SUMMARY

Insect antifeedant, growth regulatory and insecticidal activities of neem callus and plant material have been investigated by establishing assays which can be used routinely in future screening work.

Methodologies were established for assaying active metabolites in neem using antifeedancy and insect growth regulation and high performance liquid chromatography (HPLC). Standard dose response curves were built up for pure azadirachtin using *Schistocerca gregaria* for antifeedancy and *Oncopeltus fasciatus* for insect growth regulation. A calibration curve with good linearity was produced for HPLC determination of azadirachtin.

The effect of different storage conditions on the antifeedancy of freeze dried neem callus against *S. gregaria* was studied. There was an indication of the loss of antifeedancy of callus stored at room temperature. A loss of activity was not seen at 4 °C and -20 °C.

Dose response curves built up for antifeedancy of two cell lines of neem callus from different geographical origins. i.e. Niger [Niger5A (S21)] and Ghana [Gh5 (S6)] revealed very similar ED_{50} values. Nine neem cell lines of different geographical origin were also screened for antifeedancy using *S. gregaria*. There was a range of antifeedancies in the cell lines with the Sri Lankan line SL-KW2 (S10) having the highest antifeedancy of 98.06% at 5 mg callus dry weight/ml. Antifeedancy of cell lines was not related to the geographical origin of the neem trees. Insect growth regulatory effects of ethanolic extracts of neem callus from Ghana was demonstrated. At 4.29 mg callus dry weight/insect 86.67% IGR effect was achieved.

Active metabolites were extracted using four solvents (i.e. petroleum ether, acetone, methanol and water) with different polarities from leaves of a laboratory grown neem tree of Sri Lankan origin. Antifeedancy assays with *S. gregaria* showed three of the solvent extractions to be active. The acetone extract showed insect growth regulatory effects on *Oncopeltus fasciatus*. HPLC indicated the presence of azadirachtin in the acetone extract of leaves.