

Fumonisin B1 production by Fusarium species and mycotoxigenic effect on larval zebrafish

ABSTRACT

Fumonisin B1 (FB1) is a common mycotoxin produced by *Fusarium* species particularly *F. proliferatum* and *F. verticillioides*. The toxin produced can cause adverse effects on humans and animals. The objectives of this study were to detect the production of FB1 based on the amplification of FUM1 gene, to quantify FB1 produced by the isolates using Ultra-fast Liquid Chromatography (UFLC) analysis, to examine the embryotoxicity effect of FB1 and to determine EC50 toward the larvae of zebrafish (*Danio rerio*). Fifty isolates of *Fusarium* species were isolated from different hosts throughout Malaysia. Successful amplification of the FUM1 gene showed the presence of this gene (800 bp) in the genome of 48 out of 50 isolates. The highest level of FB1 produced by *F. proliferatum* isolate B2433 was 6677.32 ppm meanwhile *F. verticillioides* isolate J1363 was 954.01 ppm. From the assessment of embryotoxicity test of FB1 on larvae of zebrafish, five concentrations of FB1 (0.43 ppm, 0.58 ppm, 0.72 ppm, 0.87 ppm and 1.00 ppm) were tested. Morphological changes of the FB1 exposed-larvae were observed at 24 to 168 hpf. The mortality rate and abnormality of zebrafish larvae were significantly increased at 144 hpf exposure. Meanwhile, the spontaneous tail coiling showed a significant difference. There were no significant differences in the heartbeat rate. As a conclusion, the presence of FUM1 in every isolate can be detected by FUM1 gene analysis and both of the species produced different concentrations of FB1. This is the first report of FB1 produced by *Fusarium* species gave a significant effect on zebrafish development.

Keyword: Fumonisin B1; Toxic; *Fusarium*; Malaysia; Ultra-fast liquid chromatography