



**IFAR 2005 Professional Development Program  
Completion Report  
[800 words]**

**Instructions:**

Please submit the completion report by email, using this form, through the sponsoring CGIAR Center to [ifar@ifar4dev.org](mailto:ifar@ifar4dev.org) within two months after the completion of the fellowship.

*Please check if Thalwitz Scholarship*

**Yes**

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**Name of Applicant**

Dongo, Lelia Nkechinyere

**Sponsoring CGIAR Center**

IITA-IBADAN

### **I. Work Program goals achieved**

Surveys were carried out in Nigeria to determine fermentation methods practiced by farmers and fungal contamination of cocoa beans in Ondo, Cross-River, Edo and Taraba states in Nigeria. Individual and group questionnaires were implemented and 328 cocoa bean samples were collected. Fungi from cocoa beans were isolated on Dichloran Rose Bengal Chloramphenicol medium and identified on Czapeks Yeast Agar. *Aspergillus* (46.3%), *Fusarium* (36.8%), *Rhizopus* (9.0%) and *Penicillium* (5.6%) were the predominant contaminants. *Sclerotium*, *Mucor* and *Botryodiplodia* were also isolated. The most prominent species of *Aspergillus* encountered were *A. flavus* (74.1%) followed by *A. tamari* (18.5%), *A. oryzae* (3.9%), *A. parasiticus* (1.4%), *A. niger* (1.2%) and *A. sojae* (0.7%). *A. ochraceus* was isolated from only one sample (0.2%).

There was a significant correlation between fermentation method and frequency of fungal contamination. Cocoa bean samples fermented by heap method had the highest occurrence of *Aspergillus spp* (81.3%) while the basket (4.1%) and propylene bag (14.5%) method of fermentation had less contamination. Analysis of the questionnaires showed that 75.3% of cocoa farmers use heap method of fermentation, 22.3% propylene bag method and 2.4% basket method. Predominant use of heap fermentation method is probably responsible for significant contamination of cocoa beans in Nigeria.

### **II. Plans for follow-up**

Due to the peak harvesting period of cocoa in Nigeria (September-December) the project work commenced in September with respect to administration of questionnaires and sample collection from interviewed farmers. This caused a delay in achieving all the program goals as proposed. However, the project so far has assisted enormously in providing basic knowledge on the types of possible ochratoxin-producing fungi and other toxigenic fungi frequently encountered on ready-for-sale cocoa beans in Nigeria.

The quantification of ochratoxin produced by *A. ochraceus*, *A. niger*, *Penicillium spp* and other *Aspergillus spp* in cocoa beans and in laboratory fermentation will be estimated by competitive Direct ELISA. The OTA antisera has just arrived IITA and thus work on this will commence soon.

Arrangements have been made with the Institute of Sciences of Food production (ISPA) Bari, Italy for identification at species level of all the *Penicillium* and a few of the *Aspergillus* cultures (that were not identified to species level).

Consequent upon the completion of all these, a comprehensive report will be sent through e-mail to IFAR on or before 28 February 2006.

### **III. Report budget utilization including whether budget was spent as planned**

The budget utilization was more or less as planned, except for a few exceptions. Although \$1000 was earmarked for travel in the proposal, more funds were spent on travel for survey in Nigeria and to attend an international conference on mycotoxins in Ghana. The microscope was not purchased as planned since it cannot be effectively used in my institution due to lack of dependable electricity.

Please see also separate financial report.

### **IV. Assessment of the fellowship experience and general comments**

I wish to sincerely thank the IFAR Board of Directors and the evaluation committee chaired by Dr. Ruth Haug for this wonderful opportunity given to me to conduct research and foster relationship/collaboration with IITA. In my few years as a National Scientist with Cocoa Research Institute of Nigeria, Ibadan, I have found it difficult to carry out meaningful research that would contribute to knowledge because of lack of funds, infrastructures and facilities. It is against this background that the fellowship has tremendously enhanced my capacity to carry out mycotoxin research, thereby contributing to scientific knowledge. The fellowship has equally increased my knowledge and understanding of mycotoxins and its serious impacts on human health. I am highly indebted to IFAR. I would also like to thank IITA for supporting my application and providing me with all necessary facilities. Guidance provided by IITA Liaison scientist Dr. Ranajit Bandyopadhyay is gratefully appreciated.

The experience that I have gained by attending the Myco-Globe conference, Accra, Ghana, 13-17 September 2005 through the IFAR funds cannot be over emphasized. It afforded me the singular opportunity to meet and interact with renowned scientists all

over the globe working on a common goal of “Reducing Impact of Mycotoxins in Tropical Agriculture with Emphasis on Health and Trade in Africa”.

Please permit me to say that the project duration appears to be somehow short in achieving all the proposed goals before the submission of this report. The peak of cocoa harvesting season (September-December) was towards the end of project duration. This prevented early sample collection. As a result, much of the analytical work remains. It is my hope and desire that I would continue to enjoy more research funding and support through IFAR.