

## **Upgrading residual biomasses by fermentation: possibilities and priorities**

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### Summary

Transforming residual streams into edible ingredients is increasingly promoted to alleviate the environmental impacts of food systems. This is particularly the case for fermentation innovations. While safely producing food and feed with open cultures has a long-standing tradition, novel fermentation routes can be implemented to improve the nutritional and organoleptic functions of organic residues and co-products, unlocking new markets. Yet, enabling conditions in terms of process efficiency and markets uptake are required to ensure overall environmental improvements. Here, we discuss the role and direction that fermentation routes can take to pave the way towards sustainable and safe food systems. After an overview of the upcycling potential of a variety of fermentation routes, we propose to evaluate the prerequisites for fungal fermentation strategies to achieve net environmental benefits when upgrading agrifood co-products and agricultural residues. Then, we suggest to re-examine the place of spontaneous or natural microbial consortia for safe future food and feed biotech developments, and defend the need for microbial biotechnology literacy education.