

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

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IMPROVEMENT OF THE STABILITY OF RESULTS BY ALGORITHMS AND MACHINE LEARNING

A PREDICTION MODEL FOR THE STABILITY OF DRIED HERBS BASED ON PRODUCT PARAMETERS AND ENDPRODUCT ANALYSIS.

Due to their low height and proximity to the soil, herbs are susceptible to contamination with microorganisms. They are also exposed to numerous environmental influences, which leads to huge quality fluctuations and high processing costs.



Sage. Photo: Nina Affenzeller

controlled organic farming, dared an attempt to better manage these quality fluctuations with the help of applied statistics and machine learning as part of a project with FFoQSI and the Bioinformatics Research Group of the University of Applied Sciences Upper Austria in Hagenberg

The data collected and made available by the approximately 60 members of the cooperative served as a basis.

The Austrian Mountain Herbs Cooperative (Österreichische Bergkräutergenossenschaft), a cooperative of innovative farmers in the Upper Austrian Mühlviertel for the cultivation and sale of herbs from

On the one hand, there were over 100 parameters relating to the cultivation, harvesting and drying of each batch such as conditions during planting, type and number of tillage, type and application of fertilizers, conditions during harvesting and drying

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parameters and on the other hand each batch was tested in a laboratory for microbial contamination, e.g. with yeasts, moulds or pathogens such as Salmonella.

All this data was collected for each batch of each raw material.

In order to predict the risk of microbial contamination in future batches, various algorithms of machine learning have been used, such as Random Forests, Gradient Boosting Trees, artificial neural networks or symbolic regression.

In addition, applied statistics and hypothesis tests were used to identify the most relevant parameters for high microbial contamination. This allows to give farmers concrete recommendations for action to reduce microbial load.

All these aspects are communicated via a web application, which serves both for collecting new data and for presenting the evaluations to the farmers. In the course of its development the application has been continuously adapted to the needs of the farmers through several feedback meetings.

Parameter	Kategorie	Relevanz (%)	Werte Charge 28118087192	Werte Charge 28120017214	Mittelwerte aller guten Chargen	Mittelwerte aller verbleibenden Chargen	Mittelwerte bester Produktion
Frischmasse	Reifezustand	100 %	0 ansz	0 ansz	0 ansz	1 ansz	0 ansz
Schutthöhe oberste Lage	Trocknen	100 %	20cm	15cm	19,32 cm	21,07 cm	10,5 cm
Anzahl Handen	Handentrocknen	99 %	5 ansz	5 ansz	5 ansz	5 ansz	4 ansz

Web-application for improving the microbiological stability of dried herbs: automatic batch comparison with indication of the relevance of the process parameter Picture: Stefan Anlauf

Impact and Effects

The information system developed in this project creates greater transparency for both the cooperative and the member companies through improved monitoring of the data. By analyzing large data sets from different sources with machine learning it has been possible to identify correlation and prediction models.

This leads to a better understanding of the processes, a reduced microbial load and thus to an increase in product safety and storability of the dried herbs.

Project Coordination (Story)

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Project partners

- Österreichische Bergkräutergenossenschaft eGen (approx. 60 member companies), Austria
- Research Group Bioinformatics, FH Hagenberg, University of Applied Sciences Upper Austria, Austria

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