

FIBER • THAT'S WHAT KETO-LOVERS NEED

BOOST YOUR RECIPES WITH ORGANIC POTATO FIBER




MARROQUIN
ORGANIC
INTERNATIONAL
MEMBER OF THE AGRANA GROUP



DO YOU KNOW HOW TO MAKE KETO-LOVERS HAPPY?

THE EASIEST HIGH-FIBER KETO RECIPE

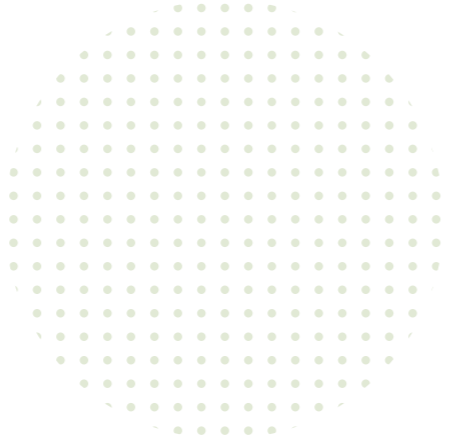
Take
2 eggs (about 50g each),
2 heaped tablespoons AGENAFIBER,
2 tablespoons heavy cream and salt,
thoroughly mix in a glass, put
butter in a pan and fry on
both sides.

CONTENT



Introduction: Appetite for keto

- 1 Bread, bakery & cakes
 - 2 Snacks & cereals
 - 3 Processed meat, sausages
 - 4 Meat alternatives
 - 5 Pizza, pasta, tortillas & wraps
 - 6 Plant-based dairy
 - 7 Sweet treats & fat bombs
 - 8 Smoothies, shakes & beverages
- About organic potato fiber



ABSTRACT

More than 1,500 new food and beverage products labeled as keto-friendly have been launched globally since the beginning of 2020, more than half of those in North America. According to a Google Trend analysis, keto is the most searched-for diet of 2020. Keto diets work on the premise that the body learns to use fat as a form of energy through an extremely low-carb, high-fat eating plan.

Although potatoes per se are not on the menu of keto enthusiasts, the tubers play an important role in a healthy, balanced keto diet and allow food manufacturers to develop a wide variety of value-added products for their customers. Potatoes in the form of dietary fiber show multiple exceptional properties and are absolutely keto-friendly. Fiber is even healthier when it is organically grown and 100% non-GMO. This paper clearly shows you which product groups you can innovate with organic potato fiber in the dynamic keto market.

THE APPETITE FOR KETO-DIET IS NOT YET QUENCHED

According to a Google Trend analysis, keto is the most searched diet of 2020. 1,500 plus new keto-friendly labelled products in the areas of food and beverages have been launched since the beginning of 2020, according to Mintel GNPD. The greatest geographical share holds North America (almost 900 new products have been introduced in this region), followed by Asia Pacific and Europe, which according to market studies is catching up significantly in the keto trend. (The Paleo Foundation recently published a report suggesting that 32 percent of projected keto market growth will occur in Europe). By product, bakery goods in particular lead the keto-friendly product range, followed by snacks, sauces and condiments.

The name „keto“ is derived from the principle that all these diets are ultimately about. The body is fed as few carbohydrates as possible to bring it into a state of ketosis, sometimes also called ketolysis. This means that it draws its energy from fat and not from carbohydrates, as is usually preferred. This happens by converting fat into so-called ketone bodies in the liver, which the body can then in turn use for energy production.

POTATO FIBERS

Although potatoes are a high-carb tuber and thus not on the menu of keto enthusiasts, they play an important role in a healthy, balanced keto diet and allow food manufacturers to develop a wide variety of value-added products for their customers. Potatoes in the form of dietary fiber show multiple exceptional properties and are absolutely keto-friendly.

Potato fiber is made by grinding up a whole potato into potato flour and removing the starch (carbs) and protein, leaving mostly insoluble fiber. Dietary fiber is that part of the plant material which is resistant to enzymatic digestion. Since insoluble fiber is not digestible, this makes potato fiber low carb and keto. Unlike potatoes, potato fiber contains only about 8 grams of carbohydrates per 100 grams, but 65 grams of fiber. When added to a product it will help to significantly reduce net carbs in food formulations.

