



High-Fiber Keto Baking

Keto baking is the production of low net carbohydrates baked goods such as breads, cakes and cookies. In these products, wheat flour is replaced with low carbohydrate flours like chia, flaxseed, lupin, almond or coconut flour, among others. Due to the importance of wheat gluten in the functional properties of most baked goods, direct substitution is not possible. So, formulation adjustments and the inclusion of other functional ingredients is required to obtain acceptable consumer products.¹

High fiber diets and ketogenic diets have several health benefits. Both diets can help with weight loss and obesity management. Other benefits include help in treating type II diabetes, pre-diabetes and insulin resistance, as well as overall heart health.^{1,2}

In 2019, the keto diet market size was valued at 9.57 billion dollars. The keto food product market is expected to grow at a compound annual growth rate (CAGR) of 5.5% from 2020 to 2027. The largest growth is expected to be in the North American countries, often with high rate of obesity and overweight-related diseases.³

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What is the Keto Diet?

The ketogenic or keto diet is a low carb, high fat diet based on the principle that when the body doesn't have an immediate source of glucose like carbohydrates, the liver begins to use the fat storage as the energy source. This state is known as ketosis. The name comes from the substance produced in the liver during this state, ketones.¹

Ketogenic diets have been widely studied by nutritionists and dieticians due to their potential health benefits. Some of the most recognized benefits are weight loss, reduction of blood pressure, reduction of insulin levels and reduction of symptoms associated with Alzheimer's disease.⁴

Several types of ketogenic diets have been proposed, all based on the principle of reducing carbohydrate intake and substituting it with fats. Most commonly known ketogenic diet is the Standard Ketogenic Diet (SKD) which is a low carbohydrate (10% of calories), moderate protein (20%) and high fat diet (70%).⁴



Replacing sugar with fiber is a solution to reach healthier formulations with more nutrition and better yield on the dough. You can easily do it with **Benexia Xia Powder 435 LM!** This amazing ingredient will bring you a cleaner label, great texture and moisture, elasticity, and great nutrition like fiber, protein, and omega-3, without altering taste. It's perfect for keto! [Find out more.](#)

Benefits of Adding High Fiber

High fiber is a term used to refer to food products containing 20% or more of the Reference Daily Intake (RDI) or the Daily Reference Value (DRV) per reference amount customarily consumed according to FDA and EU Commission Guidelines. This claim emerged due to the health concerns associated with high-calorie diets and the interest in developing guidance tools for consumers.²

Increasing fiber consumption has many beneficial health outcomes:

- Normalization of bowel movement
- Lowering cholesterol levels
- Aiding in the control of glucose blood level
- Potentially helping with weight loss

The daily recommended value of fiber consumption is between 25–38 grams for people 50 years old or younger, and 21-30 grams for people over 51 years old.²

FORMULATING WITH HIGH FIBER INGREDIENTS

Adding high levels of fiber can enhance bakery products' nutritional value. However, the inclusion of high fiber ingredients in bakery formulation can be a significant processing challenge. Combining that with the reduction or total elimination of wheat gluten can complicate the matter further.

Fiber can increase the dough water holding capacity, increase dough hardness and produce unique textures and characteristic nutty flavors. Some dietary fibers can increase the darkness or brown color of the products.²

Other challenges include increased development time, decreased mixing stability, reduced dough extensibility, decreased loaf volume and reduced spread ratio.²

Keto Baking Ingredients

Main ingredients in keto baking include native starch alternatives (resistant starch, oat fiber, etc), alternative sweeteners (stevia, sucralose, etc) with bulking agents, and wheat flour alternatives:^{10,11}

	Varieties	Composites	Advantages
Nut flours	Almond Pistachios Walnuts Hazelnuts Macadamia	8% Dietary fiber	High fiber content and absence of gluten Relatively easy manipulation of textural properties Excellent nutritional profile Acceptable flavors
	Coconut	60% dietary fiber	Excellent nutritional profile No problems with allergies Wide range of textures for products
Seed flours	<u>Chia</u>	Crude fiber 29%	Good nutritional profile High water binding capacity Good gelling properties High fiber content Non allergic Extends shelf life
	Flaxseed	28% dietary fiber	Good nutritional profile Retards staling Increases loaf volume
	Lupin	9% Fiber	Good nutritional profile Good emulsifying properties

Application Tips for High-Fiber Keto Baking

High fiber keto baking ingredients present several functional, operational, and organoleptic challenges when compared to traditional baking.

