Creating Cake with a Clean Label

The demand for clean label bakery products continues to increase as consumers look for food made with natural, chemical-free, familiar ingredients. This extends to sweet goods such as cakes and muffins as well. Batter-based products raise unique challenges, such as natural alternatives to artificial emulsifiers, chlorinated flour and preservatives. However, there are solutions to make quality clean label cakes.

The cake category represents a very important segment within the baking industry. While it can be broad, it includes products that are rich in sugar, fat and eggs, and can be accompanied with a wide variety of inclusions like fruits and flavors. They are typically made from soft wheat flour characterized by low protein content and high purity (mostly endosperm and starch from center of wheat kernels).

What counts as clean label cake?

The consumer's definition of "clean label" constantly evolves. So, food manufacturers have to be at the top of their game to provide for this dynamic market. While there is no clear FDA definition available for clean label products, the industry's definition is based on the perceived value of a product's ingredients. The baking ingredients for clean label products should be:

- Chemical-free (no artificial preservatives, flavors, or colors)
- GMO-free
- Minimally processed
- Easy to understand

For cakes, this means:

- No bromated flour
- No chlorinated flour
- No high fructose corn syrup
- No preservatives
- No artificial emulsifiers
- No leavening acids like aluminum-based phosphates and sulfates

While organic or natural sweeteners, colors and flavors may be slightly easier to bake with, it's harder to bake without bleached flour or aluminum-based phosphates. The alternatives must help with batter aeration, cell structure, and finished product texture. And most common preservatives and artificial ingredients can not be used.

Clean Label Solutions **FOR CAKE**

1 Preservation

The most prominent problems bakers face with clean label cakes are preservation and shelf-life, which are affected by:

Water activity: This can be reduced through increasing the use of humectants or hydrocolloids (sugar, honey, salt, gums, etc.).

Natural preservatives: Sorbic acid made from plant and fruit extracts can replace chemical ingredients such as potassium sorbate.

Herbs: If the herb aroma is not an issue, rosemary extract, cinnamon and clover are potent natural anti-mold ingredients.

Sanitation: Infrequent or inadequate sanitation practices reduce the shelf-life of the product due to accelerated mold growth. Make sure all processing and preparation areas are cleaned regularly, as well as the baking equipment and air filters.

2 Chlorinated Flour

Chlorinated flour (cake flour) is bleached to modify and make starch functional in higher sugar systems. The modification forms a weaker gluten structure in the batter, resulting in a softer texture.

Alternatives: The clean label alternative is a mixture of heat-treated flour, pre-gel starches, and emulsifiers.

Tip: Reduce sugar by the addition of artificial sweeteners when replacing chlorinated flour.

