

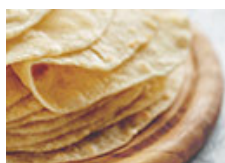


Shortening Reduction

Shortening plays a crucial role in the world of baking today. It is not just a simple ingredient but a key component that enhances the texture, flavor, and overall quality of baked goods.

However, these functions come with a significant drawback. Its high saturated fat content is responsible for most of its functional properties but also contributes to a wide variety of chronic diseases, such as obesity, type II diabetes, and coronary heart disease. Thus, the need for options to reduce or replace shortening in baked goods has increased in recent years.

Today's bakers need to understand that there are alternatives to maintaining the quality of their final products while also improving their nutritional profile.



SEBake LO™

Reduces Shortening Use in Flour Tortillas



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What is shortening?

Shortening is an edible fat that remains solid at room temperature. It is 100% fat, contains no water, and comes from animal or vegetable sources. Shortening is used to make various baked products, from pastries to pies. It was initially developed as a potential substitute for lard.¹

Shortening is extremely important for the baking industry, comprising approximately 10 - 50% of most baked goods. The name is associated with its capacity to shorten gluten strands by preventing the cross-linkage of gluten molecules. This results in crumbly dough with a delicate and flaky texture, or what most call a 'short' crumb.²

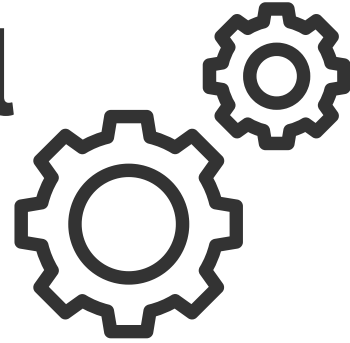
Most all-purpose shortening blends a hydrogenated base stock with a hard fat. The shortening is white and bland, but some can be flavored or colored to improve palatability.^{1,2}



*Baking just got better with the powerful enzyme blend **SEBake LO™** from **Enzyme Innovation**. Shortening is essential for achieving that perfect texture and flavor in baked goods, but its high saturated fat content makes it an undesirable ingredient for many health-conscious consumers. Using **SEBake LO™**, bakers can now reduce the shortening content in baked goods without sacrificing taste or texture. [Learn more!](#)*

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Functional Aspects



Shortening significantly influences the final product. Many of its functions affect the baked product's texture, flavor, and stability. Among the most important functions are the following:

- 1.Reduces dough stickiness.
- 2.Improves dough extensibility, aiding in the processing of the dough.
- 3.Provides a plasticizing effect that prevents gluten strands from adhering. Producing a 'short' mouthfeel.
- 4.Prevents starch molecules from linking. Thus delaying starch retrogradation and improving texture over shelf life.
- 5.Improves the rollability and foldability of tortillas and flatbreads.
- 6.Improves the 'moist' mouthfeel of snack cakes and cookies.
- 7.Improves the overall taste of the baked goods.
- 8.Improves the color of the final baked good.
- 9.Improves the aeration of the batter for leavening, resulting in a better volume.
- 10.Improves moisture retention, especially shortening that contains emulsifiers. Thus improving shelf-life stability.

How Can Bakers Reduce Shortening Content?



Given shortenings' important role, reducing their use in low-fat, nutritionally improved products is a novel challenge confronted by bakers around the globe. Reducing saturated fats and increasing the usage of fats and oils high in mono and polyunsaturated fatty acids has become a necessity in bakeries worldwide. ^{3,4}

Researchers in the industry have developed many alternatives. Using enzymes as direct ingredients or improvers of shortening structures is the most promising. ^{3,4}

Direct Ingredients: Enzymes or enzyme blends are directly added to the formulation.

Shortening Structure Improvers: An enzymatic process improves a potential ingredient, such as in the case of low saturated fat shortening made by enzymatic interesterification. ³



Case Study: Tortillas

Fats, particularly shortening, play an important role in tortilla production. Shortening aids in producing soft and rollable tortillas with a desired taste and color. Decreasing or eliminating shortening can reduce dough extensibility, cause tortillas to tear, and decrease size, producing unevenly shaped tortillas.⁵

Replacing a solid fat, such as shortening, for an oil high in mono and polyunsaturated fats can produce tortillas with objectionable texture, diameter, and shape. It can also cause them to stick together, another undesirable quality.⁵

Research studies have widely documented the use of enzymes. Each type of enzyme performs a different function in improving the tortillas' overall quality.

