STUDY OF THE BIODEGRADATIVE PATHWAY OF MESOTRIONE BY AN ISOLATED BACTERIAL STRAIN

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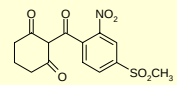
Family of triketone

Marketed by Syngenta Crop Protection under the name CALLISTO® (2001)

New selective herbicide to control broad-leaved weeds in maize

Mesotrione
[2-(4-methylsulfonyl-2-nitrobenzoyl)-1,3-cyclohexanedione]

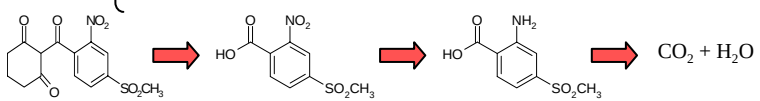


Derived from a natural phytotoxin produced by *Callistemon citrinus*

Acts by competitive inhibition of the enzyme 4-hydroxyphenylpyruvate dioxygenase (HPPD) involved in the carotenoid biosynthesis

Literature

- Few studies in the literature on the fate of mesotrione
- No detailed biodegradative pathway
- No microbial isolate known to biotransform mesotrione



MESOTRIONE MNBA AMBA

Degradation pathway of mesotrione in soils according to the literature

SCREENING OF MICROBIAL STRAINS

Isolated from polluted compartments of environment (water, soils, atmosphere)

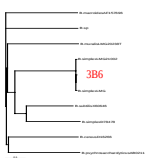
•65 bacterial and fungal strains tested → **Only one bacterium able to biotransform mesotrione**

ISOLATION

Collected at the top of the Puy-de-Dôme

Isolated from clouds water with an impactor

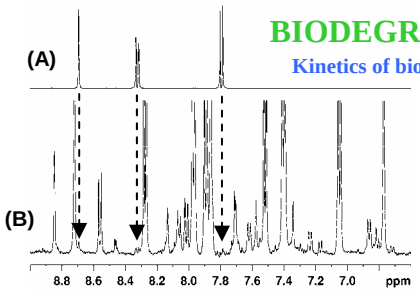
CHARACTERIZATION



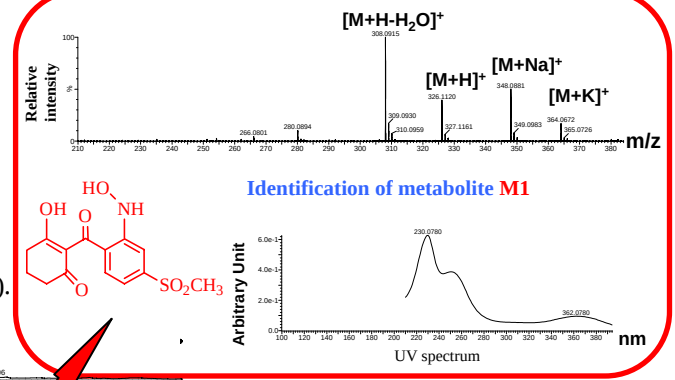
***Bacillus* sp.**

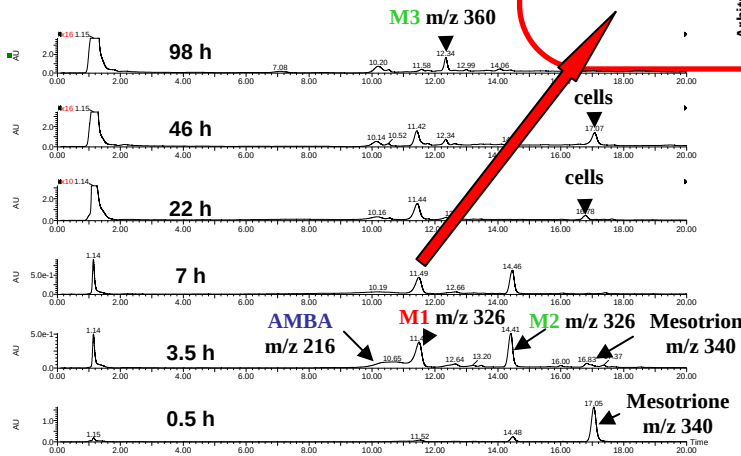
BIODEGRADATION STUDIES OF MESOTRIONE

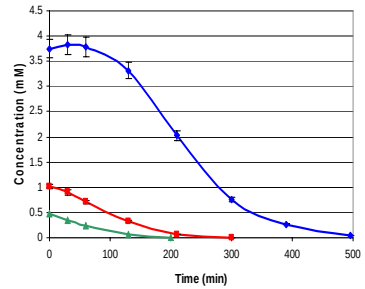
Kinetics of biodegradation monitored by HPLC-MS and *in situ* ^{1}H NMR



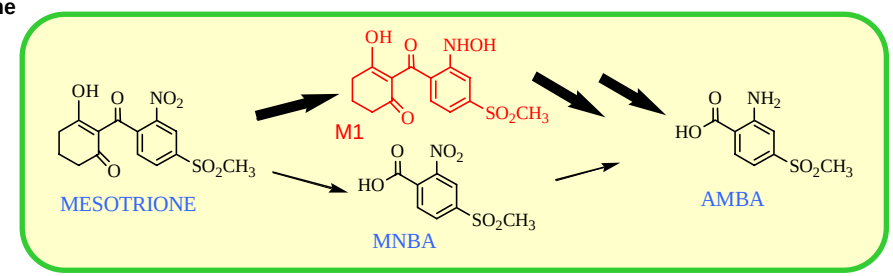
Quantification and identification by ^{1}H NMR
(A) Standard MNBA solution
(B) 5h incubation medium (5 mM mesotrione).







Kinetics of mesotrione biodegradation



CONCLUSION: The metabolic pathway involving MNBA was not the main for conditions used.

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