

Flour know-how

INTERNATIONAL AGRICULTURAL SCIENTISTS, MILLING EXPERTS AND BAKERS MET IN JUNE AT THE 3RD INTERNATIONAL MÜHLENCHEMIE SYMPOSIUM IN HAMBURG

+ Volkmar Wywiol, owner of the Stern-Wywiol-Group to which Mühlenchemie belongs, opened the symposium and greeted more than 300 participants from 60 countries. Current findings on flour processing, flour improvers, flour fortification as well as new applications were the topics on the agenda.

Michael Piber and Peter Köhler of the Food Chemistry Research Center in Garching, Germany, specialized on pentosan-gluten interactions in dough. In their experiments with radioactive tracers they detected a dehydroferulic acid – tyrosine cross link. It is likely that this cross-link represented a covalent linkage between arabinoxylans and cereal proteins. The newly identified cross-link was also identified in wheat and rye flour doughs, which had been prepared without addition of the ferulate tracer. The relative concentration of the dehydroferulic acid – tyrosine cross-link increased during wheat dough preparation. The influence of arabinoxylans on dough formation changes rheological parameters, increases bread volume and has a positive influence on bread staling, but the mechanism of action on molecular basis are not understood yet.

The effects of esterases and especially ferulic acid esterases in baking were explained by Dr. Lutz Popper, Mühlenchemie GmbH & Co. KG, Ahrensburg, Germany, and Dr. José L. Cpa-Patino of the University de Alcalá in Madrid, Spain. Baking + biscuit international will report on this topic in detail in one of the next issues.

Another interesting lecture on the control of origin of acrylamide by formulations and process parameters was presented by Leif Holmgren, Director Research & Development at Wasabröd AB, Filipstad, Sweden. The main chemical reaction responsible for acrylamide production is the Maillard reaction, which is based on free amino acids, mainly asparagine, and reducing sugar. Process conditions influencing the formation and degradation of acrylamide in baked goods to a large extent are time, temperature, water activity and fermentation. The addition of reducing sugar has no effect. High color products yield higher acrylamide values. Temperatures above 200 degrees and less humidity in the product increase the acrylamide values. Fermentation reduces

free asparagine in dough and thus the acrylamide content in bread. Normal yeast fermentation is more effective than sourdough fermentation. In a crisp bread trial with and without yeast, the acrylamide content was more than seven times higher without yeast. Results in the UK have shown that a deficient amount of sulphur in the soil increases the asparagine content in the wheat grain. Rye contains more than wheat and most of the asparagine is located in the germ and the bran fraction. Baking powder increases the production of acrylamide. Ammonium bicarbonate gives more increase than sodium bicarbonate. The addition of CaCl₂ seems to reduce the formation of acrylamide. Recent studies have shown a 30% decrease of acrylamide with the addition of 1% rosemary as an herb or extract in bakery products. The addition of asparaginase also has a good effect in reducing acrylamide.

Professor Fengcheng Wang from Grain College, Henan University of Technology, Zhengzhou, China, in-

