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Multi-substrate screening the ability to produce alternariol among *Alternaria arborescens* strains

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Small-spored species of fungi from *Alternaria* section are widely distributed in plants and assumed to contaminate feeds by alternariol (AOL)-metabolite with mutagenic and carcinogenic action. Recently, AOL producing potential of *A. alternata* (Fr.) Keissl and *A. tenuissima* (Nees et T. Nees:Fries) Wiltshire has been estimated by the rapid screening procedure at the panel of nutrition media. The purpose of this study was to carry out a similar assessment for *A. arborescens* E. G. Simmons belonging to section *Alternaria*. Three strains from maize grain and sunflower seeds were identified by micromorphological characteristics, their affiliation to sect. *Alternaria* was confirmed by PCR with specific primers. Every strain was grown on wort agar, Yeast Extract Sucrose agar (YES), Malt Extract Agar (MEA), agar media containing the mix of vegetable juices (V-4), watering polished rice and oat flakes in 15 ml vials in three replicates, incubated for 7 days at 25°C without lightening and extracted with water-acetonitrile. Detection limit of AOL by ELISA was equal to 0.4 ng/ml. All strains were found to be AOL producers, however, toxin levels at wort agar were extremely low (0.4-0.5 μg/g). At MEA, V-4, YES both strains from sunflower seeds poorly accumulated AOL, whereas the strain from maize grain demonstrated sufficiently high activity (>10 μg/g). On grain substrates, all strains showed a 10-fold increase of the intensity of toxin biosynthesis and accumulation level from 80-620 μg/g. For comparison, the *A. arborescens* strain from Argentinean wheat produced AOL in the amount of 124 μg/g on rice in 21 days. Thereby, MEA and grain substrates are completely acceptable substrates for laboratory assessment of producing potential of *A. arborescens*, both *A. alternata* and A. tenuissima. The fact that the intensity of the metabolic response *in vitro* does not coincide among strains differing in origin deserves further study.

Figure 1: AOL accumulation by *A. arborescens* strains isolated from maize-grain (# 338/1m) and sunflower seeds (#19/4s, #39/4s) at agar media (MEA, V-4, YES) and grain substrates (oat, rice) (25°C, 7d, darkness).

Recent Publications

1. Ostry V (2008) *Alternaria* mycotoxins: An overview of chemical characterization, producers, toxicity, analysis and occurrence in foodstuffs. World Mycotoxin Journal 1(2): 175-188.
2. Konstantinova P, Bonants P J M, Van Gent-Pelzer M P E, Van der Zouwen P and Van den Bulk R (2002) Development of specific primers for detection and identification of *Alternaria* spp. in carrot material by PCR and comparison with blotter and plating assays. Mycological Research 106(1): 23–33.
3. Andersen B, Krøger E and Roberts R G (2002) Chemical and morphological segregation of *Alternaria* arborescens, A. infectoria and *A. tenuissima* species-groups. Mycological Research 106(2): 170–182.

4. Patriarca A, Azcarate M P, Terminiello L and Fernández Pinto V (2007) Mycotoxin production by *Alternaria* strains isolated from Argentinean wheat. International Journal of Food Microbiology 119: 219–222.
5. Mašková Z, Tančinavá D, Barboráková Z, Felšöciová S and Cisarová M (2012) Comparison of occurrence and toxinogenity of *Alternaria* spp. isolated from samples of conventional and new crossbred wheat of Slovak origin. Journal of Microbiology, Biotechnology and Food Science 1(4): 552–562.

Biography

Galina P Kononenko is the Head of Mycotoxicology laboratory at All-Russian Research Institute of Veterinary Sanitation, Hygiene and Ecology, Moscow. She is a Professor and has received her Diploma of a Doctorate of Biology in the year 2005. Her scientific work is devoted to the studies of secondary metabolites of microscopic fungi. She is an author of more than 50 international scientific publications.

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