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Strain dependant mycophenolic acid biosynthesis in *Penicillium roqueforti*

Mycophenolic acid (MPA) is a well-known mycotoxin produced by *Penicillium* species, in particular by the cheese related species *Penicillium roqueforti*. MPA biosynthetic gene cluster was recently described in *Penicillium brevicompactum* and *P. roqueforti*. In the present study, a 23.5 kb putative MPA cluster was localized in the recently available *P. roqueforti* FM164 genome sequence via an in silico analysis and is composed of 7 genes putatively coding for 7 proteins (MpaA, MpaB, MpaC, MpaDE, MpaF, MpaG, MpaH) highly similar in terms of gene synteny and sequence homology to the P. brevicompactum cluster. In order to confirm the involvement of this gene cluster in MPA biosynthesis, a gene silencing approach, using RNA interference targeting mpaC (coding for a putative polyketide synthase), was performed in a high MPA producing *P. roqueforti* strain (F43-1). In the obtained transformants, a reduced mpaC gene expression as observed by Q-RT-PCR was correlated with a decrease in MPA production as measured by LC-Q-TOF/MS. In parallel mycotoxin quantification on multiple *P. Roqueforti* strains in our collection suggested strain dependent MPA production. The entire MPA gene cluster was therefore sequenced for *P. roqueforti* strains with contrasted MPA production and a 174 bp deletion in *mpaC* was observed in low MPA producers (below quantification level). PCRs targeting the identified deleted region were carried out on 55 strains and the obtained results showed an excellent correlation with MPA quantification. Overall the obtained results indicated the clear involvement of *mpaC* gene as well as surrounding cluster in *P. roqueforti* MPA biosynthesis. The developed molecular tools could be useful for *P. roqueforti* ripening culture selection.

Biography

Monika Coton has obtained her PhD from the University of Caen Basse-Normandiein, France, where she was trained as a Molecular Microbiologist. Since 2011, she works as an Assistant Professor at the Université de Bretagne Occidentale and teaches Food Processing Technologies, Food Microbiology and Biotechnology at the “Ecole Supérieured’ Ingénieurs Agro-alimentaires de Bretagneatlantique” (ESIAB). Her research mainly focuses on the structural and functional diversity of filamentous fungi in fermented food products (dairy, beverages etc) in the “Laboratoire Universitaire de Biodiversitéetd’ Ecologie Microbienne” (Brittany, France). She has published more than 40 papers in reputed journals.

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