

TECHNICAL ARTICLE

# How to create cake mixes for all cakes with just one emulsifier



BRINGING GOOD THINGS TOGETHER

**Palsgaard**<sup>®</sup>

Cake emulsifiers are vital ingredients in cakes due to the complicated interaction with the other ingredients. Often several cake emulsifiers are needed to create the desired quality and variety of cakes. What if you could do it all with just one emulsifier?

### Can one emulsifier really do it all?

Imagine the requirements of the unique cake emulsifier possessing all the desired properties highly valued by the cake mix producers, the cake industry and the end users:

- A product with a unique, uniform performance in all types of cake mixes and a minimum of two years of optimal functional shelf-life which would secure a uniform and long functionality in the cake mixes, leading to satisfied end-users
- A fast and efficient product with a high tolerance to difficult ingredients such as egg powder, cocoa and oil – in other words a very versatile and robust cake emulsifier
- A smart emulsifier composition which would open up the possibility to create cakes with lower amounts of saturated fats and at the same time result in a shorter list of ingredients
- A cake emulsifier which could facilitate the production of almost all types of cakes by recipe engineering and result in high quality cakes even with an improved cost in use calculations

Palsgaard has matched these requirements by developing and fine-tuning a cake emulsifier which more than meets these demands.

The product is named **Emulpals® 110**.

It possesses three major and very important benefits:

- Superior stability over minimum 24 months
- Stable batch-to-batch performance
- Superior tolerance

The development of **Emulpals® 110** has been followed by intensive performance- and shelf-life tests which have been carried out in both in-house in our application labs at Palsgaard as well as at several production sites. The results of the various tests resulted in a number of performance benefits which, when put together, paint a perfect picture of a unique and special product – a product that can do it all.

Apart from the three major benefits, several others should be mentioned in order to paint the full picture of a truly unique product:

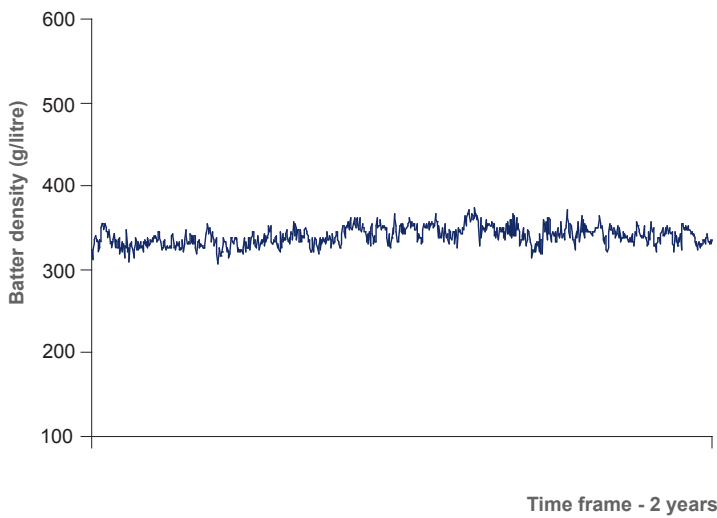
### Stability & performance

**Emulpals® 110**, an activated cake emulsifier, is based on specially selected polyglycerol esters and mono- and diglycerides which have been optimized to perfect performance in cake systems. The emulsifiers are finally activated on rice starch in a highly sophisticated extrusion process resulting in a convenient free flowing off-white powder. The whipping active emulsifier is fixed to the outer surface of the starch particles during the extrusion process and has proven to be extremely stable in functionality during storage.

The activation process provides an instant functionality of **Emulpals® 110** once in contact with water and energy, in other words when the whipping starts. The continuous production process enables a functional uniformity second to none, which is documented in the specially developed aeration and baking control (ABC test) we continuously carry out on samples drawn with intervals over every production run. Figure 1 shows the batch-to-batch stability of **Emulpals® 110** over a period of two years.



