Enhancing the pathogenicity of Arthrobotrys conoides and A. oligospora against Meloidogyne javanica J_2 by transferring of protease (AcI) gene and evaluation of antagonistic capability of transgenic isolates

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PII: S1049-9644(18)30195-6
DOI: https://doi.org/10.1016/j.biocontrol.2018.03.017
Reference: YBCON 3743

To appear in: *Biological Control*

Received Date: 24 December 2016
Revised Date: 10 March 2018
Accepted Date: 29 March 2018

Please cite this article as: Lavin Nourani, S., Mohammadi Goltapeh, E., Safaie, N., Jalali Javaran, M., Pourjam, E., Enhancing the pathogenicity of Arthrobotrys conoides and A. oligospora against Meloidogyne javanica J_2 by transferring of protease (AcI) gene and evaluation of antagonistic capability of transgenic isolates, *Biological Control* (2018), doi: https://doi.org/10.1016/j.biocontrol.2018.03.017

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Abstract Antagonistic fungi are well-known as viable alternatives to chemical control of root-knot nematodes. In this paper, serine protease Ac1 as an important pathogenicity factor was used to enhance the antagonistic activity of *Arthrobotrys conoides* and *A. oligospora* against *Meloidogyne javanica* J_2 (second stage juveniles). *Ac1* gene was extracted from *A. conoides* and cloned in pCAMBIA1304 vector. The recombinant plasmid was then transferred to these fungi using two strains of *Agrobacterium tumefaciens* (LBA4404 and AGL1). Transgenic isolates were confirmed by PCR amplification of Hygromycin B resistance gene (*hph*) as selectable marker, protease assay using casein substrate and *in vitro* bioassay. Transferring of *Ac1* gene by homologous recombination to *A. conoides*, increased protease activity. Our results showed that production of protease in both transgenic species was increased compared to wild type. Bioassay results indicated that pathogenicity rates of transformants, in both the number of traps formed and the number of trapped J_2, increased compared to the wild type. The results showed that inhibition of root-knot nematode, *M. javanica*, was markedly increased by transgenic isolates of *Arthrobotrys* spp. compared to the wild types.

Keywords Antagonistic activity, *Arthrobotrys conoides*, *A. oligospora*, *Meloidogyne javanica* J_2, Ac1 serine protease, *Agrobacterium tumefaciens*-mediated transformation.

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