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better baking

TopBake Gluten Enhancer

The great all-rounders for weak and composite flours

Flour quality is not always optimal

In practice, mills are not always able to use wheat with optimal properties. The reasons include lack of availability, crop damage and widely fluctuating prices. Mills therefore tend to mix high-quality hard wheat with poorer quality soft wheat, or they work in wheat lots that have not developed as they should because of climatic conditions. In some places it is usual, or even prescribed by law, to add alternative flours made from soy, maize, beans or cassava. The disadvantage of this practice is that the weaker the wheat gluten, or the smaller the proportion in the mixture, the greater are the negative effects on dough stability and volume. The answer is to compensate for this loss of quality with suitable flour improvers.

Vital wheat gluten has its limitations

One possibility is to add wheat protein. But the prices and availability of vital wheat gluten vary enormously, and the results in the baked goods are not always satisfactory.

TopBake Gluten Enhancers make up for deficiencies

Against this background we have developed a product series that greatly improves the structure of the dough: TopBake Gluten Enhancers make it possible to use low-gluten soft wheat or work in non-bread flours without loss of baking quality and to do without vital wheat gluten. The effects of the new compounds were tested in our applications laboratory with various mixtures of hard and soft wheat and the addition of cassava.

Benefits of a TopBake Gluten Enhancer

Baking

- Increases the water absorption capacity
- Optimizes dough stability
- Enhances the crumb structure
- Compensates for the use of composite flours

Economy

- Maintains good baking properties when soft wheat is used
- Makes it possible to replace vital wheat gluten at 1/10 of the usage level
- Lower cost through the use of cheaper raw materials
- Product series based on different raw materials, permitting a response to price fluctuations

Tab. 1: Effect of hard and soft wheat mixtures on water absorption in the farinograph

Hard/soft wheat	100	90/10	80/20	70/30	60/40	50/50
Protein (NIR)	14.8	14.6	14.5	14.2	13.9	13.7
WA farinograph in %	64.6	64.1	63.7	63.2	62.7	62.1
With TopBake Gluten Enhancer 22						
Usage level in %	0	0.05	0.1	0.2	0.25	0.3
WA farinograph in %	64.6	64.5	64.4	64.3	64.3	64.1
Stability farinograph in min.	20:19	20:04	19:45	19:02	19:05	19:43

Reference mixture, 80/20

Mixture 70/30 + 0.1% TopBake Gluten Enhancer 22

Fig. 1: Optimization of the mixture ratio of hard and soft wheat using TopBake Gluten Enhancer 22 and uniform standard treatment

Reference with 4% vital wheat gluten

1% vital wheat gluten + 0.3% TopBake Gluten Enhancer 22

Fig. 2: Enhancing the efficacy of vital wheat gluten leads to much better results in products baked with composite flour containing 10% cassava.

Optimization of hard and soft wheat mixtures

The initial reason for this series of tests was the poor availability of hard wheat in some regions. We were looking for a flour improver that would permit mixing with soft wheat and compensate for the resulting loss of protein quality.

TopBake Gluten Enhancer 22 brought about a considerable improvement in quality. Whereas water absorption in the farinograph sank, without the additive, as the proportion of soft wheat increased, the addition of TopBake Gluten Enhancer 22 maintained the required level. It also had a positive effect on stability (Table 1).

The baking trials confirmed the rheological results. For example, a 70/30 mixture of hard and soft wheat with the addition of 0.1% TopBake Gluten Enhancer 22 produced a loaf similar to an 80/20 mixture without the additive (Figure 1).

Cassava flour: TopBake Gluten Enhancer proves superior to vital wheat gluten

In the second series of tests, cassava flour was used – a raw material that contains no gluten and disrupts the structure-forming function of the protein from the wheat flour. In order to produce cassava loaves capable of competing with pure wheat bread, the dough must be strengthened and the baking properties improved. Vital wheat gluten is often added to achieve this.

Figure 2 shows our test with 10% cassava flour, 4% wheat gluten being replaced with 1% wheat gluten and 0.3% TopBake Gluten Enhancer 22. This modification significantly improved the quality of the end products, which was reflected above all in a noticeable increase in volume and a more even crumb structure.

Processing

The use of TopBake Gluten Enhancers does not require either a change in dough processing or adjustment of the baking process.

Examples of usage levels

Gluten replacement:
0.1% TopBake Gluten Enhancer replaces 1% vital wheat gluten.

Mixtures of hard and soft wheat:
0.05-0.1% TopBake Gluten Enhancer to each 10% soft wheat.

Examples of products

Product	Active ingredients	Objective
TopBake Gluten Enhancer 16	Enzymes, vegetable fibres, hydrocolloids, ascorbic acid	Basic version with a balanced raw material base for volume and dough stability
TopBake Gluten Enhancer 21	Enzymes, vegetable fibres, hydrocolloids	Basic version for increasing water binding without changing dough properties
TopBake Gluten Enhancer AS	Enzymes, vegetable fibres, ascorbic acid	Optimized dough stability due to ascorbic acid
TopBake Gluten Enhancer 22	Enzymes, vegetable fibres, ascorbic acid	Large baked volume through a varied enzyme system

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