

Editorial

Special Issue “Cereal-Based Foods”

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Published manuscripts about cereals have been increasing in numbers over the last 20 years by an average of 160 manuscripts per year. However, during the last three years, this number has increased to more than 450 manuscripts per year (Scopus database). This demonstrates cereals' status as one of the most important groups of staple foods for human nutrition. However, the processing of the raw material, the improvement in the nutritional value of the final product, as well as consumer acceptance are still of the utmost importance. Furthermore, one major aspect in the future will be the influence of the climate change on the raw material. How this will influence the daily diet of humans is hard to predict, but it must be discussed soon.

This Special Issue of *Applied Sciences* entitled “Cereal-Based Foods” presents novel examples of the preparation of bread and noodles. The accepted manuscripts cover a wide range of important topics in different area, such as the influence of drought on the production of bread, the optimization of the fermentation process of dough, the improvement in nutrition and the antioxidant activity of bread, as well as the improvement in the quality and fat content of fried instant noodles. The implementation of the response surface methodology is presented for two different applications. The accepted manuscripts comprise six original research papers, which are summarized below.

The influence of drought stress due to climate change is becoming more and more importance for food quality. Rekowski et al. [1] investigated the very important question of how drought stress during anthesis will influence the grain protein composition and bread quality in Iranian and German wheat genotypes grown in the field. They showed that drought stress did not significantly change total grain protein concentration in any of the wheat genotypes. However, an increase in ω -gliadins with increasing drought stress could be observed. In the German genotypes, higher levels of HMW and a reduction in LMW-C glutenins were found. It is noteworthy that the drought-induced compositional change correlated positively with the specific bread volume obtained. The authors suggest paying attention to the protein composition may help to develop more efficient wheat varieties with an optimal baking quality when there is a lack of water. However, the results also highlight the necessity of evaluating the drought tolerance of wheat genotypes under their respective environmental conditions in the field.

Borsuk et al. [2] determine the optimal conditions to produce a mature ferment by investigating the ferment storage, fermentation time, and fermentation temperature on the quality of the ferment, as well as the obtained bread. The ferment was assessed for total titratable acidity (TTA), pH, and viscosity; the corresponding breads were evaluated for processing parameters, dough properties, and bread quality. The optimal ferment conditions were found to be a fermentation temperature of 35 °C combined with a fermentation time of 240 min and a fermentation storage time of 24 h at 4 °C to stabilize acid production. The viscosity of the ferment was in a range good for pumping. For process supervision, the authors mention that measurement of TTA would be an effective way to monitor ferment quality.

To explore the effect of the primary processing conditions on the quality of sweet bread made from ready-to-proof and ready-to-bake dough, Zhao and Kweon [3] carried



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out response surface optimization experiments. They used four influencing factors, such as the first and second fermentation times, the freezing temperature, and the freezing time for the optimization. The quality of the breads was evaluated by using the weight, moisture, top crust color, volume, height, and firmness. A multiple response method and desirability were used to identify the optimized processing conditions.

Blends of purple-colored wheat bran with flour at different rations were investigated by Seo et al. [4]. They present the dough mixing characteristics of the flour–bran blends, as well as the quality characteristics and antioxidant activity of the obtained bread. Furthermore, to optimize the formula and processing conditions for the bread the response surface optimization methodology is applied. The results of measurements such as solvent retention capacity, mixographs, and the determination of the total phenolic and anthocyanin contents and antioxidant activity are presented, in addition to optimized process conditions.

Because information regarding the technological functionality and bread making applications of the black rice flour is scarce, Banu and Aprodu [5] provide a comparative analysis of the chemical composition and functional and thermo-mechanical properties of flours obtained from two white rice cultivars and one black rice cultivar. Furthermore, the influence of water absorption on the thermo-mechanical behavior of the dough and on the quality of the bread was investigated. They could show that the black rice flour had the highest contents of protein, crude fiber, ash, and fats. Its dough exhibited a higher value of thermo-mechanical weakening, suggesting a lower protein resistance. The corresponding rice-flour-based bread showed a better quality compared to the other rice varieties.

The effect of the addition of rice and hemp protein, together with transglutaminase (TGase), on the quality and fat content of fried instant noodles has been investigated by Marciniak-Lukasiak et al. [6]. A low-fat product has been obtained with a 3% hemp protein addition with TGase in an amount of 2%; however, the better consumer acceptance levels were observed for the rice protein addition (1%) with 2% TGase. The authors highlight that during the sensory evaluation, all samples of the instant noodles obtained scores higher than 4.2 points on a 5-point scale.

The articles in this Special Issue highlight the diversity of the production of cereal-based foods and new applications in the development and management of these processes. They demonstrate how the optimization of such processes can be carried out using the response surface methodology and how the quality of products can be improved with respect to its nutritional value. In addition, the articles in this Special Issue show a major step towards the production and optimization of cereal-based foods in the future still further research is needed. The papers from this Special Issue can be accessed at the following link: https://www.mdpi.com/journal/applsci/special_issues/Cereal_Fermented.

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