

TREATED WASTEWATER FOR AFRICA'S AGRICULTURE

DAAD scholarship holder, Isaac Mbir Bryant, is working on a biogas digester that kills pathogens in wastewater and produces methane – something, which he hopes will help the people of his homeland, Ghana, to solve their wastewater problems

He is wearing a black suit and has short hair. A Ghanaian, Isaac Mbir Bryant, presented his research topic at the DAAD scholarship holders meeting at the Brandenburg University of Technology (BTU Cottbus-Senftenberg). For the past three years, the doctoral candidate has been working on finding a solution to the wastewater problem in his home country, Ghana.

»In Ghana, we hardly have many possibilities for purifying wastewater like in Europe and other developed countries. Most household wastewater is currently discharged into the environment without any pre-treatment, which creates a huge environmental problem. I really wanted to do something about this«, says the doctoral candidate at the Chairs of Biotechnology of Water Treatment and Waste Management. »The farmers in the cities irrigate their vegetables with untreated wastewater, which means pathogens get into food leading to many people falling sick. I have experienced this myself. I ate contaminated salad and when I regained consciousness, I was in hospital as cholera patient. I could have lost my life through that. If that could happen to me, it can happen to others. This is what motivated me to find solutions to the wastewater problems in Ghana«.

Isaac Mbir Bryant wants to use biogas digester for wastewater treatment in a slum in Ghana. »About 7,600 people live in the slum in which I constructed the biogas plant. If every household was connected to such

a biogas plant it would really help the people there, however, it is very expensive and would have to be supported by the state.« My supervisors, Prof. Dr. Marion Martienssen and Dr.-Ing. Marko Burkhardt, respectively, supported me financially and materially to construct and test the facility in the slum.

In his test facility, biomass, food waste and wastewater (black water) are converted into biogas with high methane content which the residents could use for cooking. Bryant's method works with high temperatures of up to 65 degrees throughout in a single-stage biogas digester. This kills pathogens such as *Vibrio cholerae*, for example. The wastewater (black water) that is treated in this way can be used for urban agriculture, for example, watering of crops. Bryant spent a year working in the laboratory testing his concept together with his second supervisor, Dr.-Ing. Burkhardt, before he built the biogas plant in Ghana for a pilot study. One year later, he is now in Cottbus again working on his dissertation.

His love for Natural Sciences developed early on in his childhood days: »I come from a small town called Kissi in the Central Region of Ghana where I grew up in the countryside. There were oranges, coconuts and fruits everywhere; these made me appreciate and love nature. In my basic school at that time, we had only one teacher who taught every subject and made Natural Science appealing to me, thus it motivated me to pursue my career in science «.



^ In the laboratory on the main campus: DAAD scholarship holder Isaac Mbir Bryant from Ghana testing wastewater samples

How biogas plants works

The fermentation process in biogas plants occurs in airtight, heat insulated and heated fermenting vessels – so-called fermenters. These are regularly filled with fresh substrate. The bacteria in the fermenters convert the substrate into biogas and other fermented products. At the same time, the untreated water is purified with the high temperature which is created in the biogas plant.

Chair of Biotechnology of Water Treatment

PROF. DR. RER. NAT. HABIL MARION MARTIENSSEN

Chair of Waste Management

DR.-ING. MARKO BURKHARDT