Ban on bromate boosts Gluzyme® Mono in China

In 2005, sales of Gluzyme Mono in China increased eightfold compared to 2004. This enzyme has become a standard choice for maintaining performance when replacing bromate.

Among other things, a good flour for making bread should have good water absorption, good dough handling properties and good fermentation tolerance. In China, meeting these requirements is often a challenge.

In particular, the baking of Western-style white bread places high demands on locally produced Chinese wheat flours. Even though high-quality wheat is imported from countries such as Canada, USA and Australia for use in baking, in the main it is low-quality or medium-quality local wheat that is used. This flour needs to be supplemented with other ingredients and processing aids.

Oxidising agents such as potassium bromate and ascorbic acid, enzymes such as fungal alpha-amylase and xylanase, and emulsifiers such as SSL/CSL have been used to improve flour in China.

Banned in July 2005

Up to 2005, potassium bromate was popular in China. This cheap and effective oxidant helps to improve dough strength, tolerance, oven spring/loaf volume and crumb structure. However, bromate has been identified as a carcinogen and is banned as a flour additive in most countries around the world. China also introduced a ban on July 1, 2005 in response to a growing awareness of food safety issues. In fact, bakers, flour mills and flour improvers were given just 30 days' notice to stop using bromates. This triggered a flurry of activity and a sudden surge in interest in Novozymes' baking enzymes, in particular Gluzyme Mono. This enzyme strengthens the gluten, contributing very positively to dough elasticity and helping to produce a stronger, drier dough.

Replacing bromate

In the absence of bromate, it is normal to readjust the enzyme and oxidising system to maintain similar functionality in dough and bread (see Fig. 1). This may include adjusting dosage levels as well as applying additional enzymes not previously used.

Novozymes has many years' experience of bromate replacement and gives the following general recommendations:

- Add the glucose oxidase Gluzyme Mono.
- Increase ascorbic acid or other oxidising agents.
- Increase addition of the xylanase Pentopan® Mono.
- Maintain or increase fungal alpha-amylase levels.
- Add the lipase Lipopan® F and/or emulsifiers for further improvement depending on the flour and baking procedure.

This is general advice, but Novozymes doesn't believe that one solution is right for all customers and all bread recipes. To meet individual needs, Novozymes therefore supplies a range of baking enzyme products with specific activities.

Customer trials

In China, Novozymes has its own baking laboratory team and technical sales representatives who can assist with trials at bakeries or flour improvers. Here are two examples of typical results from external customer trials in China in 2006.

One customer obtained a better effect on the volume, crumb structure and ascorbic acid factor of its buns compared to its current bromate-free solution. The ascorbic acid factor is the ratio between the height and diameter of a bun. This measure, which is very important to Chinese customers, can be used to evaluate the flow characteristics and, to some degree, the firmness and strength of the dough. Gluzyme Mono and Lipopan F make a significant contribution to this factor in the absence of bromate due to their effect in strengthening the dough gluten network and in improving the gas retention ability.

Another customer also obtained a better result than with its control based on emulsifiers, fungal alpha-amylases, xylanases and chemical oxidants. For the trial, they added Gluzyme Mono and Lipopan F to the same mix but took away the emulsi-

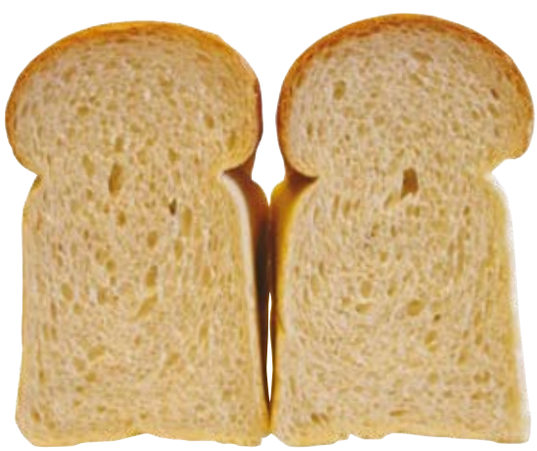
fiers. The result was a superior ascorbic acid factor and crumb structure.

Widespread ban

China is the latest in a long line of Asia Pacific countries to have implemented a ban on potassium bromate for use in the baking industry over the last few years. However, in most other parts of the world this chemical additive was banned many years ago. That's why bromate replacement is nothing new to Novozymes even though it is relatively new in China. ●

FIG. 1. A BROMATED SYSTEM VERSUS A BROMATE-FREE SYSTEM

The base flour was a medium-quality, local Chinese wheat flour. The loaves look roughly the same, showing that the use of Gluzyme® Mono and Lipopan® F with a slightly increased level of ascorbic acid can effectively replace bromate. A fine, white, even crumb structure is maintained, but the bromate-free bread made with Gluzyme Mono has a 2.5% higher loaf volume.



CONTROL, BROMATED:
Potassium bromate: 30 ppm
Ascorbic acid: 50 ppm
Fungamyl® 2500 SG: 5 ppm
Pentopan® Mono BG: 30 ppm

BROMATE-FREE:
Ascorbic acid: 80 ppm
Fungamyl® 2500 SG: 5 ppm
Pentopan® Mono BG: 40 ppm
Gluzyme® Mono 10,000 BG: 10 ppm
Lipopan® F BG: 15 ppm

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Neutral Bio-Polishing gives

Cellusoft® CR, Novozymes' latest product, helps textile manufacturers to boost the quality and finish of their fabrics.

Most fabrics containing natural cotton fibres have tiny, loose or protruding yarns dotted over their surface, giving them a fuzzy texture. With repeated wearing and washing, these yarns break and their ends become tangled, resulting in pilling, which can make fairly new garments look old and worn. Bio-Polishing removes projecting fibres to improve the texture and appearance of fabrics. This not only creates a smoother fabric with resistance to pilling, but also improves softness, lustre and drape. In short, Bio-Polished fabrics look better and last longer.

Bio-Polishing uses a group of enzymes called cellulases. These enzymes have the ability to degrade cellulose, the basic structural building block of plants and the major constituent of other cellulosic fibres.

When the enzymes are applied to the fabric, they partially digest excess and protruding yarns, loosening them from the fabric. The resulting fuzz is then removed by high-speed mechanical agitation of the fabric, for example in a jet dyer.

Sensitive cellulases

However, this process has been hampered by the sensitivity of conventional Bio-Polishing enzymes to pH. Most cellulases will only operate effectively across a very narrow, acidic pH range. Even very small differences in pH can alter the performance and effect of the enzymes.

All this means that manufacturers must take great care to ensure that the solution is at the correct pH for the enzyme to work properly and that the pH is uniform throughout the solution. The processes taking place before Bio-Polishing, for example bleaching and dyeing, require a high, alkaline pH. Operators must therefore carefully adjust the pH of the solution by adding acid prior to Bio-Polishing.

The time taken to adjust the pH and wait for even circulation can significantly draw out the Bio-Polishing process. Seemingly trivial differences in pH between batches