Enzymes can improve dough handling and machinability, and enhance mixing tolerances and crumb structure. They can also improve final product shelf-life and are considered a clean-label ingredient.⁵

The most commonly used enzymes used in tortilla manufacturing are:




α - Amylases

α -Amylases modify damaged starch, providing a better structure and retarding starch gelatinization, improving product shelf-life. Usage depends on the nature of the amylase being utilized. Amylases are gelatinized starch-specific. Thus, it's important to consider if fungal or malt α - Amylases are the best choice. The selection of one variety over the other largely depends on the type of flour used, whether wheat or corn.⁵



SEBake GA 800™
Enzymes to Help:
✓ Reduce Sugar Use ✓ Improve Bread Volume

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Hemicellulases

Hemicellulases break down complex non-starch polysaccharides that retain water, influencing tortilla flexibility. Water retention is essential to preventing starch gelatinization and gluten development, which can produce less flexible tortillas.⁵



Oxidoreductases

Oxidoreductases oxidize glucose molecules and produce substances that can increase the elastic properties of dough, helping to stabilize the gluten network.⁵



Proteases

Proteases can be used in wheat flour tortillas to reduce proofing and resting times, influencing dough relaxation.⁵



Asparaginases

Asparaginases can aid in the reduction of acrylamide formation, a probable human carcinogen, by removing its developmental precursor.⁵

Enzyme Innovation Solutions

Reduction of shortening content can cause a wide range of issues. However, an enzyme blend like SEBake LO™, designed by Enzyme Innovation, can aid in overcoming the challenges.⁶

Replacement of up to 33% of shortening by enzyme blends SEBake LO™ has been found to:



A blend of enzymes may be used to obtain the desired characteristics of the final product. The synergistic effect of a formulated enzyme blend can mimic the shortening function and be successfully used as a method of shortening reduction in tortillas.



Improves the smoothness and extensibility of low-fat doughs.

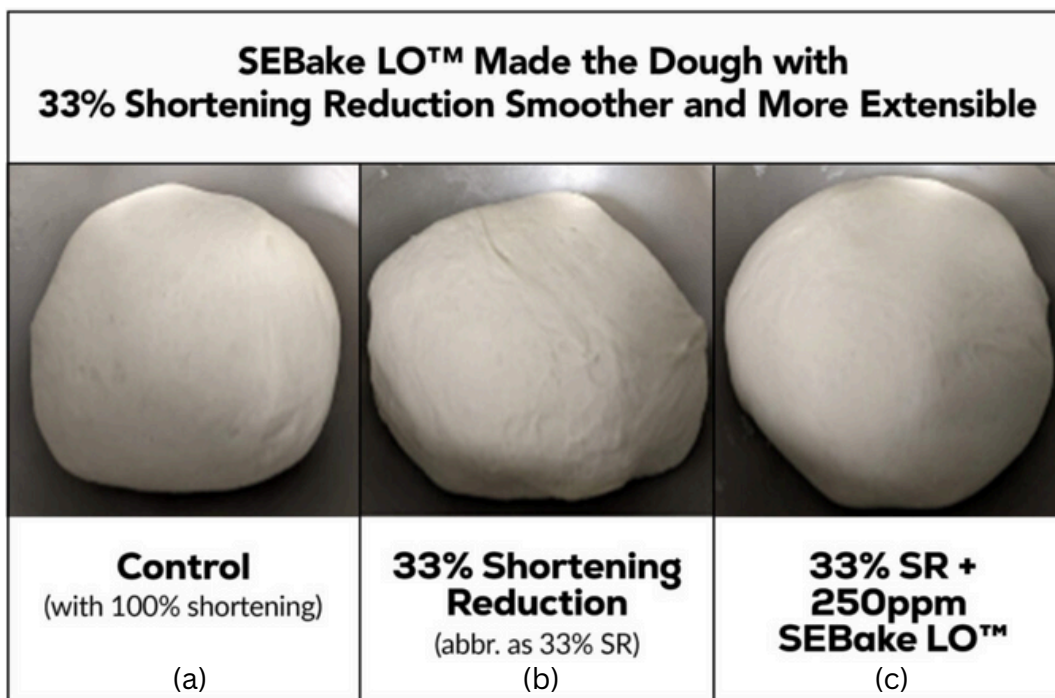


Figure 1: Dough obtained from the control sample (a), 33% shortening reduction (b), and 33% shortening substitution with SEBake LO™



Ensures that reduced-saturated fat tortillas maintain their diameters.

