

### Possible bio-fungicide to control Anthracnose caused by *Colletotrichum gloeosporioides*

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Since early 1990's pathogen, *Colletotrichum gloeosporioides* has been considered as a major causative agent of the disease, anthracnose which takes heavy toll of annual production in many agricultural countries. Currently, management of disease by heavy usage of fungicides has create many undesirable problems such as development of fungicide resistance, food poisoning, residue contamination in market product, environmental pollution and escalating cost in crop production. Therefore less expensive, environmentally friendly bio-fungicide could serve as a good alternative to synthetic fungicides.

With this objective tuber extracts of 4 medicinal plants were screened for their fungicidal activity against *Colletotrichum gloeosporioides* by poison food technique. Except *Costus speciosus* (Thebu) other three extracts *Acorus calamus* (Wada kaha) ; *Zingiber zerumbet* (Wal inguru) *Curcuma zedoaria* (Haran kaha)

have demonstrated remarkable fungicidal activity against the tested fungus. Fungicidal activity of three tuber extracts were in following order *Acorus calamus* > *Zingiber zerumbet*, > *Curcuma zedoaria*. Minimum Inhibitory Concentration (MIC) and Minimum Lethal Concentration (MLC) data of the tuber extracts. were also determined. They are as follows. MIC values of *Acorus calamus*; *Zingiber zerumbet* and *Curcuma zedoaria* ((g/ml) were 2.2, 2.6, and 3.4 respectively. MLC values were -2.4, 2.8 and 3.6 respectively. These result suggest that tubers of *Acorus calamus* ; *Zingiber zerumbet* and *Curcuma zedoaria* can be used as possible bio-fungicide to control anthracnose caused by *Colletotrichum gloeosporioides*.

**Key words**; , *Colletotrichum gloeosporioides*, anthracnose, Fungicidal activity, *Acorus calamus* ; *Zingiber zerumbet*. *Curcuma zedoaria*

### Antimicrobial activities of endolichenic fungi isolated from *Usnea* sp. at Hakgala montane forest

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Endolichenic fungi live asymptotically within the lichen thallus, much the same way as endophytic fungi live within healthy plant tissues. Although the significance of the endolichenic fungi within the lichens still remains unknown, some studies have reported the production of bioactive compounds by these fungi. Therefore, the present study was conducted to evaluate the bioactivity of selected endolichenic fungal extracts against selected bacteria and fungi.

Six endolichenic fungi, *Chrysosporium* sp.1, *Chrysosporium* sp.2, *Curvularia* sp., *Fusarium* sp., and two sterile fungal species isolated from the lichen *Usnea* sp. at Hakgala montane forest were evaluated for their *in vitro* antimicrobial activities. Ethyl acetate extracts of endolichenic fungi grown in potato dextrose broth (PDB) and potato dextrose agar (PDA) medium were tested against two Gram positive bacteria; *Staphylococcus aureus* and *Bacillus subtilis* for antibacterial activity and against two fungi; *Colletotrichum musae* and *Aspergillus flavus* for antifungal activity using well diffusion method. All the fungal extracts were screened for their *in vitro* antimicrobial activity at a dose of 500 µg. Fungal extracts which showed bioactivities were further tested against bacteria and fungi at different concentrations of the extract to determine the minimum inhibitory concentration (MIC) and minimum lethal concentration

(MLC). Chloramphenicol and captan were used as positive controls in antibacterial and antifungal assays respectively. DMSO was used as the negative control and to dissolve fungal extracts. Extracts of *Curvularia* sp. and *Chrysosporium* sp.1 showed inhibitory activity against pathogenic bacterium *Staphylococcus aureus* with MIC values of 400 µg and 200µg respectively. Also, *Curvularia* sp. and *Chrysosporium* sp.1 showed inhibitory activity against toxigenic bacterium *Bacillus subtilis* with MIC values of 300 µg and 200 µg respectively. Minimum inhibitory concentrations of Chloramphenicol antibiotic against *Staphylococcus aureus* and *Bacillus subtilis* were 100 µg and 75 µg respectively. According to the results obtained for the minimum inhibitory and minimum lethal concentration values, *Chrysosporium* sp.1 extract appeared to contain more inhibitory substances than that of *Curvularia* sp., against the growth of *B. subtilis* and *S. aureus*. Compared to the results obtained for chloramphenicol, *Chrysosporium* sp. 1 showed moderate bioactivity and *Curvularia* sp. showed slight lower bioactivity against the two bacteria.

Extracts of *Chrysosporium* sp.1, *Curvularia* sp. and sterile sp.2 showed strong antifungal activity against the pathogen *Colletotrichum musae*. Only the extract of *Curvularia* sp. showed weak antifungal activity against aflatoxigenic fungus, *Aspergillus flavus*. Minimum