Catabolism of the Cancerogenic Mycotoxin Fumonisin B_1 by *Sphingopyxis* sp. MTA144

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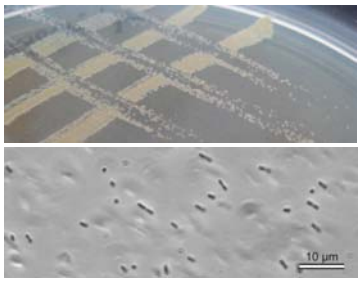
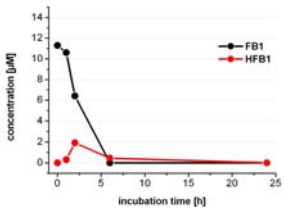
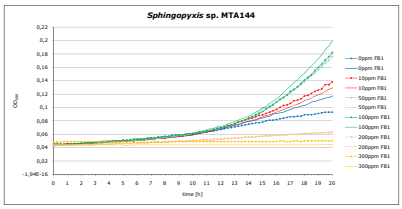
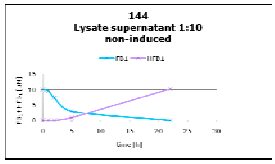
Fumonisins are: - cancerogenic mycotoxins produced by *Fusarium verticillioides* and other fungi.
- natural contaminants in maize from all warm growing regions of the world.

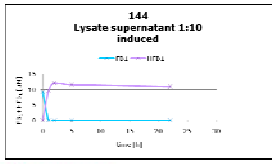
Our goals were: - to elucidate the catabolic pathway for fumonisin degradation of *Sphingopyxis* sp. MTA144.
- to eventually provide feed enzymes for gastrointestinal detoxification of fumonisins in farm animals.



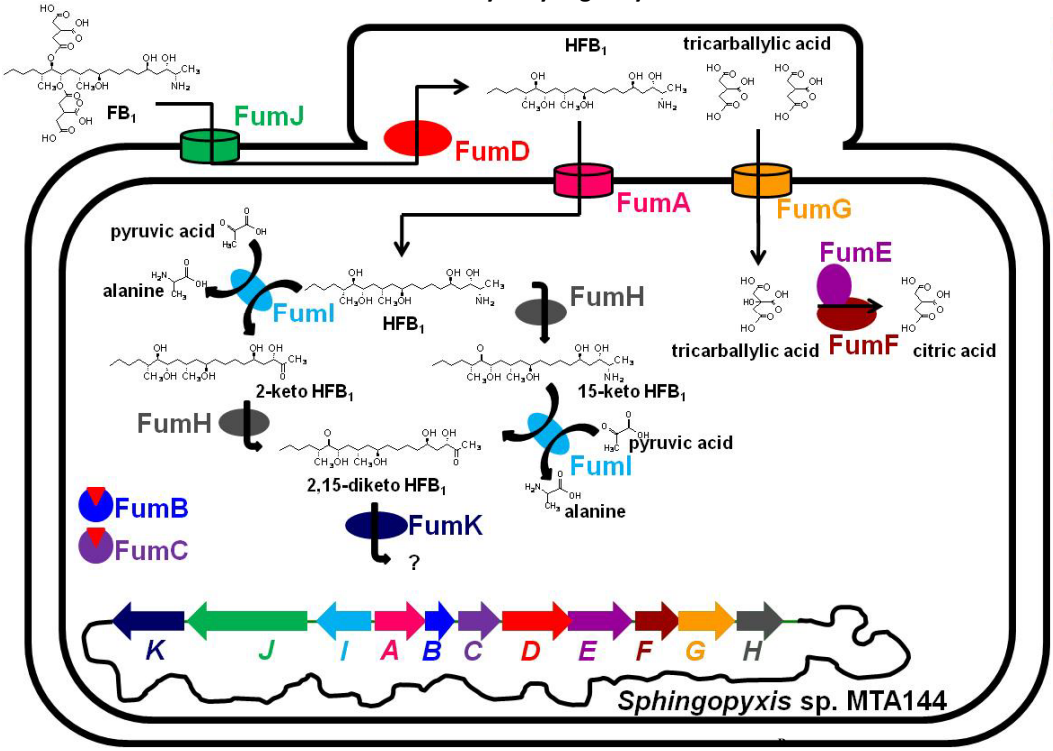






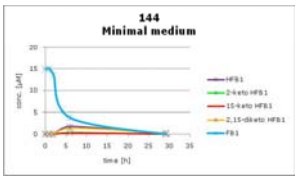


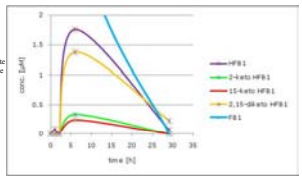
***Sphingopyxis* sp. MTA144 was isolated from soil. It was found to catabolise fumonisin B_1, which supported growth. Production of a fumonisin hydrolysing enzyme was inducible.**



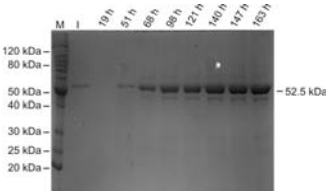
FumA	permease
FumB	tetR-like transcriptional regulator
FumC	lysR-like transcriptional regulator
FumD	carboxylesterase
FumE	tricarballylate dehydrogenase
FumF	citrate utilisation protein B
FumG	tricarballylate proton symport
FumH	alcohol dehydrogenase
FumI	aminotransferase
FumJ	TonB-dependent receptor
FumK	acetolactate synthase

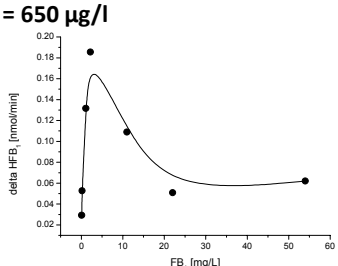
The whole genome was sequenced (Roche 454) and 11 *fum* genes on 16.2 kb were located. Genes *fumD*, *fumI*, *fumH* and *fumK* were expressed in heterologous hosts. Purified enzymes were characterised and structures of reaction products determined.

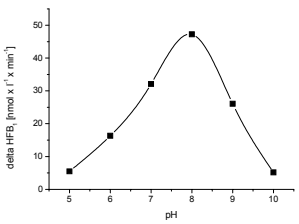


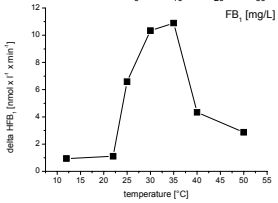


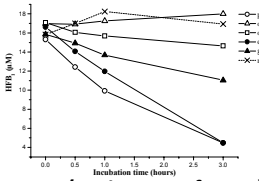
FumD (carboxylesterase) produced in *Pichia pastoris* and purified for characterisation. K_M = 0.9 µM = 650 µg/l



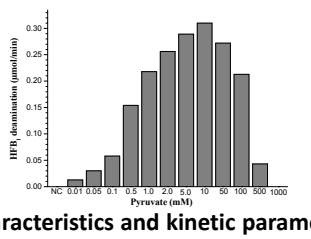


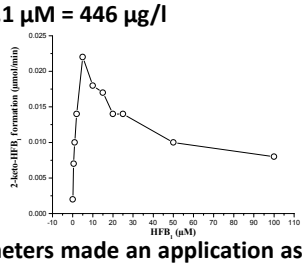






FumI (aminotransferase) produced in *E. coli* and purified for characterisation. K_M = 1.1 µM = 446 µg/l





The enzyme characteristics and kinetic parameters made an application as feed enzymes for gastrointestinal fumonisin detoxification seem feasible.