Fungal potentials for sustainable food production

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Fungi possess the fascinating capability to convert organic materials into a diverse array of valuable products, offering unique opportunities to address the pressing challenges faced by humanity. Fungal biotechnology can thus facilitate the shift from our current petroleum-dependent economy to a bio-based circular economy, not only enabling the sustainable production of chemicals, fuels, textiles, and novel materials with many application possibilities, but also providing solutions for securing and enhancing our food and feed supply for an expanding global population. By doing so, fungal biotechnology and the rational and targeted development of fungal cell factories, can act as an innovation driver and at the same time has the potential to significantly contribute to climate change mitigation, helping to achieve the United Nations' sustainable development goals [1].

In my talk, I will discuss some of the basics of fungal physiology, genetics and morphology that are key to understand the extraordinary adaptability and robustness of fungi and that underlie their extraordinary functions that we try to harness in biotechnology today. I will then present some results of recently finished projects concerned with fungal-mediated biotransformations of agricultural residues (projects PRO-SUGAR and PRO-SUPER) and a glimpse into ongoing research at TUM on the (possible) future of foods, which can be “supported” by fungi (and that might even be attractive for non-mushroom lovers).

[1] Meyer et al. (2020) Growing a circular economy with fungal biotechnology: a white paper. Fungal Biology and Biotechnology, 7:5. https://doi.org/10.1186/s40694-020-00095-z