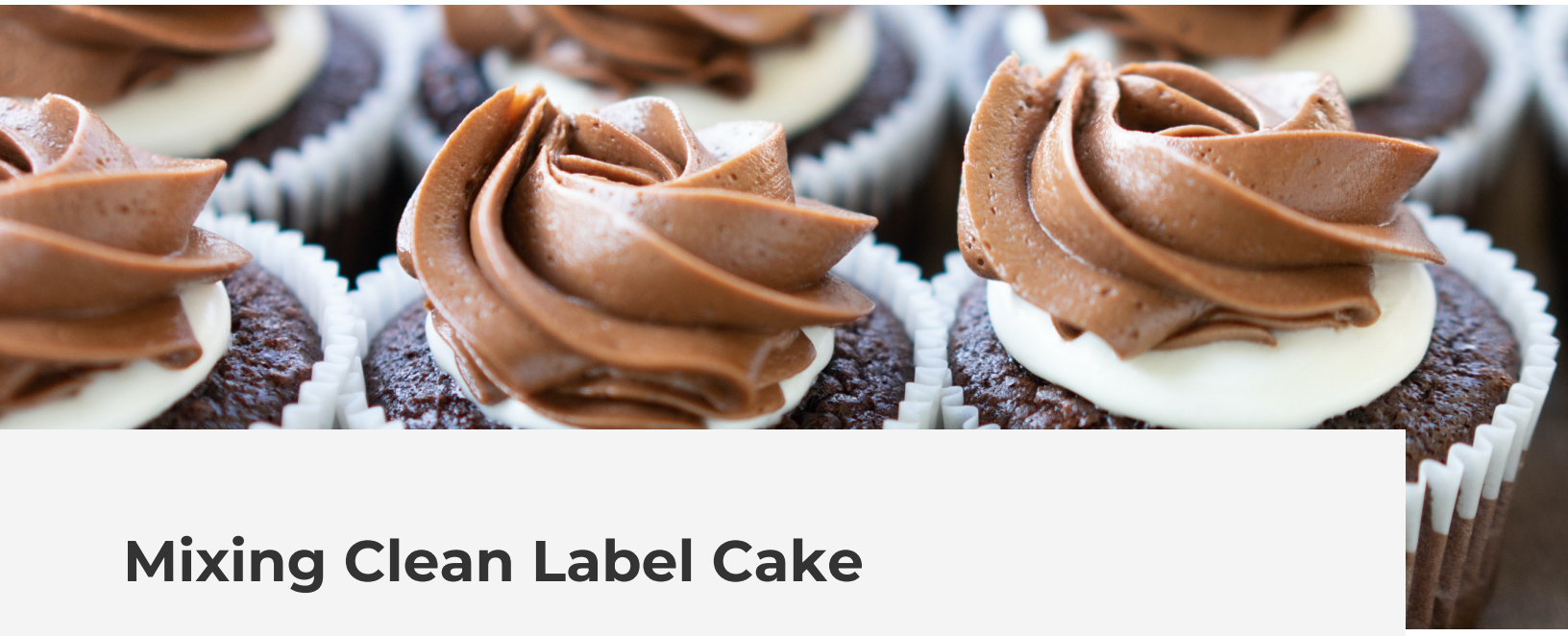
Clean Label Solutions **FOR CAKE**

3 Emulsifiers

Emulsifiers work on air-water interface systems to incorporate higher air content in the batter. Therefore, they aid in creating a fluffy cake. The fluffiness of a cake can be analyzed by checking the specific gravity for different cake systems. The lower specific gravity value results in a fluffier cake.

Eggs: are natural emulsifiers. They foam well and maintain the cake's structure to help with volume.

Other natural emulsifiers: include soy and canola lecithin, wheat protein isolates, and whey protein.



Mixing Clean Label Cake

The creaming method is a good processing option for making clean label layer cakes. This is because creaming enhances batter aeration, improves product volume and produces a finer grain. First, sugar, butter and an emulsifier are mixed to form a “cream.” Then, eggs are then incorporated gradually into the cream. Last of all, the remaining dry ingredients are added alternately with water or skimmed milk.

Other Clean Label Ingredients

Colors and Flavors

Natural coloring substances such as turmeric, annatto, beetroot juice, and algae are replacing chemical coloring agents rapidly. The color-gels reduce the system dilution and maintain the batter or frosting viscosity and flavors. Dairy products and yeast-based extracts replace butter flavors, while concentrated fruit powders and pulps replace artificial fruit flavors.

Fats and Shortening

Since the 2018 regulation, trans-fat-free alternatives have been in place. Palm oils are currently capturing the market swiftly. The usage and consumption of algae butter is expected to increase as well.

Antioxidants and Chelating Agents

A TBHQ alternative in icing and frostings is rosemary extract. Natural antioxidants include phytochemicals (ferulic acid, gallic acid, flavonoids, catechins, carotenoids) and vitamins (mainly C and E).

High Fructose Corn Syrup (HFCS)

HFCS is a low-cost sweetener in baked goods that can be replaced with other alternatives such as inverted sugar, honey, rice syrup, organic sugar, and more.

Aluminum-based Phosphates and Sulfates

Fat-coated organic acid or soda microcapsules can effectively replace slow-acting leavening agents such as SALP and SAS. These alternates are not well researched compared to other clean label ingredients.

Stabilizers and Thickening Agents

These ingredients increase batter viscosity and hence, stabilize the gas bubbles. Furthermore, they improve the texture of the cake resulting in a better structure. The clean label solutions for stabilizers and thickening agents include modified cereals, roots, and tuber starches.[1]

I manufacture cakes mixes and bases. How can I replace artificial preservatives in my dry mix?

Simply replace potassium sorbate or sorbic acid with natural preservatives like J&K Ingredient's SOR-Mate in your cake mix or base. It is vital to reduce the water activity in mixes to increase their shelf-life. Using heated flour and proper sanitation methods help in increasing the product shelf life.

How can I make a loaf cake moist with natural preservatives that has a 1-2 week shelf life?

Natural preservatives should be added to the formula. On the process side of things, a slow bake-out helps avoid extreme moisture evaporation and overbaking. Store the product at room temperature if possible, or remember to reduce the freeze-thaw cycles to a minimum. These cycles increase the rate of oxidation and rancidity due to various chemical and physical reactions.

Package the product as soon as possible to reduce moisture migration. The use of Modified Atmosphere Packaging (MAP) or antimicrobial packaging is also highly effective.

Can I still mention that a cake has no added preservatives and no chemicals if I use CMC?

Carboxymethyl Cellulose (CMC) helps with the viscosity and emulsification in cakes. There is no FDA definition on what is a preservative or chemical, therefore, having these claims are misleading. CMC is produced from cellulose using a two-step method. Many people do not see CMC as a clean label solution.

References & Further Reading

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