Researchers Propose a New Perspective in Nano-fungal Interactions: Restricting Mycotoxins without Killing the Producers

Researchers from the Department of Environmental Health Sciences at the University of South Carolina’s Arnold School of Public Health have published a paper that has proposed a theoretical model on how engineered nanoparticles can serve as a new tool for restricting mycotoxin contaminations in crops and food. They published their model as a minireview in *Applied Microbiology and Biotechnology* entitled Restricting mycotoxins without killing the producers: new paradigm in nano-fungal interactions. The model builds on the available evidence from nano-bio interaction research and the recent interaction studies performed by the ENHS researchers with Aspergillus cells and engineered silver nanoparticles.

“Over the past several years, numerous studies have demonstrated the feasibility of using engineered nanoparticles as antifungals, especially against those fungal pathogens that produce mycotoxins and infect plants, animals, and humans,” says graduate student Rubaiya Jesmin, who served as lead author on the paper. “The high dosage of nanoparticles has been a concern in such antifungal applications due to the potential toxicological and ecotoxicological impacts.”

“To address such concerns, we had shown in our previous papers that specifically designed silver nanoparticles can successfully inhibit aflatoxin biosynthesis in Aspergillus cells even when applied at doses that are not toxic to humans” says Dr. Anindya Chanda, Assistant Professor of Environmental Health Sciences and the Director of Integrative Mycology Laboratory.

The theoretical model proposed by the team offers a novel start-point for a long-term research that will effectively use of nanotechnology to intervene in the biology of fungal pathogens and also help in an accurate evaluation of the impacts of the increasingly growing nanomaterials in the environment on fungi and their interacting biotic partners. “There is a pressing need for a rigorous understanding of nano-fungal interactions, which is currently far from complete” says Chanda. The team is now working in collaboration with the USDA to test the validity of the proposed model and understand the fungal mechanisms that are targeted by the nanoparticles. The studies will provide detailed insights on how nanoparticle uptake and their transformation inside fungal cells, possibly influence the production of mycotoxins and other secondary metabolites of filamentous fungi.