg/ml. Second fraction obtained from the silica gel column chromatography of ethyl acetate extract of *G. arborea* showed higher inhibition than the positive control for α-glucosidase with IC_{50} 7.8 ± 1.6 µg/ml. According to phytochemical analysis, both *N. orientalis* and *G. arborea* stem barks contain alkaloids, steroids, terpenoid, tannins, and cardiac glycosides. In addition, extracts of stem bark of *N. orientalis* contained saponins. None of the *N. orientalis* or *G. arborea* extracts showed cytotoxicity in the brine shrimp lethality assay. In conclusion, stem bark extracts of *N. orientalis* and *G. arborea* plants exhibit antidiabetic properties by inhibition of α-amylase and α-glucosidase enzymes. Therefore, these two plants are potential sources for new antidiabetic drugs.

Keywords: *antidiabetic; Gmelina arborea; herbal medicine; Nauclea orientalis*