Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Screening extracts of bacterial endophytes isolated from *Allophylus abyssinicus* (Hochst. Radlk.) for control of bean anthracnose

Hellen Kariuki[1], Isabel Wagara[2], Josphat Matasyoh[3]

[1] *The Center for International Forestry Res. and World Agroforestry (CIFOR-ICRAF), Trees Theme, Kenya*
[2] *Egerton University, Biological Sciences, Kenya*
[3] *Egerton University, Dept. of Chemistry, Kenya*

Abstract

Common beans are among the major crops cultivated and consumed in large quantities worldwide due to their high protein and fiber contents. However, it is prone to fungal attacks majorly by *Colletotrichum lindemuthianum* causing anthracnose, leading to 90–100 % yield losses. This study investigated the bioactivity of secondary metabolites of bacterial endophytes isolated from *Allophylus abyssinicus* against *C. lindemuthianum in vitro*. The endophytes were isolated from sterilized leaves, bark and roots of *A. abyssinicus* and cultured on nutrient agar. A total of 15 bacterial endophytes were isolated and one of the most active bacterial endophytes was identified. Most of the bacterial endophytes were active against *C. lindemuthianum* with the highest inhibition being 72.5 % Lysinibacillus fusiformis, in the dual culture assay. *Lysinibacillus fusiformis* was fermented in nutrient broth and extracted using ethyl acetate and hexane to yield hexane and ethyl acetate extracts. Disc diffusion method was used to determine the antimicrobial activities (bioassay) of the extracts against *C. lindemuthianum*. The crude ethyl acetate extract from the *Lysinibacillus fusiformis* (100 mg ml^{-1}) had the highest inhibition 32.7±6.5 mm against the pathogen compared to hexane extract with an average inhibition of 22.3±5.7 mm. Minimum inhibitory concentration (MIC) was determined for all the active extracts against *C. lindemuthianum* and ethyl acetate extracts of *Lysinibacillus fusiformis* had the lowest MIC of 0.078 mg ml^{-1}. Various chemical constituents were detected in *A. abyssinicus* bacterial endophytes extracts including saponins, flavonoids, alkaloids and coumarins. These results show that bacterial endophytes isolated from *A. abyssinicus* are a source of compounds that can be used in the control of *C. lindemuthianum* affecting common bean in Kenya.

Keywords: Allophylus abyssinicus, Antifungal activity, bacterial endophytes, Colletotrichum lindemuthianum, secondary metabolites

Contact Address: Hellen Kariuki, The Center for International Forestry Res. and World Agroforestry (CIFOR-ICRAF), Trees Theme, 529-20107 njoro nakuru kenya, Nairobi, Kenya, e-mail: hgathiru2@gmail.com