



# Clean Label Ingredient Replacement Technologies

Solutions for quality, natural baked goods

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## Understanding the Clean Label Trend

Consumers desire safe, simple and clean healthy food. While the FDA may not have a definition for what exactly counts as a “clean label” product, consumers are asking to buy them. The share of clean label sales has increased in the last two years, making up to 33 % of total food and beverage sales in 2019. At least 93 % of U.S. households have purchased a clean label product at a grocery store, and now half of all shopping trips now include the purchase of a clean label product.

### Clean labels are generally recognized as:

- Simple and short ingredient lists
- No chemicals, artificial preservatives, color agents or flavor agents
- Minimally or organically processed
- Ingredients that are easy to read and that you might find in your pantry

### Why did we start ‘dirty’ labels in the first place?

Artificial ingredients allow us to bake consistent, safe, quality products without skilled talent. They were also key to make products withstand the pressures of high-speed production with a longer shelf life. Natural and clean label ingredients negatively affects this, and there may need to be an increase in the cost to the price of the formulation.

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# How to Bake a Clean Label

Baking clean label is not impossible. In fact, there are plenty of resourceful substitutes that fill in just fine. When going clean, here are areas that affect the baking industry.

## 1 COLORS

- Try natural colors like annatto and turmeric for yellow and orange, beetroot juice for red and algae for green to replace artificial colors.
- Ask for gel versions, as they will work best to avoid diluting your system and negatively affecting viscosity and flavor.

## 2 FLAVORS

- Replace artificial butter flavors with concentrated dairy products, buttermilk and yeast-based extracts.
- Replace artificial fruit flavors with concentrated fruit powders.

## 3 EMULSIFIERS

- Emulsifiers are tiny molecules that make interfaces like oil in water, or air in water, stable. Mono and diglycerides and PGMEs are common non-clean label examples.
- For frosting, try Alpha cyclodextrins.
- For cake and frozen batter, canola or soy lecithin, wheat protein isolates, and enzymes can act as emulsifiers.

## 4 DOUGH CONDITIONERS

- Ingredients such as vital wheat gluten and enzymes like glucose oxidase, xylanase and phospholipase can help replace DATEM and SSL.
- Age flour for up to 14 days, and use longer fermentation times for sponges (4-8 hours) to help process your clean label dough.



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## 5 ENZYMES

- Act as a natural alternative for many ingredients and functions.
- Improve flour quality and emulsification.
- Increase water absorption and the machinability of the dough.
- Enzyme and ascorbic acid blends have been used to replace potassium bromate, ADA, DATEM and SSL.

## 6 LEAVENING AGENTS

- Aluminum and phosphates in ingredients like SALP are being replaced by fast-acting baking powder systems.
- Look into a "heat activated" leavening system that is extremely process tolerant and not susceptible to react prematurely during the pre-baking process. It's a sodium bicarbonate with a chloride.

## 7 HEAT TREATED FLOUR

- Some consumers are shying away from chlorinated flour, a key ingredient for the high ratio cakes baked in the US.
- Cake flour is usually treated with chlorine gas to modify the starch, which provides viscosity and structure to the cake batter.
- Instead, get this functionality with heat treated flour and pregelatinized starch.



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## 8 FATS

- Trans-fat free alternatives have been in place since regulation in 2018.
- Palm oils are common alternatives.
- Algae butter could be the next big thing.

## 9 ANTI-MOLD

- Key elements to prevent mold: sanitation and water activity.
- Humectants like sugar or honey and other ingredients like salt or gums decrease water activity, making less water available for mold growth.
- Naturally-obtained sorbic acid can replace potassium sorbate. In yeasted foods, use the encapsulated form.
- Other alternatives for bread include cultured wheat, whey with vinegar, prune and raisin concentrates
- If aroma is not a problem, then rosemary extract, cinnamon and clove are more natural ingredients for anti mold.

## 10 Antioxidants and Chelating Agents

- Try rosemary extract to replace TBHQ in icings and frostings.
- It has been used to replace it at a higher ppm, and with relatively with no change in organoleptic attributes.





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## 11 HYDROCOLLOIDS & GUMS

- These ingredients act functionally in batters to handle specific gravity issues, improving viscosity.
- Xanthan gum and Guar gum can help replace emulsifiers.

## 12 STARCHES

- Mechanically pregelatinized starch (a mechanical modification of starch to make it functional) is used to replace chemically modified starch and dextrin.
- Everything from high amylopectin or amylose corn to tapioca starch can work, so reach out to your supplier to find the best fit.
- Emulsifier replacement: The modifications provide viscosity, increasing the stability of the networks previously supported by emulsifiers.

## 13 FIBERS

- Soluble fibers: show promising emulsifying properties.
- Aqua faba: used in home baking for egg replacement. It's currently studied as a commercially viable ingredient in New Zealand.
- Maple fiber: has been studied and shows promising results in replacing mono and diglycerides. Instead of chemicals, it uses water pressure and high temperature for extraction.



## Ways to Clean Up Your Label Through Process

Ingredients are a short-term solution for baking clean labels. However, adjustments to your process can help ensure quality and efficiency over time.

By using sponge and dough systems, or including a brew process, you naturally hydrate your dough to make it easier to machine. A stress-free dough handling system may be slower in speeds, but they are effective in eliminating many dough conditioners on your label.

Thermal profiling your system and targeting with a longer bake out that will help dry out the baked product and reduce mold issues. An easy-to-sanitize cooling system, together with an efficient air filtration system, will also reduce your dependence on mold inhibitors.



### IN CONCLUSION

It's all about knowing what role ingredients play in your formulas, and finding natural alternatives that fill the same role. Pay attention to all aspects of your process, including fermentation times, temperatures and where other ingredients and adjusted ratios can carry the weight. It seems the clean label trend is here to stay. So, we'll just keep finding innovative solutions, experimenting, and baking.