IMPROVED PRODUCT CHARACTERISTICS

Fiber enrichment is a big topic with growing importance in human nutrition as it has been shown that diets rich in fiber are linked with a decreased incidence of several diseases. However, fibers are not only used to boost fiber content in recipes, but also improve water-binding, shelf life, product texture and mouthfeel.

Insoluble fibers are – as already implicated in their name – not soluble in water. They show high-water and oil-binding capacity thereby retaining moisture depending on the physical and chemical stress they are exposed to. They can help to stabilize particles in liquids and to prevent phase separation and syneresis in the final products. In addition they can prevent e.g. baked goods from staling and are most suitable to increase fiber content in final goods to achieve a nutritional fiber health claim.

Potato fibers are a great replacement for hard-to-find fibers. Marroquin Organic International has the only organic potato fiber on the market worldwide, named AGENAFIBER, which offers various additional benefits in food products. It is guaranteed glutenfree, 100% from potato and neutral in odor and taste, which makes it an ideal carrier substance as well.

On the following pages you will learn how you can enrich the diet of ketotarians with high-quality potato fibers and enhance it with valuable product properties.

YES, THAT'S KETO!





Contact us for your product innovations:
MARROQUIN-ORGANICS.COM

1 KETO BREAD, BAKERY & CAKES

Bread, cakes and pastries unjustly do not yet play a major role in keto diets, as traditional recipes are considered as high-carb. However, you can see a trend on user forums where ketotarians share recipes for home-made keto breads and cakes, all high in fiber. Potato fiber acts as a flour substitute, because it is perfect for making low carb breads and other, hearty low carb pastries, while being neutral in odor and taste.

Furthermore potato fiber brings another advantage: They do not contain gluten and are therefore suitable for allergy sufferers. The right mixture of grain-based flours and potato fibers ensures the right stability of the pastry.

Keto and other low-carb diets also include nuts as a source of fat and proteins. Potato fiber can be used perfectly in combination with nuts as basic ingredients. For nut allergy sufferers, potato fiber used can provide relief.

Ideal for the taste and consistency for pastries is a combination of two to three low carb flours, such as chia or flaxseed flour. For sustainability consideration, AGENAFIBER can be used as an organic alternative from Europe to other fibers like bamboo.

Bread, bakery and cakes with potato fiber can also be suitable for diabetics, as it hardly raises blood sugar levels.

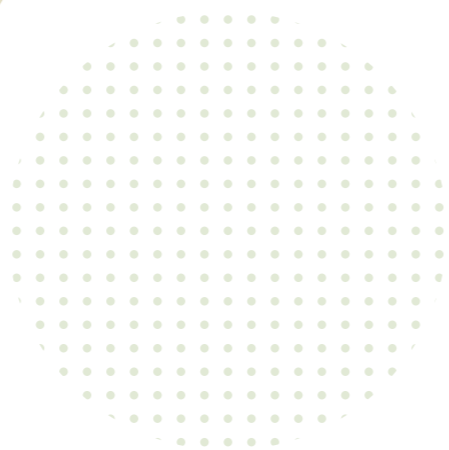
In bread, baked goods and cakes, potato fiber is used for fiber enrichment, which also brings to bear its side effects, such as prevention of staling, water retention and reduction of retrogradation.



PRODUCT CLAIM
"HIGH IN FIBER"
At least 6 g fiber/100 g
At least 3 g fiber/100 kcal

PRODUCT
CHARACTERISTIC

At least 3 g fiber/100 g
At least 1.5 g fiber/100 kcal
Organic potato fiber having
more than 75% fiber
content



2 KETO SNACKS & CEREALS

For ketotarians, one meal is certainly the hardest change in their diet plan, and that is breakfast.

For many Americans, a good and balanced breakfast includes cereals, aside from or in addition to pastries and pancakes.

By definition, cereal is a grain, and therefore a high-carbohydrate food, which at first glance is difficult to incorporate into a keto lover's menu plan. For the high-fat diet, the cereal grains in an average serving of granola also provide too few oils.

So the goal must be to enrich the most important meal of the day – breakfast – with protein, fat and plenty of fiber. High fiber results in fewer net carbohydrates, while protein slows the digestion of carbohydrates and provides a better feeling of satiety.

Potato fibers are perfect for the keto-friendly breakfast table: They enrich granola, granola bars, pastries, breakfast cookies and snacks with fiber. In fact, their dietary fiber content is at least 65%. Furthermore they impact texture, calorie reduction, water binding capacity, moisture-migration, shelf life extension and organoleptic properties in a significant positive way.

