



Federal Ministry  
of Agriculture, Food  
and Regional Identity

## PHD PROGRAM OF BMLEH

### ***Mycotoxins Ghana: Associations between diet and internal exposure to mycotoxins among adults in Ghana and Ghanaian migrants in Europe***

<b>country/countries</b>	Ghana, Germany
<b>funding agency</b>	Federal Ministry of Agriculture, Food and Regional Identity - BMLEH
<b>project management</b>	Federal Office for Agriculture and Food – BLE
<b>project coordinator</b>	German Federal Institute for Risk Assessment (BfR)
<b>project partner(s)</b>	<ul style="list-style-type: none"><li>▪ University of Münster (Münster, Germany)</li><li>▪ University of Bonn (Bonn, Germany)</li><li>▪ Kwame Nkrumah University of Science and Technology (Kumasi, Ghana)</li><li>▪ Agogo Presbyterian Hospital (Agogo, Ashanti Akim, Ghana)</li><li>▪ Navrongo Health Research Center and Ghana Health Service (Navrongo, Ghana)</li><li>▪ Charité - Universitätsmedizin Berlin (Berlin, Germany)</li></ul>

<b>project budget</b>	<b>164.356,45 €</b>
<b>project duration</b>	1st April 2025 – 31th March 2028
<b>key words</b>	Human biomonitoring, mycotoxins, Ghanaians resident to rural Ghana, Ghanaian migrants living in Berlin, exposure, nutrition, food sources
<b>background</b>	Mycotoxins, the toxic secondary metabolites of moulds, are acknowledged as relevant threats to food safety and food security, especially concerning Sub-Sahara Africa. Due to the diverse serious health effects of mycotoxins, reducing exposure to mycotoxins is of great importance for public health. Yet, necessary data on exposure to diverse relevant mycotoxins as well as their relevant food sources is lacking for many Sub-Sahara African countries and Ghana in particular.
<b>objective</b>	<p><b>Scientific objectives</b> of the project comprise</p> <ul style="list-style-type: none"> <li>(i) detailed characterization of the exposure to mycotoxins using a validated multi-mycotoxin method in urine samples, as well as the long-term exposure to aflatoxin B1 measured in blood samples</li> <li>(ii) investigation of the impact of geographical regions of the exposed population (comparison of rural Ghanaian regions and Ghanaian migrants resident to Berlin),</li> <li>(iii) exploration of associations between mycotoxin exposure and diet.</li> </ul> <p><b>Public health objectives</b> of the project are</p> <ul style="list-style-type: none"> <li>(i) to raise awareness of the health burden of the Ghanaian population associated with exposure to mycotoxins,</li> <li>(ii) to discuss risk mitigation activities and to prepare a policy brief involving relevant stakeholders and decision makers in Ghana, and</li> <li>(iii) to inform the Ghanian population via printed media.</li> </ul>
<b>short description</b>	A workshop with representatives of involved partner institutions from Ghana, Berlin, Bonn, and Münster as well as political decision makers and stakeholders will be organised for participatory design of the research project.

The project is based on a random sample from two cross-sectional studies: approximately 300 young adults living in rural Ghana, were recruited in 2024 within a follow-up of the *Intermittent Preventive Treatment of Malaria in Infancy (IPTi)* study; and approximately 300 Ghanaian migrants living in Berlin, who were examined between 2012 and 2015 within the multi-centric *Research on Obesity and type 2 Diabetes among African Migrants (RODAM)* study. For both study populations, data on socio-demographics, health status and diet among others as well as blood and urine samples will be used.

In urine samples, 35 mycotoxins and metabolites will be analysed by a validated "dilute and shoot" LC-MS/MS method. Blood samples will be used for additional analysis of the long-term biomarker aflatoxin B1-lysine adduct among those participants with relevant exposure evident from the multi-mycotoxin screening in urine. Statistical analysis will focus on characterization of the mycotoxin exposure in the Ghanaian population resident to different geographical regions (rural Ghana vs. migrant Europe) as well as associations with important dietary contributors from the Ghanaian Food Propensity Questionnaire.

Finally, a dissemination workshop with involved partners and relevant stakeholders and regulatory authorities in Ghana will be organised for discussion of possible risk mitigation activities and preparation of information material.