Use of *Trichoderma* in Controlling Black Rot Disease and Increasing the Shelf Life of Carrots (*Daucus carota* L.)

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Carrot (*Daucus carota* L.) is one of the most widely grown and eaten vegetable but it is more vulnerable to many postharvest diseases such as black rot, which is caused by the fungus *Alternaria radicina*. Since there are many disadvantages of using fungicides,it is important to find an effective biocontrol method to control *A. radicina*. In the present study, the use of fungus *Trichoderma asperellum* in controlling A. *radicina* was investigated. Pure cultures of *A. radicina* which were isolated from infected carrot taproots were tested against *T. asperellum* using the dual culture technique. As the control A. *radicina* pure culture was used without *T. asperellum*. The *A. radicina* radial growth reduction percentage was found to be 58.33% . Then the effect of *Trichoderma* spp. in control of black rot was studied by making a small wound in healthy, organic, disinfected carrots and inoculated them with 1 mL of *A. radicina* conidial suspension. A 1 mL of *T. asperellum* (2.46×10^{10} spores per 1 mL) was added to the wounds after 48 hours. Positive control was the fungicide, Mancozeb and the negative control was sterilized distilled water. After 10 days of incubation at room temperature, *T. asperellum* reduced A. *radicina* by 72.63%. which is approximately similar to the effect of the positive control. *T. asperellum* had significantly ($p<0.05$) decreased disease occurrence and severity. In addition, inoculation of *T. asperellum* had greatly improved the minimum keeping time of average 13 days without characteristics symptoms which is seven days higher than the negative control. It can be conclude that, biological control of postharvest diseases by *T. asperellum* is an alternative to the use of fungicides and it could be a good solution for black rot disease in carrots.

Keywords: Carrots; Biocontrol; *Trichoderma asperellum*; Black rot; *Alternaria radicina*