

Emulsifier boosters make baking more profitable

Alphamalt EFX, SFX, DFX

Importance of the flour's natural lipids

Depending on the level of extraction, the total lipid content varies between 1 and 2.5%. It comprises a complex mixture of polar and non-polar lipids which interact with the starch, and in particular with the gluten proteins, during the process of preparing and baking the dough.

Non-polar lipids consist of a glycerol molecule esterified with up to three fatty acids. Because of their molecular structure these lipids tend to be hydrophobic and have an unfavourable effect on the volume of breads.

Polar lipids in wheat flour are above all glycolipids and phospholipids (lecithin). These lipids are based on glycerol but the latter is only esterified with one or two fatty acids and a polar group. They are surface active and therefore affect baking properties.

The development of the emulsifier booster

How can the natural potential of the emulsifying substances found in wheat flour be exploited to improve the baking properties? Attaining the best possible bread volume depends on the ratio of non-polar to polar lipids and the amounts present in the flour. With the aid of special carboxylic ester hydrolases we achieved an enzymatic modification of the flour's baking-active wheat lipid fractions during the baking process. Our emulsifier booster splits fatty acids from the flour's natural lipids. In the process completely non-polar, lipophilic triglycerides are split into less non-polar mono- and diglycerides. From lipids such as lecithins and galactolipids, which are already polar, more strongly polar and hydrophilic molecules are formed.

Benefits of the emulsifier booster

Technical

- Compensates for fluctuating flour qualities
- Boosts the emulsifying effects of flour lipids
- Has positive effects on stability, handling, volume and crumb
- Enters synergisms with emulsifiers, in particular DATEM and SSL

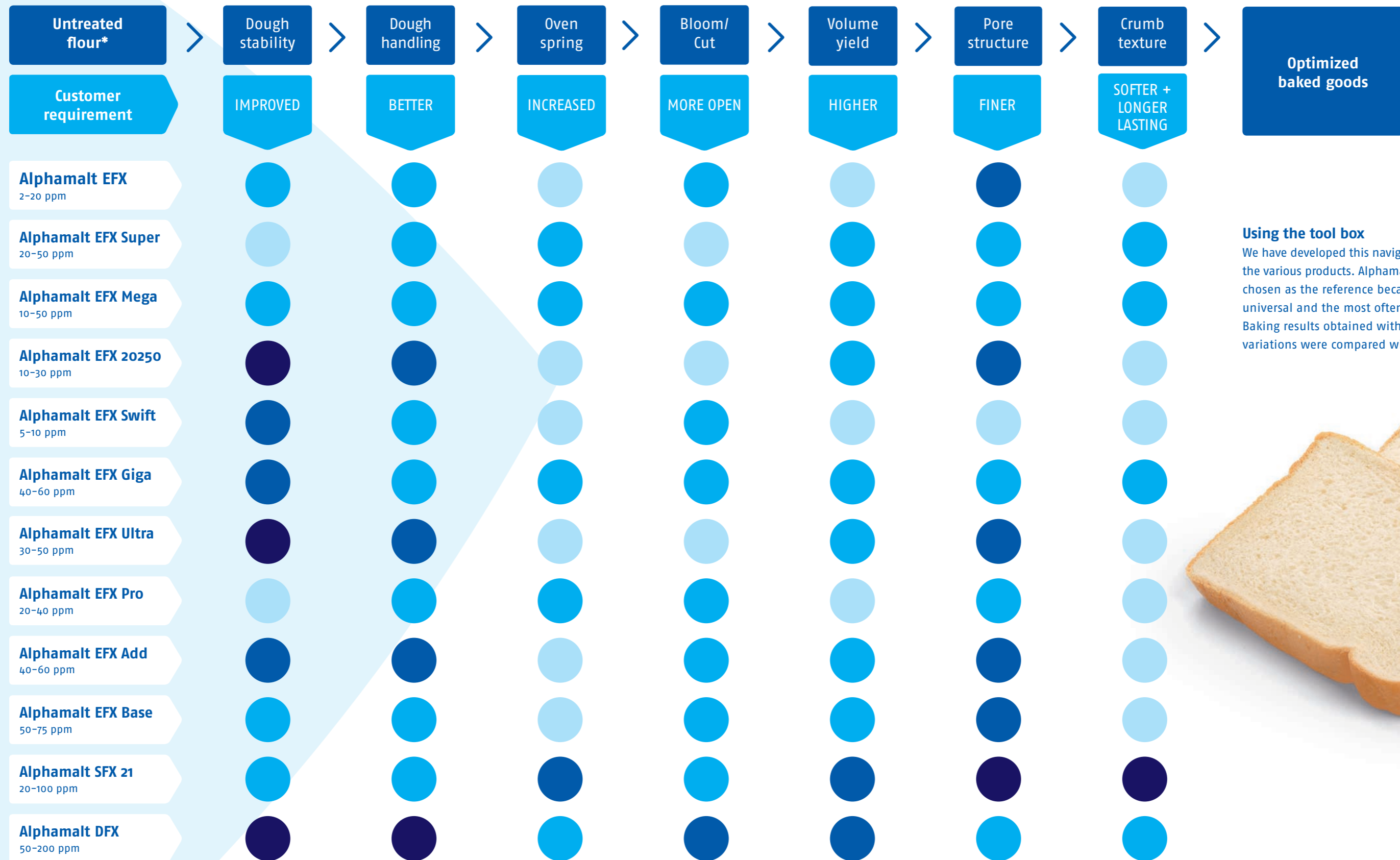
Economic

- Possible to reduce the amount of emulsifier used
- No lumps formed compared with emulsifiers
- Low dosage, transport and storage costs

This results in a noticeable shift towards the baking-active, polar lipid fractions with emulsifier-like properties, similar to those familiar from the emulsifier DATEM, for example. Modified wheat lipids help to create an elastic film around the gas bubbles that form during fermentation and the early phase of baking – rather like bubble gum. This "encapsulation" and stabilization of the expanding gas cells increases the dough's fermentation tolerance and gives it a greater gas retention capacity.

