qPCR assessment of aurofusarin gene expression in mycotoxigenic *Fusarium* species challenged with mycoparasitic and chemical control agents

Vladimir Vujanovic, Madhavi Arla Daida, Prasad Daida

PII: S1049-9644(17)30069-5
DOI: http://dx.doi.org/10.1016/j.biocontrol.2017.03.010
Reference: YBCON 3567

To appear in: *Biological Control*

Received Date: 11 May 2016
Revised Date: 20 February 2017
Accepted Date: 25 March 2017

Please cite this article as: Vujanovic, V., Daida, M.A., Daida, P., qPCR assessment of aurofusarin gene expression in mycotoxigenic *Fusarium* species challenged with mycoparasitic and chemical control agents, *Biological Control* (2017), doi: http://dx.doi.org/10.1016/j.biocontrol.2017.03.010

qPCR assessment of aurofusarin gene expression in mycotoxigenic *Fusarium* species challenged with mycoparasitic and chemical control agents

Vladimir Vujanovic*, Madhavi Arla Daida and Prasad Daida

Department of Food and Bioproduct Sciences, University of Saskatchewan, Saskatoon, SK, S7N 5A8, Canada

* Author for Correspondance. Tel: (306)-966-5048; Fax: (306)-966-8898; E-mail: vladimir.vujanovic@usask.ca

ABSTRACT

Sphaerodes mycoparasitica is a *Fusarium*-specific mycoparasite and biocontrol agent against Fusarium Head Blight (FHB) in cereals. *Fusarium* spp. produce harmful deoxynivalenol (DON), zearalenone (ZEA) and aurofusarin (AUR) mycotoxins. This study focuses on aurofusarin (AUR) as a poorly studied dimeric polyketide-derived mycotoxin synthesized by the polyketide synthases (PKS). AUR provides a red pigmentation to the Fusarium's cell wall. It is a proven contaminant in food and feed posing a health risk to consumers. To determine if the production and/or expression level of PKS genes influence the changes in mycelia coloration, AUR-red pigmented *Fusarium* spp. were co-cultured with *S. mycoparasitica* and *Trichoderma harzianum* mycoparasitic biocontrol agents compared to tebuconazole (Folicur®) fungicide, as a control. In this study, a set of six specific qPCR primers were designed. Results revealed the presence of PKS12 gene coding for AUR biosynthesis in *F. graminearum* 3ADON and 15ADON chemotypes, *F. culmorum* and *F. avenaceum*, unlike other tested *F. proliferatum*, *F. oxysporum*, *F. arthrosporoides* strains. *S. mycoparasitica* was most effective in reducing the AUR in *F. graminearum* 3ADON, *F. graminearum* 15ADON, *F. culmorum* and *F. avenaceum* followed by *T. harzianum* and tubaconazole. Furthermore, qPCR transcription results confirmed that the *F. avenaceum* mycelia's shift in color from dark red to light red and white is associated with respective heat shock tolerance and virulence which corresponds to the level of AUR biosynthesis or PKS12 gene expression. *S. mycoparasitica* could be used as an effective biocontrol agent against *Fusarium* pathogens to reduce AUR production.