3



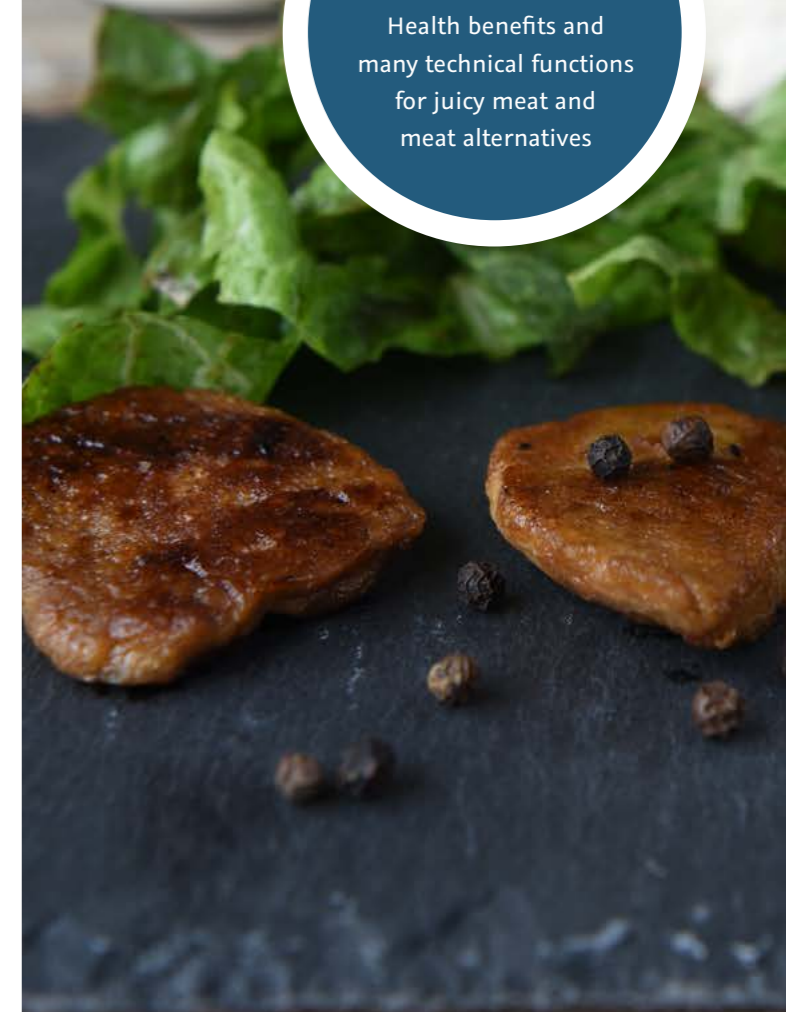
APPLICATION
BENEFITS

Water binding capability
Fiber enrichment
Texture and binding properties
Texture improvement
Guaranteed gluten-free
Reduced juice loss
Mouthfeel
Vegan

4

THE NATURAL
UPGRADE

Health benefits and
many technical functions
for juicy meat and
meat alternatives



PROCESSED MEAT & SAUSAGES; MEAT ALTERNATIVES

At the top of the menu list for ketotarians stands meat, and in the vegetarian and healthier version: meat alternatives. Health experts agree that a plant-based keto diet is the healthier option.

However, basically it can be said that all kinds of fresh meat are suitable in the ketogenic diet – pork, beef, chicken, turkey, fish, game meat. Processed meat is considered less suitable only if it contains too much sugar or chemical additives.

Meat is a source of protein with high biological value, essential nutrients such as minerals and vitamins, and an abundance of bioactive compounds. Processed and refined meat products often have the problem of lacking nutrients such as fiber. However, fiber is an important part of the diet because of its cardioprotective, weightloss, antidiabetic, antioxidant and stress-reducing effects.

Studies recommend that fiber intake is mandatory, especially in high energy density products such as meat. The recommended intake of dietary fiber for adults is 28-36 g/day, of which 70-80 % must be insoluble fiber.

For the food industry, it is important to know that dietary fiber not only performs health functions in meat products, but also manufacturing functions: it improves yield and processing properties, changes texture, etc. Being a by-product of agriculture, these fibers are comparatively cheaper and their addition to meat products helps make them more natural, juicier and increase their shelf life.