In our tool box all the products have been graded using *Alphamalt EFX Mega* as the reference against which various product characteristics are compared. Whereas the Alphamalt *EFX* range was developed for universal use, Alphamalt *DFX* is geared to applications containing DATEM and Alphamalt *SFX* to those containing SSL.

Toolbox Alphamalt EFX, SFX & DFX



* As basic treatment Mühlenchemie recommends e.g. Alphamalt A 6003 and Elco P-100 K.

Intensity of effects compared with Alphamalt EFX Mega:

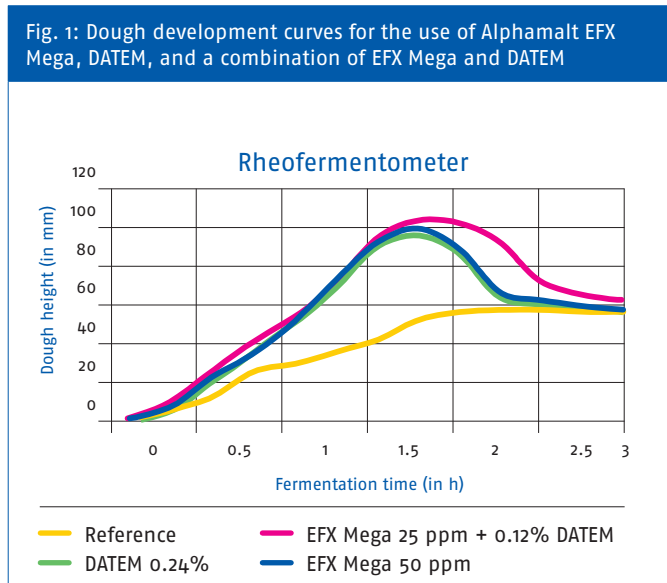


Dough properties and volume yield with Alphamalt EFX Mega

The laboratory tests reveal **major improvements in dough development**.

Fig. 1 shows the development of the dough using Alphamalt EFX Mega, DATEM and a combination of the two in the Rheofermentometer.

The curves correlate well at a dosage either of 50 ppm Alphamalt EFX Mega or 0.24% DATEM. A combination of the two substances actually produces synergies.



Baking trials with baguettes

Fig. 2: Comparison of the results of baking (baguette, 120 min proof time; basic treatment: oxidizing agent Alphamalt VC 5000 (amylase product))

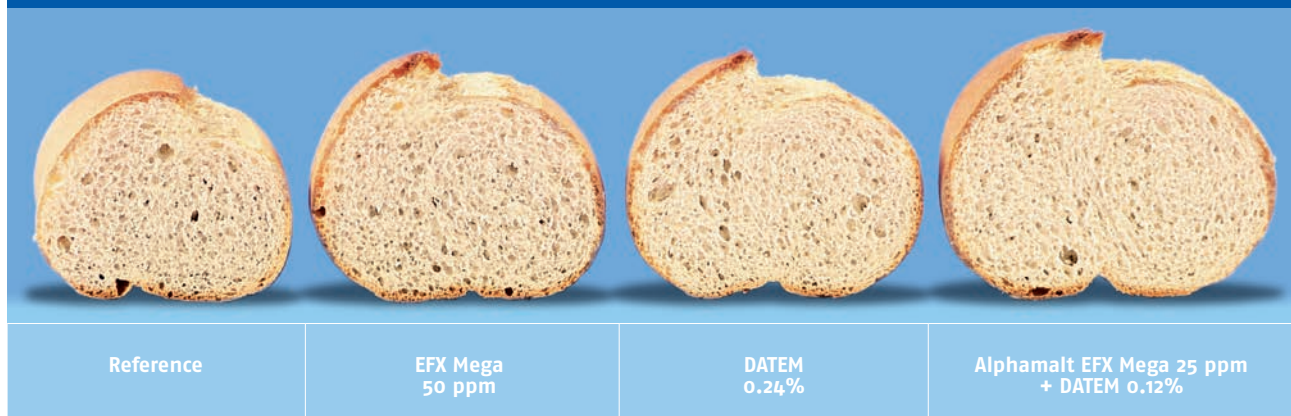


Fig. 2 shows the results of a baking method with a relatively long proof time (120 minutes). This is characteristic of applications in which dough stability and gas retention capacity are especially important. Alphamalt EFX Mega delivers volume yields comparable to those of DATEM and a similar or even better crumb and identical top surface.

There is a diverse range of solutions to meet the diversity of requirements for baked goods. The navigator will help you identify the best emulsifier booster.

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