Preventing or postponing wheat bread staling with enzymes

Identification

Key words: bread, staling, enzyme, amylase, alpha-amylase, lipase, Actinidin
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Completed by: SP

How does it work?

Primary objective: Prevention or postponement of bread staling by addition of enzymes into the dough or flour before baking.
Working principle: The principle is to add enzyme to wheat flour before dough preparation or during the mixing of the dough. The enzymes will be activated when in contact with water and at the required temperature. They will then be deactivated during the baking process (due to high temperature denaturation). The enzymes used for prevention/postponing of bread staling are mainly amylases (more specifically alpha amylases). There are also other kinds of enzymes that have shown to retard bread staling but has not been as thoroughly investigated as the amylases. Lipases, lipoxygenases and some proteases are examples that have shown potential to be anti-staling. Bread staling itself is not well understood on a molecular level but it is known that certain enzymes have a good anti-staling effect through empirical testing. For amylases it is thought that the side chains of the amylopectin are affected by the enzymes.

Images

Additional effects: An enzyme used in bread making contributes to a wide variety of improvements in bread and bread making. For instance amylases can beyond the anti-staling effect improve loaf volume, improve crumb texture and crust colour. Other enzymes can improve dough strength and increase dough stability.

Important process parameters: Temperature.
Important product parameters: Type of enzyme (heat resistant or not), type of bread, concentration of enzyme.

What can it be used for?

Products: Enzymes can be used in a wide variety of products, but as an antistaling agent they can only be used in bakery product since the phenomenon only exists there.
Operations: Baking
Solutions for short comings: This technique can resolve the issue of bread staling and therefore prolong the shelf-life of the product.
What can it NOT be used for?

**Products**
It can only be used for bakery products since the staling phenomenon only occurs there.

**Operations**
Technology only for baking.

**Other limitations**
Temperature of baking, time.

**Risks or hazards**
Not known

Implementation

**Maturity**
Addition of enzymes exists in the bread making industry today, either as an addition in flour or in the dough preparation.

**Modularity /Implementation**
This technology can be implemented in a product line.

**Consumer aspects**
As enzymes are consumed in baking they are used as a process aid and it is therefore not required to be present at the table of contents and therefore is not exposed much to the consumer. Therefore consumers are not aware of this and the impact of enzymes should be low.

**Legal aspects**
There exist regulation documents for EU countries regarding enzymes, please read from the following link for more information.

**Environmental aspects**
Not known currently.

Facilities that might be interesting for you

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<th>Title</th>
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<td>Auditorium IRTA</td>
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<td>Clean room – Histocell</td>
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<td>Video observation system for market research and product development tasks - Keki</td>
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Further Information

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<td>SP, KU Leuven LFCB</td>
<td>Puratos, Zeelandia</td>
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References


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