KETO BREAD

In breads, common production methods such as straight dough and sponge can be used where the fiber component is added to the sponge part for proper hydration. Longer mixing times, as well as extended baking, times are often required. Due to the absence of sugars, yeast-raised doughs may be supplemented with chemical leavening agents to enhance volume.^{1,10}

Enzymes, organic acids, oxidizing agents or other dough conditioners are added to produce acceptable texture. Combinations of dough conditioners can aid in improving the dough softness and extensibility.^{1,10}

SWEET GOODS

Substitution of wheat flour by keto flours is relatively easier in cookies than in breads due to the small influence of gluten in cookie structures. Controlling the leavening agents is important for proper texture. Spreadability, an extremely important property of cookies, is accomplished by the appropriate formulation balance of liquids and fats.

Cakes rely greatly on starch for structure. Cake batter viscosity can be improved by controlling the amount of fiber added. Formulation modifications such as proper fat phase stabilization may aid in tenderizing the cake in the absence of sucrose. Lower baking temperatures and longer baking times can help remove excessive water content.

Xia Powder 435 LM from Benexia is a multifunctional 100% natural fiber concentrate extracted from the chia seed. It is an excellent source of fiber (56%, both soluble & insoluble) and omega-3 ALA fat and provides high-quality plant-based protein. Our clean label powder is revolutionizing the market of healthy natural fibers. [Learn more here!](#)

“ What can improve the crumb texture in keto bread?

Keto breads tend to develop a more open crumb than wheat based bread. Stabilization of leavening gas bubbles is vital to obtain an adequate crumb texture. A clean label alternative is the use of hydrolyzed (i.e. lipase-treated) lecithin. This popular emulsifier is a natural source of galactolipids and phospholipids that can be enzymatically modified to become strong surface-active molecules. The addition of other emulsifiers or even hydrocolloids may aid in the production of a finer crumb.^{9,10}

“ What preservatives can increase the shelf life of keto based baked products?

Keto products are characterized by their potential clean label status, thus recommended preservatives or additives should try to preserve such status. Enzymes such as α -amylases, hemicellulases and lipases and hydrocolloids have shown promising results in the production of keto products with similar organoleptic properties to traditional breads.⁹

“ Can I add chia fiber to my product to improve moisture and volume?

Chia fiber is a great alternative to replace wheat flour in keto breads. Chia is high in healthy, natural fiber and gluten-free protein, and their products' inclusion can reduce the need for refined wheat flour by up to 30%. The high water holding capacity of fiber requires increasing the moisture content of the formula. This will also help to keep product fresher for a longer period.

Chia flour may also increase the hardness of the bread crumb and reduce loaf volume. So, also adding vital wheat gluten can help improve volume, moistness and chewiness.⁵



“ What are good alternative sweeteners for keto products?”

Several alternative sweeteners can be used in keto baking. Examples include stevia (liquid or powder), erythritol, monk sugar, or xylitol. Both xylitol and erythritol are bulk sweeteners and can be replaced 1:1 to sucrose. However, these sweeteners are very potent and have a lingering effect.⁴



This BAKERpaper is brought to you by Benexia. Innovate with our Xia Powder W 435 LM, a new plant-based sustainable ingredient for bakery and snacks, designed to achieve superior healthy nutrient dense products, with a clean label, at the most competitive price. [Learn more here.](#)

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