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Efficacy of *Bacillus subtilis* and *Trichoderma asperellum* Against Damping Off in Ethiopian Kale and African Nightshade

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Abstract

Damping off is a disease of economic importance in vegetable seedling causing losses of up to 100 % in Ethiopian kale and African nightshade. In Kenya this disease is mainly controlled through prophylactic application of synthetic chemical fungicide. Greenhouse studies were carried out to determine the efficacy of two biological control agents, *Bacillus subtilis* BS-01 and *Trichoderma asperellum* T-900 against damping off disease. Sterilised coco peat was inoculated with the *Pythium aphanidermatum* one week before sowing. Seeds coated with the biological control agent at concentration of 10^7 were sown in the *Pythium* spp inoculated media in trays. *B. subtilis*, *T. asperellum* and a combination of the two biological control agents reduced incidence of pre-emergence damping off by at least 30.8 %, 43.9 % and 34.3 % respectively compared to control which had an incidence of up to 60.6 % in African nightshade. The biological control agents similarly resulted to a drop incidence of pre-emergence damping off in Ethiopian kale to a range of 25.2%-31 %. The post-emergence damping off incidence also declined in *B. subtilis* and *T. asperellum* and combination treatments to 24.3 % - 27.1 % in contrast to high incidence in the control of up to 63.8 % for the two vegetables. Single biological control agent treatments were not significantly different from the combination treatment but these treatments were significantly different from control. Therefore utilisation of *Bacillus subtilis* and *Trichoderma asperellum* singly and in combination can provide potential to management strategy for both pre-emergence and post-emergence damping off disease caused by *Pythium aphanidermatum* in Ethiopian mustard and African nightshade.

Keywords: African indigenous vegetables, biological control agents, *Pythium aphanidermatum*