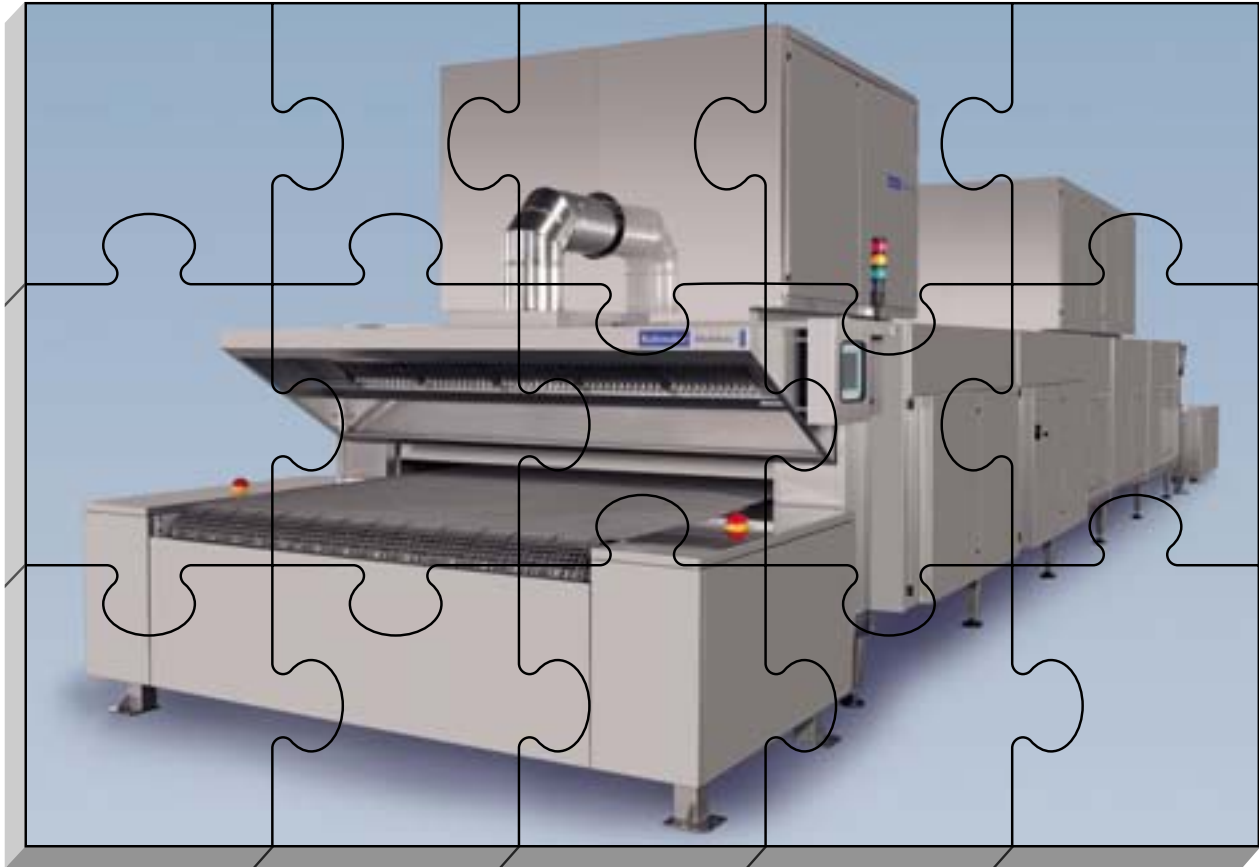
formed the auditorium about the rheological dough properties in steamed bread. Steamed bread called mantou is a yeast raised flour-based product cooked by steaming, instead of baking. It is a popular staple food for the Chinese. Desirable attributes are a smooth, shiny white skin, a round or symmetrical shape and a wrinkle- and blister-free surface. Professor Wang showed the influence of different wheat qualities, the effects of flour blends, dosage of ascorbic acid or lipases, glucose oxidase or xylanase.

Pieter van der Horst, Cargill b.v., talked about the function of vital wheat gluten in different bakery applications. Dr. Markus J. Brandt, food technologist at Ernst Böcker GmbH & Co KG, Minden, Germany, lectured about the influence of sourdough and enzymes in French baguette dough. In comparison to straight dough processes, the drop in pH during sourdough fermentation changes the activity of endogenous and added enzymes affecting dough rheology. With the use of convenient dried or liquid sourdoughs, a short time straight process is possible for baguette production with optimum dough properties and enhanced flavor, said Dr. Brandt. A range of other lectures on flour fortification and milling technology rounded off the two day symposium. +++



++ The persons decisively responsible for the symposium: Dr. Lutz Popper (research & development) (right) and Thomas Schramm (baking laboratory). The posters "baking" and "rheology" inform on problems and present possible solutions with the help of Mühlenchemie. They are available in English, French, German and Spanish

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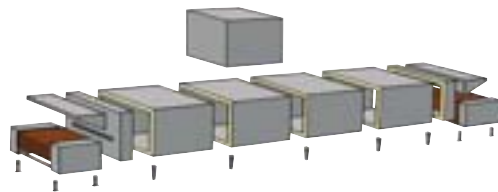
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