

**FFoQSI**  
**Austrian Competence Centre for Feed and Food Quality, Safety and Innovation**

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Bread in traditional fermentation baskets. Photo: Fischer Brot GmbH

## DANGEROUS OR NOT? IDENTIFICATION OF MOULD SPECIES BY DNA BARCODING

THE HAZARD POTENTIAL OF MOULD NESTS WAS EVALUATED AND PREVENTION STRATEGIES WERE DEVELOPED.

Fischer Brot, a successful family-owned bakery with its headquarters based in Linz, Upper Austria, guarantees its customers a certified quality management system that is put into practice every day with a focus on maximum product safety and continuous improvement. With the aim of further improving product safety for consumers as well as working conditions for production employees, the collaboration between Fischer Brot and FFoQSI began in 2017 as part of the project Innovation in Food Processing.

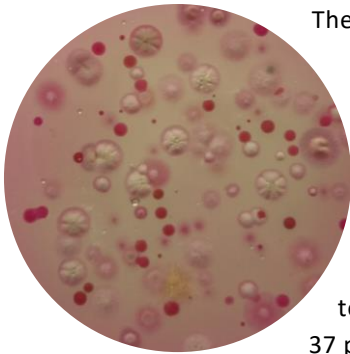
One problem that many food producers have to deal with is mould. Mould spores are ubiquitous, which means they are everywhere in the air. A low dose of mould is safe for humans and animals. There is only a health risk when it proliferates locally.

In bakeries moulds find optimal growth conditions during fermentation processes: increased humidity and organic surfaces (traditional fermentation baskets). For this reason, Fischer Brot was concerned to avoid the entry of mould spores and to make it more difficult for the few spores that do enter to settle.

In order to fight something effectively, you need to know what it is. Conventional methods for determining moulds are time-consuming and require experts with great specialist knowledge. So there was need for a fast and robust method with which a broad spectrum of mould species could be identified.

This was achieved by sequencing characteristic DNA-segments and then comparing them in a database – in short, DNA-barcoding.

## SUCCESS STORY



Whit to greenish moulds isolated from air. Photo: Nicole Ollinger

The moulds were isolated and eight regions of DNA were sequenced per sample. Through optimization measures, 12 samples could be analyzed simultaneously. For verification the protocol was carried out with 37 purchased pure cultures.

The world's leading working group for mycotoxin research led by Prof. Dr. Rudolf Krska took over the qualitative and quantitative determination of mycotoxins. Their LC-MS/MS-based method for the simultaneous determination of more than 1000 secondary metabolites (characteristic metabolic products), developed at the Institute for Bioanalytics and Agro-Metabolomics at the BOKU Department IFA Tulln, had been further optimized in course of other FFoQSI projects before.

The presence of certain moulds detected by DNA barcoding could be chemically confirmed by the detection of typical metabolite patterns.

### Impact and Effects

The analyses showed that no dangerous moulds were present in the bakery but only environmental germs that were introduced, for example, during delivery of goods. Nevertheless, Fischer Brot tested additional prevention strategies to reduce the entry and settlement of such undesirable germs.

The developed identification method has great potential far beyond its original purpose. It creates the conditions for a fast and reliable identification of many types of mould in a wide variety of foodstuffs.

It is therefore further being developed in the area of FFoQSI's strategic research in order to expand the spectrum of identifiable germs and also to be able to detect rare pathogens or plant pests. The DNA analysis will be further accelerated in cooperation with another long-term FFoQSI partner, the AIT's Center for Health & Bioresources, using Next Generation Sequencing (high-throughput sequencing; NGS). Subsequently the new method will be tested on products that have been difficult to analyze so far, such as muesli or dried fruits.

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### Project Coordination (Story)

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### Project partners

- Fischer Brot GmbH, Austria
- FH OÖ - University of Applied Sciences Upper Austria, Austria
- BOKU - University of Natural Resources and Life Sciences Vienna, Austria
- AIT Austrian Institute of Technology, Austria

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