

Scientific aspects in baked goods production

THE ASSOCIATION OF GERMAN FOOD TECHNOLOGISTS ORGANIZED AN INTERNATIONAL FOOD TECHNOLOGY CONGRESS WHICH TOOK PLACE AT THE END OF OCTOBER IN LEMGO, GERMANY



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+ The three track congress program was well equipped with lecturers from all scientific fields. The main focus of the conference program was science and research and there were very few industrial application themes. One morning within the three day conference was dedicated to baked goods technology.

Panettone

The first lecture in this series was held by Olga Harder who reported about the results of her Bachelor thesis on “one-stage production of Panettone”. The production of this traditional Italian Christmas cake is a rather laborious process. It requires several fermentation stages until the natural sourdough yeast has multiplied sufficiently in order to provide the leavening power needed to obtain the characteristic texture of the Panettone which is characterized by large, longish pores. It is also possible to produce Panettone with baker’s yeast instead of sourdough. The goal of the study was to compare the effects of baker’s yeast and sourdough on the processing and overall quality of Panettone.

Several fermentation processes had been used, including three-stage and one-stage sourdough methods, direct fermentation with baker’s yeast and the use of a pre-ferment with added baker’s yeast. The resulting Panettone cakes were compared in terms of volume, crumb elasticity and sensory analysis.

It was found that the higher the sugar content, the lower the volume turned out for the sourdough Panettone. These baked goods showed the softest crumb and highest elasticity whereas the Panettone cakes made with baker’s yeast were much harder in their structure. Sourdough Panettone also displayed more elongated pores compared to the baker’s yeast cakes. The best results were achieved with the sourdough product, “Milano Sour” by the Ernst Böcker company, Minden, Germany, and a one-stage process which saves a lot of time without compromising the characteristic Panettone features. From the food legislation point of view, the use of sourdough starters in the production of Panettone seems to be acceptable because all ingredients comply with the Italian regulation on Panettone.

Gluten-free, fermented bread

Eva Beierle from the University of Bonn, Germany, reported on the “use of lactic acid bacteria for the fermentative acidification of gluten-free flours and for the production of gluten-free bread”. The suitability of several gluten-free flours for the production of sourdough were compared and the effects of the fermentation on the baking behavior of the flours investigated. The microorganism used for the fermentation was *Lactobacillus plantarum*. The baking tests with fermented buckwheat and corn flour yielded very different quality results in terms of the baking loss, bread volume, texture and distribution of pores in the finished bread. It turned out

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that fermented buckwheat flour has the same performance as its unfermented counterpart while for corn flour the fermentation improves its performance. It was suggested that bread made from 50% unfermented buckwheat flour and 50% fermented corn flour would yield the best sensory result for gluten-free bread.

Hulless barley – a new bread cereal?

Mathias Kinner from the University of Natural Resources and Applied Life Sciences in Vienna lectured about hulless (or naked) barley. This grain variety is interesting because of its nutritional profile which includes dietary fiber, carotinoids as well as polyphenols. Currently, it is not used as a bread cereal. In a study, different hulless barley varieties were ground and used in baking tests. One flour was further optimized and used with varying parameters (proofing time, amount of added yeast, hydration, etc.) until a 100% barley bread could be obtained with an acceptable texture and pleasant sensory properties.

Yeasts and pomace for more flavor

The last lecture in the bakery technology section was presented by Marion Seitter from the German Institute of Food Technologies (DIL), Quakenbrück. She explained the “influence of yeasts and other food by-products on the flavor of wheat dough”. Based on the observation that consumers are becoming more and more demanding in terms of bread flavor, it seemed to be advisable to test other yeasts besides the traditional *Saccharomyces cerevisiae* in bread production. Other yeast species such as *Kluyveromyces*, *Torulaspora*, *Dekkera* and *Hanseniopsis* have different metabolic pathways and with that a different impact on the formation of flavor components in fermented dough. In a study, 25% beer, apple or carrot pomace was added to the wheat flour doughs prior to the inoculation with the respective yeasts. In this way, fruity or fruity-flowery flavor components developed in the dough as well. However, further studies are required to gain detailed insight into the metabolic pathways which regulate the formation of flavor components.

Other topics presented at the GDL congress included process engineering, ingredients, packaging, analysis and many more. The conference track on hygiene focused on the Directive 2006/42/EC on machinery which will become effective at the end of December in Germany. Dr. Brose explained that the machine manufacturers then have also to conduct a hygiene risk evaluation besides the equipment risk assessment. The hygiene risk evaluation has to be presented within 24 hours after the occurrence of an incident. The speaker also emphasized that the operating instructions for the machine or equipment have to be provided in the original language of the manufacturer and in the case of exports, the instructions must also be supplied in the language of the user in the export country. The responsibility for providing the instructions in the correct languages lies with the machine manufacturer. +++

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