**Name of project**: **Research on technology and equipment for production of some bio-products for prevention of mycotoxin (aflatoxin, ochratoxin A and patulin) on some major fruits of Vietnam and the Czech Republic.**

**Project duration:** 36 months

**\* Total estimated budget**: 1,900,000 USD

*\* Total estimated budget includes finances from MOST and TA CR plus other financial supports from private parties that involve in the project*

**Proposing institute (from the Vietnamese side)**

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**Project’s objectives**

***General objectives:***to determine the natural infection of mycotoxins in some local fruits (lychee, longan, mango, apple, dragon fruit, orange, and bananas) and to produce some bio-products for mycotoxin prevention during the time in the field and storage

***Concrete objectives:***

To create a technological procedure and equipment necessary for the production of bio-products for prevention of mycotoxin (aflatoxin, ochratoxin A and patulin) in some main fruits in Vietnam with the aim to increase the storage time by at least 20% as well as to reduce loss during storage to ≥5%. The mycotoxin contamination in fruits, therefore, will be reduced in accordance with FAO and WHO standards.

**Research activities**

1. Research on natural infection of mycotoxin (aflatoxin, ochratoxin A and patulin) in soil and in fruits such as lychee, longan, mango, apple, dragon fruit, orange and banana in targeted plantation in Vienam and the Czech Republic.

2. Research on technology for bio-products *Aspergillus flavus,* *Flavobacterium aurantiacum* which do not produce aflatoxin to prevent against aflatoxin on fruits in the fields and during storage.

3. Research on technology for bio-products *Aspergillus niger, Rhizopus stolonifer* which do not produce aflatoxin to prevent against ochratoxin A on fruits in the fields and during storage.

4. Research on technology for bio-products *Penicillium* against patulin on fruits in the fields and during storage

5. Research on technology for bio-products against mycotoxin

6. Establishment of technology for production of anti-mycotoxin bio products for some main fruits (500 kg/batch).

7. Testing of the bio-product against mycotoxin in fruits in the fields (1 hectare/ each kind of fruit) and mycotoxin detoxication during storage (1 ton/batch/each kind of fruit). Evaluation of the bio-product effectiveness on the fields during two continuing crops in some plantations of lychee, longan, mango, apple, dragon fruit, orange and banana in Czech and Vietnam.

8. Establishment of testing model for bio-product for mycotoxin prevention and detoxication in some fruits during the time in the field and storage (1 ton/batch/each kind of fruit). Evaluation of the bio-product effectiveness on the fields during two continuing crops both in Vietnam and Czech Republic.

9. Proposal of utilization procedure of the bio-products for mycotoxin prevention and detoxication in some fruits in the field and during storge in Vietnam and Czech.

10. Evaluation of economic benefit delivered by the model.

11. Commercialization of the bio-products in both Vietnam and the Czech Republic.

**Expected results**

**Technology procedures**

Technological procedure for *Aspergillus flavus,* *Flavobacterium aurantiacum* which does not produce aflatoxin, powder. The product is proved to be effective in 70% aflatoxin decreased on some fruits on the field and during storage.

Technological procedure for *Aspergillus niger, Rhizopus stolonifer* which does not produce aflatoxin, powder. The product is proved to be effective in 80% ochratoxin A decreased on some fruits on the field and during storage.

Technological procedure for *Penicillium, powder*. The product is proved to be effective in 80% patulin decreased on some fruits on the field and during storage.

These Bio-products are environmental safe and satisfy both domestic consumption and export. They do not contain any toxic to humans health as well.

**Models**

* Production technology model on mycotoxin prevention on some tropical fruits 500 kg/batch.
* Experimental model for utility of Aspergillus flavus, Flavobacterium aurantium non-aflatoxin antagonist to prevent aflatoxin on some fruits in the field (1 hectare) and during storage (1 ton/batch).
* Experimental model for the application of Aspergillus niger, Rhizopus stolonifer against ochratoxin A on some tropical fruits in the field (1 hectare) and during storage (1 ton/batch).
* Pilot model for Penicillium aplication in some fruits to prevent patulin during the time in the field (1ha) and storage (1 ton/batch).

**Products:**

Bio-products that are environmental safe and qualified not only for domestic consumption but also export. The products contain no toxic elements to humans health:

* Bio-product *Aspergillus flavus, Flavobacterium aurantiacum* does not produce aflatoxin, powder containing 109 CFU/g. The product is proved to be effective in 70% aflatoxin decreased on some fruits on the field and during storage.
* Bio-product *Aspergillus niger, Rhizopus stolonifer* does not produce ochratoxin A, powder containing 109 CFU/g. The product is proved to be effective in 80% ochratoxin A decreased on some fruits on the field and during storage.
* Bio-product *Penicillium* does not produce patulin, powder containing 109 CFU/g. The product is proved to be effective in 80% patulin A decreased on some fruits on the field and during storage.