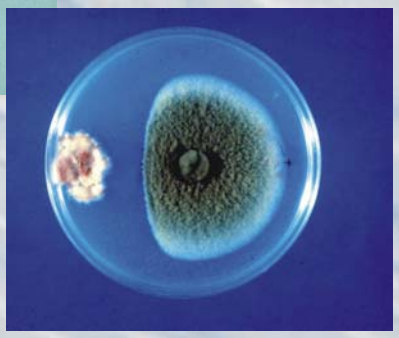
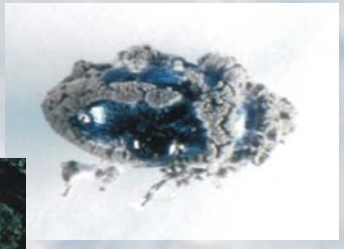


RAFBCA

QLK1-2001-01391

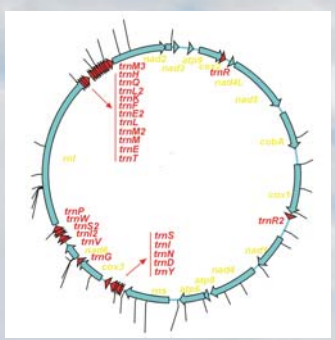
Risk Assessment of Fungal Biological Control Agents

www.rafbca.com



Risk Assessment of Fungal Biological Control Agents (RAFBCA)

The **RAFBCA project** was funded by the European Commission under the Fifth Framework Programme, Quality of Life and Management of Living Resources Programme (QoL), Key Action 1 - Food, Nutrition and Health, (Contract n°QLK1-CT-2001-01391). Ten partners from nine countries cooperated in this project from November 2001 to October 2004. They generated data that could help address key registration questions for BCAs. The **overall aim** of this unique project was to establish if metabolites produced by fungal BCAs entered the food chain and if they posed a risk to human and animal health.



Identification and Detection of Metabolites

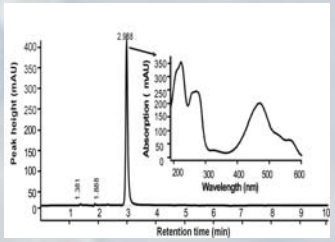
The RAFBCA team has identified efficacious strains of mycoinsecticides (*Beauveria brongniartii*, *Metarhizium anisopliae*, *Verticillium lecanii*), mycofungicides (*Gliocladium* spp., *Trichoderma harzianum*), and a mycoherbicide (*Stagonospora convolvuli*) and the major metabolites secreted by these fungi (oosporein, destruxins, gliotoxin, peptaibols, elsinochrome A). They have generated data that provide a better understanding of the type and quantity of the selected major metabolites as well as their distribution and regulation.

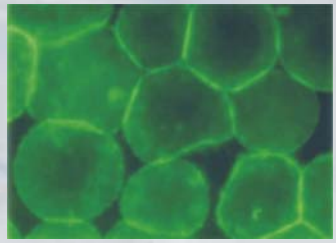
All the partners have been involved in field and glasshouse trials under commercial/semi-commercial conditions to determine the fate of fungal BCAs and their metabolites in the food chain (e.g. lettuce, cucumber, tomato, potato, maize) and plant growing media. **They have shown that BCA metabolites do not enter the food chain or pose a risk to consumer and animal health, nor pose environmental problems.**

Development of Tools and Methodologies

The RAFBCA team has developed methods and tools to conduct a targeted risk assessment - making this more reliable and industry more competitive. Standard Operating Protocols will be published. Some of the RAFBCA achievements include:

- Development of molecular probes to monitor several important fungal BCAs in the environment;
- Identification of the highly sensitive SF-9 insect cell-line - more sensitive than mammalian cell-lines to a wide range of fungal metabolites;
- Identification of highly sensitive single cell organism (*Paramecium caudatum)* and invertebrates *(Artemia salina, Daphnia magna)* - very sensitive to metabolites and crude extracts of fungal BCAs;
- Development of extraction methods that give good recovery and repeatability;
- Evaluation of the Ames - and Vitotox tests, which showed that pure metabolites and crude extracts from BCAs were not genotoxic or mutagenic;
- Testing crude extract from BCAs, which proved to be a time - and cost-efficient alternative to testing of individual metabolites.





Case study - Mycoherbicide

Field bindweed and hedge bindweed are considered among the twelve economically most important weeds. *S. convolvuli* LA39, an effective biocontrol agent of both bindweed species produces elsinochrome A as a major metabolite. Data obtained from greenhouse and field trials showed that elsinochrome A (1) is rarely present in the applied product and if so, in amounts which are far too small to pose any risk to the environment or the consumer; (2) is not produced on the crop or the bindweed. Therefore, the metabolite does not enter the food chain.

Case studies - Mycoinsecticides

The entomopathogenic fungi *M. anisopliae* and *V. lecanii* successfully control a wide range of soil and foliar pests. Destruxins are major metabolites of both species. Large-scale greenhouse trials showed that the metabolites do not enter tomato, cucumber or radish fruit, even when the BCAs were applied at normal and 10 fold higher dose than recommended. Destruxins could not be flushed from conidia with solvents. Results indicate that the BCAs are safe for growers, consumers and the environment.

The use of the entomogenous fungus *B. brongniartii* is recommended for *Melolontha melolontha* (European cockchafer) control. Field trials showed that it is harmless to potatoes and that oosporein, the major metabolite secreted by this fungus, does not enter potato plants. Results suggest that the BCA is safe for humans and the environment.

Benefits to SMEs, Consumers and Growers

RAFBCA have shown that the selected fungal BCAs do not pose a risk to human and animal health and the environment. This strengthens the argument for their use as safe alternatives to chemical pesticides. They could be used as part of integrated crop protection programmes, which reduce or eliminate the use of harmful chemicals. This will, ultimately, encourage commercial development of the BCAs and through increased sales increase wealth and create jobs to meet increased demand for these products.

Contributions to EC Policy

RAFBCA impacts on Directive 91/414/EEC and Directive 2001/36/EEC (data required on microbial BCAs in Annexes II and III Part B) by showing that the evaluation of fungal metabolites during registration of BCAs could be simplified. The RAFBCA consortium has generated new data that could be used to develop a new risk assessment strategy that could help accelerate risk assessment of fungal metabolites and reduce registration costs. They have devised strategies that could lead to a more balanced system for risk assessment and registration -and enable the EC to compete with the USA and other countries. RAFBCA have data that could help end users (policy makers, registration authorities, industry) and the public in making more informed decisions about fungal BCAs.

Dissemination

The consortium has disseminated results through flyers, numerous international scientific journals, and via oral and poster presentations at national and international symposia.

The RAFBCA team has organised three highly successful workshops:
Helsinki, August 2004, in collaboration with the SIP, IBMA, and IOBC
Brussels, September 2004, in collaboration with the IOBC and IBMA
Innsbruck, October 2004, in collaboration with the IOBC

The RAFBCA website (http://www.rafbca.com) has been visited by numerous groups from all over the world.

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