CHEMISTRY AND BIOACTIVITY OF THE FRUITS OF *ARTOCARPUS ALTILIS* AND *FLACOURTIA INDICA*

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This study consists of two parts. Part I describes the chemistry and bioactivity of the fruits of *Artocarpus altilis* (Par.) Fosb. and Part II describes the chemistry and bioactivity of the fruits of *Flacourtia indica* (Burm. F.).

Part I

Arttocarpus altilis (sinhala: rata-del) is a moderate size tree and widely cultivated in tropics. It is commonly found in home gardens and economically important as a staple crop. The fruits of *A. altilis* are known as breadfruit and it is cooked as a starchy staple.

The dried powdered whole fruits of *A. altilis* were defatted with *n*-hexane and extracted with ethyl acetate and methanol at room temperature. Preliminary investigations indicated the presence of antifungal compounds in both extracts on TLC bio-autography method against *Cladosporium cladosporioides*. Chromatographic separation of the ethyl acetate and methanol extracts afforded twelve compounds and identified as (*E*)-2,4,3'5'-tetrahydroxystilbene (**60**), (*E*)-4-(3-methyl-*E*-but-1-enyl)-3,5,2',4'-tetrahydroxystilbene (**81**), (*E*)-4-isopentenyl-3,5,2',4'-tetrahydroxystilbene (**10**), 2-(3,5-dihydroxyphenyl)-benzofuran-6-ol (**82**), 2-(2,4-dihydroxyphenyl)-5,7-tetrahydroxychroman-4-one (**5**), 5,7,2',4'-tetrahydroxyflavone (**83**), 6-(3-methyl-*E*-but-1-enyl)5,7,2',4'-tetrahydroxy flavone (**7**), 6-isopentenyl-5,7,2',4'-tetrahydroxyflavone (**84**), cycloartenyl acetate (**73**), 3β-acetoxyolean-12-en-11-one (**85**), β-sitosterol (**80**), 3-*O*-β-D-glucopyranosylsitosterol (**86**) by the detailed analysis of NMR and mass spectral data. Antifungal activities of

compounds **5**, **7**, **10**, **81**, **82** and **84** were tested against seven plant pathogens (*Alternaria* sp., *Aspergillus* sp., *Colletotrichum* sp., *Cladosporium cladosporioides*, *Fusarium* sp., *Geotrichum* sp. and *Rhizctonia* sp) using disc diffusion method and TLC bio-autography method for *C. cladosporioides*. Only compounds **7**, **10**, **81**, and **82** showed an antifungal activity. Compound **10**, **81** and **82** were active against all the fungi and among them **82** showed the highest activity on all the fungi. Compound **7** did not show any activity against *Aspergillus* sp., *Colletotrichum* sp. and *Geotrichum* sp. under the tested concentrations.

Qualitative and quantitative analysis of the antioxidant activity of these isolates were carried out using DPPH (2,2'-diphenyl-1-picrylhydrazyl) radical scavenging assay. 2-(3,5-dihydroxyphenyl)-benzofuran-6-ol (**82**) showed the highest antioxidant activity having a IC_{50} value 2 ppm in comparison with ascorbic acid (3.4 ppm) and butylated hydroxy anisole (3.0 ppm).

Cytotoxicity of these isolates were carried out using brine shrimp (*Artemia salina*) micro-well cytotoxic assy. Compound **82** showed a highest cytotoxic activity having a LC_{50} of 20 ppm.

Lettuce seed (*Lactuca sativa*) germination assay was carried out to study the phytotoxic activity. Only compounds **10** and **82** showed a phytotoxic activity. Compound **82** completely inhibited the germination of the seeds at 1000 ppm level while the shoot growth was completely inhibited at 250 ppm.

Part II

Flacourtia indica (sinhala: uguressa) is a tree of moderate size and widely cultivated in tropics and subtropics. In Sri Lanka it is cultivated in mid and low country for its edible fruit as well as an ornamental plant.

The red coloured juice of the fruits of *F. indica* was filtered through a Büchner funnel. The *n*-BuOH extract of the fruit juice was chromatographed over columns of silica gel, RP-18 silicagel, sephadex LH-20 and PTLC. The final purification using reverse phase HPLC furnished four compounds including a new natural product, 4-oxo-2-cyclo pentenylmethyl 6-*O*-(*E*)-*p*-coumaroyl-β-D-glucopyranoside (**48**) named flacourside, together with three known compounds, methyl 6-*O*-(*E*)-*p*-coumaroylglucopyranoside (**52**), α and β anomers of 6-*O*-(*E*)-*p*-coumaroylglucopyranose (**53**/ **54**).

Qualitative and quantitative analysis of the antioxidant activity of **48**, **52**, **53** and **54** were carried using DPPH radical scavenging assay. None of them showed a significant activity.