Monacrosporium ambrosium: A good source of antifungal naphthoquinones

C. Kehelpannala[1], D. Dissanayake[1], D. Kanatiwela[1], N.S. Kumar[1,*], L. Jayasinghe[1,*], H. Araya[2], and Y. Fujimoto[1,2]

[1]National Institute of Fundamental Studies, Kandy, Sri Lanka.
[2]School of Agriculture, Meiji University, Kawasaki 214-8571, Japan.
**nskumar3@gmail.com*

Monacrosporium ambrosium (syn. *Fusarium ambrosium*, *Fusarium oligoseptatum*) is found in symbiotic association with the tea shot-hole borer (TSHB) *Euwallacea fornicatus* (Eichhoff) of tea (*Camellia sinensis*). Liquid cultures of *M. ambrosium* have been found to produce naphthoquinones under laboratory conditions. *In vitro* studies have shown that the ethyl acetate (EtOAc) extract of liquid cultures of *M. ambrosium* containing naphthoquinones inhibits the growth of two endophytic fungi *Pestalotiopsis camelliae* and *Phoma multirostrata* isolated from tea stems. Naphthoquinones, intensely coloured compounds comprising of a naphthalene skeleton, possess a broad range of bioactivities including antimalarial, antifungal, antibacterial, antiviral, antitumor, antileishmanicidal, molluscicidal, insecticidal and anticancer properties. Their biological activity arises from the ability to bind to nucleophilic molecules and act as oxidizing agents. Biological activity of naphthoquinones is exploited by scientists to produce novel drugs and bioactive compounds which can be used in agriculture, medicine and industries. We now report the antifungal activity of twelve naphthoquinones isolated from the EtOAc extract of liquid cultures of *M. ambrosium* against the common plant pathogen *Cladosporium cladosporioides* by TLC bioautography. *M. ambrosium* was isolated from the TSHB and cultured in potato dextrose broth. The broth was extracted into EtOAc and subjected to chromatographic separation to furnish twelve naphthoquinones. Of the twelve compounds eight compounds showed antifungal activity against *C. cladosporioides* at a concentration of 64 µg/spot while all compounds showed activity at 128 µg/spot on TLC bioautography. The antifungal nature of the naphthoquinones produced by *M. ambrosium* indicates its ability to prevent/inhibit the growth of the common plant pathogen *C. cladosporioides* under laboratory conditions.

Keywords: *antifungal activity, Monacrosporium ambrosium, naphthoquinones*