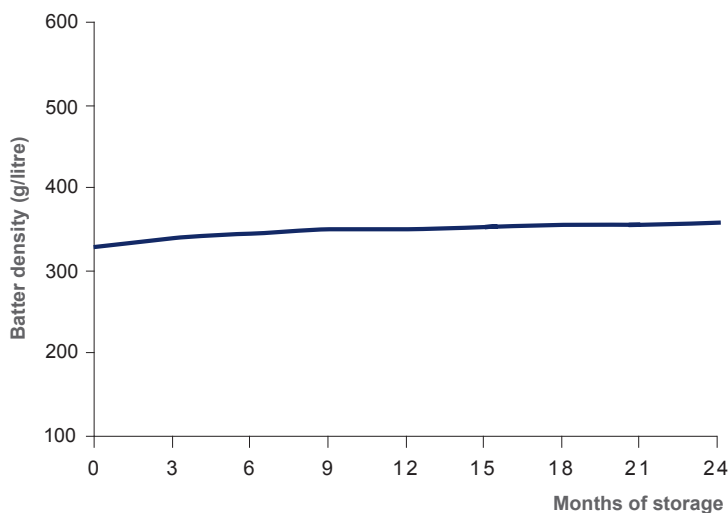
**FIGURE 1: BATCH-TO-BATCH STABILITY OF EMULPALS® 110**



### Superior stability over minimum 24 months

As a standard, a random number of samples are drawn from the production runs and are kept under normal fluctuating temperatures for at least the shelf-life period, which in the case of **Emulpals® 110** is minimum 24 months. In the shelf life period – and actually much longer – the functionality of **Emulpals® 110** is not significantly changed and will therefore be fully functional in cake mixes during the entire shelf-life period. Figure 2 shows the storage stability of **Emulpals® 110** over a two year period.

**FIGURE 2: STORAGE STABILITY OF EMULPALS® 110 OVER A 2 YEAR PERIOD**



### What is an activated cake emulsifier?

“Activated cake emulsifiers” is a term used to describe the instant properties of the emulsifier when added to the cake batter. The activation is achieved by placing the emulsifier on the surface of very small starch granules by means of a highly sophisticated extrusion process.

The result is significant: One 15 kg carton has a surface area equal to 4 or 5 football fields. The effect is instant functionality, fast uptake and incorporation of air into the cake batter, leading to improved stability and superior cake quality.

## Tolerant aeration performance

**Emulpals® 110** can be characterized as an all-in medium fast-acting cake emulsifier which means there is no need for adding the ingredients in steps. The aeration develops already after a minute and reaches its optimum after 5 – 8 minutes which is perfectly in balance with the other ingredients in the cakes. The risk of over-whipping is not an issue due to the very stable batter created by the interaction between the emulsifiers and the protein in the cake batter.

A potential problem when making cakes is the seasonal temperature fluctuations of the ingredients and the production room which often leads to variation in the cakes. This is not the case when using **Emulpals® 110** due to the tolerance to temperatures in the batter.

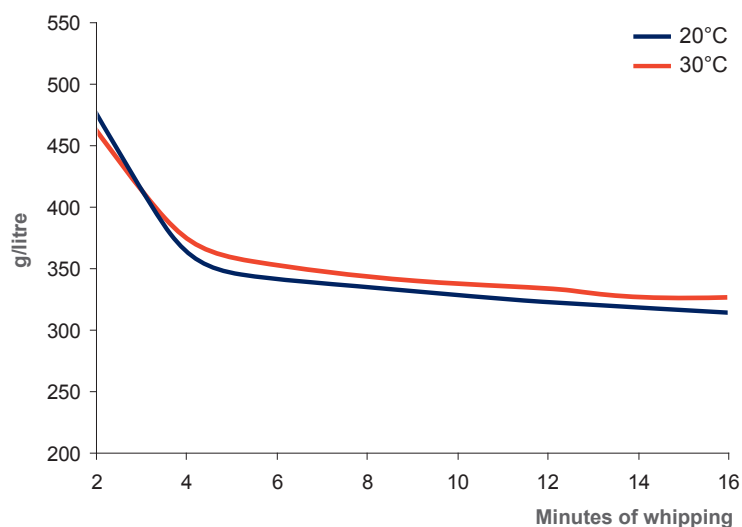
In Figure 3 the whipping performance of a batter based on **Emulpals® 110** is tested with batter temperatures of 20°C and 30°C and as shown, the performance is very similar at both temperatures. In addition to this, the graph shows the stability against over-whipping as basically no change is seen from 6 to 16 min. of whipping.