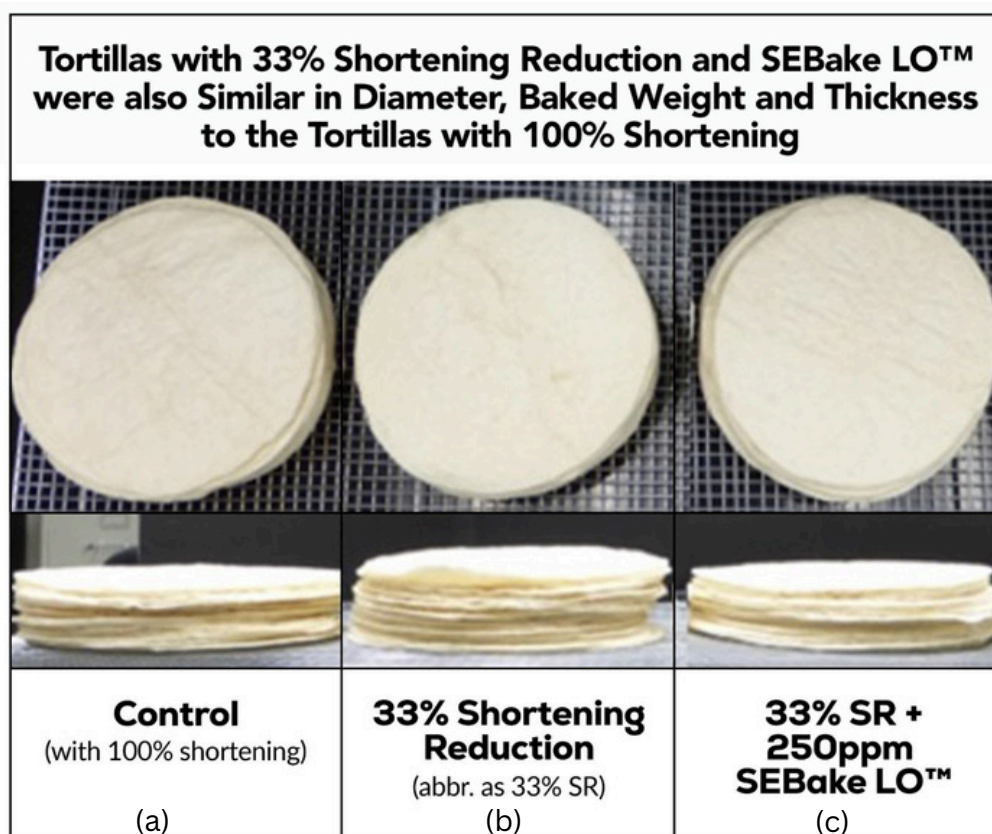


Figure 2: Thickness and diameter changes of the control sample (a), 33% shortening reduction (b), and 33% shortening substitution with SEBake LO™

- ✓ Improves the rollability and foldability of reduced-fat tortillas by delaying staling and thus improving shelf-life stability.

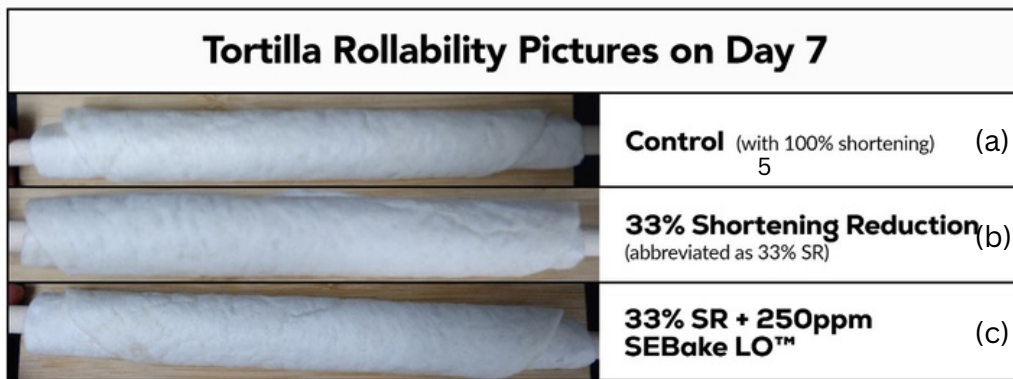


Figure 3: Rollability Test of the control sample (a), 33% shortening reduction (b), and 33% shortening substitution with SEBake LO™

Summary

Shortening reduction is a significant challenge for bakers worldwide. Improving the nutritional profile of baked goods has never been more in demand, and novel alternatives are needed. As bakers seek healthier baked goods with longer shelf-life, shortening technology should not be overlooked.³

Novel developments in this field can help create new baked goods that are healthier and taste better. Enzymes are one of the most powerful innovations currently available.



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