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PRESSEMITTEILUNG

Bread of the future: How to make wheat bread even more nutritious

Wheat Research at the University of Hohenheim How nutritious and healthy a loaf of bread is depends not only on the type of wheat – but also on the baking process.

PRESSEFOTOS unter www.uni-hohenheim.de

Wheat contains many valuable nutrients – and can help to make a diet with bread even healthier. However, the nutrient content depends on the type of wheat. A rapid test method could help to increase the nutrient content of wheat along the entire value chain. Researchers at the State Plant Breeding Institute of the University of Hohenheim have reached this result. In the Betterwheat project, they worked with the University Medical Center at the University of Mainz and four wheat breeding companies to record around 6,000 traits in more than 280 wheat varieties and 400 breeding lines. The team led by Prof. Dr. Friedrich Longin also found out that it is up to the bakers to decide whether the healthy ingredients in wheat bread can also be absorbed by the body. Only certain baking methods, such as an extended leavening process, make the nutrients available to the body.

Higher yields with the lowest possible use of fertilizers and pesticides as well as good baking properties: Up until now, this has been the common interest of all players in the wheat value chain – from breeding to the bakery.

However, it was frequently lost that wheat can also be an important source of nutrients. “Wheat is not only an important source of carbohydrates and protein in the global diet, but according to the FAO it also contributes over 20 percent to the global supply of fiber, minerals, and trace elements” explains Prof. Dr. Friedrich Longin, Director of the Wheat Department of the State Plant Breeding Institute at the University of Hohenheim and coordinator of the Betterwheat project.

“However, how to increase the nutrients in wheat products has so far been a marginal topic in the global value chains.” One reason for this: “A high mineral content in wheat often goes hand in hand with lower yields.”

Five years of research along the entire value chain

To find out which wheat varieties exhibit stable quality under different environmental and

cultivation conditions, the University of Hohenheim and the University Medical Center of the University of Mainz as well as the wheat breeding companies Deutsche Saatveredelung AG, KWS Lochow GmbH, Limagrain GmbH, and W. von Borries-Eckendorf GmbH & Co. KG have recorded more than 6,000 traits in 282 wheat varieties and 400 breeding lines over five years of research.

“The unique thing about the project was the holistic view of variety characteristics along the entire value chain,” emphasizes Prof. Dr. Longin. “In addition to important characteristics for successful cultivation, several dozen processing characteristics for bakeries were considered, as well as important ingredients and proteins that could be important for human nutrition.”

And this was done on many important wheat varieties from Europe, which were tested in numerous growing environments. “This allows us to estimate the extent of the influence of breeding, but also that of the growing environment, on these many traits,” adds Dr. Johannes Schacht, senior wheat breeder at Limagrain GmbH and coordinator of the economic partners in this project.

A healthy diet with wheat starts with choosing the variety

One focus of the team was on the nutrient profiles of different wheat varieties. “We examined around 800 wheat harvest samples for their content of 13 valuable trace elements and minerals, such as iron and zinc – micronutrients that are important for the immune system, our cells and metabolism, among other things.”

The result: “We were able to determine that the nutrient content in different wheat varieties varies greatly – and can fluctuate by up to 50 percent,” summarizes Prof. Dr. Longin. “Our trials also show that the nutrients in wheat can be combined well with the required baking qualities in terms of breeding. These correlated positively with the protein content and dough properties.”

Nutrients in wheat can be measured using a quick method

“In order to use this knowledge in practice, xrf fluorescence spectrometry is a method that can be used to measure the nutrient content in wheat quickly and reliably,” explains Prof. Dr. Longin. The process uses X-rays to detect the ingredients in the wheat and then quickly calculate them based on previous calibrations. The process, which has so far only been used for research purposes, could help to record and increase the content of minerals and trace elements along the value chain.

“But this is only possible if the additional work is also paid for,” emphasizes Prof. Dr. Longin. In addition, the increase in many nutrients in wheat only makes sense if significantly more whole grains or at least flours with a high type number (1050 or ideally greater) are consumed. This is because the valuable nutrients are usually found in the outer layers of the grain and the germ, both of which are ground away in light flour of types 405, 550, and 812.

Baking process determines the bioavailability of nutrients

And the researchers investigated a well-known problem in more detail: “The healthy ingredients in wheat are bound in phytic acid. However, this acid cannot be digested and is excreted along with the beneficial nutrients."

In a further step, Prof. Dr. Longin and his team therefore investigated what influence different baking methods can have on the amount of phytic acid in bread. “To do this, we tested four very common baking methods together with artisan bakers," says the wheat expert.

The combination of a long dough cycle with a sourdough proved to be particularly effective. “We found that the phytic acid is almost completely broken down during this baking process, making the ingredients available to the body.

“All partners in the wheat value chain can influence the nutritional content of bread,” summarizes Prof. Dr. Longin. “However, clear priorities must be set: First of all, we consumers should eat more whole grains. This should then be baked with a long leavening process, and only then does breeding and targeted grain trading make sense in order to further optimize the nutrient profile.”

BACKGROUND: Project Betterwheat

The Project Betterwheat started in winter 2019/20 and ends in September 2025. It is supported by the Federal Ministry of Agriculture, Food and Home Affairs via the innovation promotion program with a total of 2.33 million euros and is administratively supervised by the Federal Office for Agriculture and Food. The breeding companies involved have also made an additional contribution of almost 700,000 euros through extensive field trials and quality analyses. This makes the Betterwheat project one of the largest wheat quality research projects in the world.

The University of Hohenheim, the University Medical Center of the University of Mainz and the plant breeding companies Deutsche Saatveredelung AG, KWS Lochow GmbH, Limagrain GmbH, and W. von Borries-Eckendorf GmbH & Co. KG are involved in the project.

BACKGROUND: Heavily funded research projects

37.1 million euros in third-party funding was acquired by researchers at the University of Hohenheim in 2024 for research and teaching. The “Research heavyweights” series presents outstanding research projects with a financial volume of at least 350,000 euros for applied research and 150,000 euros for non-applied research.

More "Research Heavyweights"

Further details:

Lectures, field tours, and exhibitions on the topics of breeding, cultivation, and processing of bread grains are offered at the “Field and Specialist Day” of the State Plant Breeding Institute of the University of Hohenheim. This will take place on 8 July 2025 at the Heidfeldhof Agricultural Experiment Station. Further information:
https://weizen.uni-hohenheim.de/fileadmin/einrichtungen/lsa-weizen/Feldtag25_Programm.pdf

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