## Recipe engineering & product development

Using only one cake emulsifier in various mixes makes the declaration easy and simple – and when the components in the emulsifier is limited to two emulsifiers and one activating medium (rice starch) it can hardly be more simple. Contrary to protein and sugars which are components in other powdered cake emulsifiers, rice starch will not add any colour to the finished cake.

This benefit opens up for convenient and easy dosage changes in recipes without having to worry about a potential colour change and therefore this contributes to making **Emulpals® 110** a very versatile product. This and the stable performance of **Emulpals® 110** over a big dosage range makes it possible to make fluffy and light cakes, more dense and moist cakes, various crumb structures and cakes

**FIGURE 3: WHIPPING PROFILE OF EMULPALS® 110 AT DIFFERENT TEMPERATURES**



with cocoa, high amounts of eggs and oil – all with one cake emulsifier and only by adjusting the dosage and the components in the recipes.

Being free of allergens, completely vegetable and free of trans fats, not to mention sugar, **Emulpals® 110** fits in all types of recipes from vegan to gluten- and sugar-free which makes product development so much easier.

As part of **Emulpals® 110** is starch this part can be taken out of the recipe and replaced with e.g. flour and this way balance the recipe and at the same time achieve cost savings on the total recipe without changing the nature of the cakes.

## Reducing saturated fats in cakes

The emulsifier tolerates high amounts of oil in both aerated and non-aerated cake systems. In aerated systems such as the typical Asian sponge cake which is a highly aerated sponge cake with an addition of 10% of liquid oil, **Emulpals® 110** has proven to be a highly valued ingredient as it creates a very stable aerated cake batter able to absorb and stabilize high amounts of liquid oil, resulting in a very soft and delicious cake.

Non aerated cakes such as pound cakes are often based on margarine or shortening which contain



high amounts of saturated fats. With **Emulpals® 110** as cake emulsifier all the solid fat can be replaced by liquid oil without changing the nature of the pound cake – apart from the possibility of achieving a softer and more moist cake and an easier production process, that is.

In general this opens the possibility of reducing the overall fat content, and just as importantly changing the composition of the fat in a more healthy direction. Utilizing the properties of **Emulpals® 110** it is possible to replace 90% of the saturated fat in a traditional pound cake with the healthier unsaturated fats and in addition to this an overall fat reduction is possible.

### **The importance of uniformity, robustness and versatility**

The uniformity is important for bakers and food services worldwide as it enables them to easily make the same delicious cakes every day in all climates and this way increase customer satisfaction.

The uniformity and the batter stability is crucial for industrial bakeries securing a completely uniform cake production, no loss of batter stability during pumping or storage of the batter, and a resulting stable cake which can be handled and packed on highly automated lines without time consuming adjustments.

The robustness and versatility of **Emulpals® 110** are highly valued properties in retail mixes where

cake making is different from house to house. There will be variations in the scaling and egg size, added milk or water, oil or margarine, special homemade innovations and last but not least the whipping or mixing and the baking. These are all important variables which call for the unique stability and robustness possessed by **Emulpals® 110**.

### **Practical applications**

The above performance characteristics makes **Emulpals® 110** the ideal choice for the cake mixes used by bakers and food services, the industrial mixes used by cake factories as well as for the retail mixes used by household consumers worldwide.

In general the composition of **Emulpals® 110** provides the benefit of leaner labelling, easier product development, possibility of reducing saturated fats and an overall use in various special products with claims such as vegetable, free of allergens etc.

This and all the special properties of **Emulpals® 110** makes it a highly valued product development tool.

## **CONTACT US**

Contact us to order samples of **Emulpals® 110** to try out in our vast library of recipes, or visit [www.palsgaard.com](http://www.palsgaard.com) for more information.