FIBER FOR MEAT ALTERNATIVES

When choosing a healthy, sustainable lifestyle, as many ketotarians do, one must also consider the origin of food and its impact on the environment, animal welfare and the climate. Plant-based products to meat are a real alternative: in fact, (organic) potato fiber makes it possible to produce meat alternatives with fewer additives, while remaining juicier and tastier, and is more sustainable in its footprint than conventional fiber.

Because of its distinct water-binding and texturizing properties, insoluble potato fiber offers many different added benefits in foods, including meat alternatives.

Here, this ingredient can target these niche products to go to more natural and organic meat alternatives to add fiber and body and provide additional water retention. While consumers in this booming segment often demand cleanlabel products, meat alternatives typically require the use of many modified additives in their production. The long ingredient lists that typically comes with them can deter consumers from purchasing.

Food formulators face the challenge of adding body and water-binding properties to products made largely from popular plant-based proteins such as soy, wheat and pea protein, while ensuring clean labeling. This is where the ingredient can target these niche products to go on organic meat alternatives to add body and bind water for a juicy experience.

5 PIZZA, PASTA, TORTILLAS & WRAPS

Pizza is one of the most popular ready meals worldwide. Chilled and frozen pizza has seen a continuous growth in the last years, also shelf stable pizza performed well, with strong sales of make-at-home pizza kits. Americans' appetite for pizza is worth more than 7.4 bn USD in total.

So why not combine the two trend markets of pizza and keto? At first glance, pizza is indeed a carb bomb and thus not keto-friendly. At second glance, it's just the dough, because the usual pizza toppings are very accommodating to the keto diet, especially the cheese, a great source of fat and protein. Meat and sausage and vegetables, for example, mushrooms, peppers, onions and tomatoes. Pizza sauce, with no sugar but potato fiber as a stabilizer, is equally keto-friendly.

Similar to bread, potato fiber acts as a flour reducing agent in pizza and other doughs, reducing net carbohydrates. Due to its exceptionally high water-binding capacity, the use of potato fiber in doughs also extends shelf life in terms of organoleptic properties, has a great impact on texture, reduces moisture migration and can be used in reduced-calorie products. Pizza dough – as well as tortillas, wraps and pasta – thus becomes high in fiber and low in calories.



6 PLANT-BASED DIARY

Milk and dairy products are a tricky area for ketotarians. While milk is considered a great source of protein and fat, it also contains too many carbohydrates to be considered an integral part of a keto diet.

Plant-based dairy like unsweetened almond or coconut milk offers an alternative that can leverage the growing interest in the keto diet to explicitly promote healthy fat levels and fiber enrichment.

Consumers are demanding plant-based dairy products with multiple qualities in terms of ingredients and properties. They demand not only organic ingredients, but also for characteristics such as the right texture and mouthfeel, reduced sugar content without compromising taste, and specific nutritional benefits.

In terms of plant-based products, starches and starch products will help improve functionality and the eating experience as the customer expects. In addition, extended shelf life without loss of positive attributes is a major need.

Potato fiber, when used in plant-based yogurt drinks, serves to enrich fiber content, but also helps add a pulpy texture to plant-based yogurt smoothies.

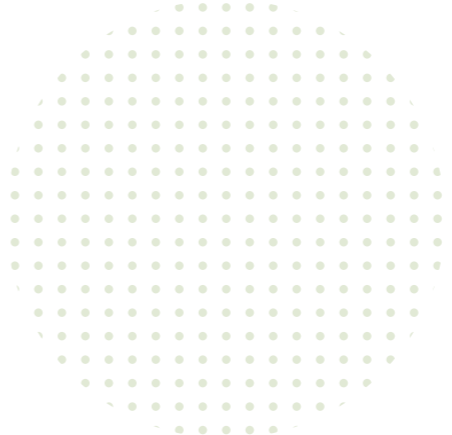
In addition a broad variety of health-related properties of potato fiber stands out: products can be touted as 100 % plant-based, organic & GMO-free, clean label, low-carb and glutenfree on the packaging.

KEY BENEFITS

- Fiber enrichment
- Pulpy texture
- Extended shelf life
- Organic & GMO-free
- Plant-based
- Clean label
- Low-carb
- Gluten-free

KEY BENEFITS

- Neutral in odeur & taste
- Product softness & mouthfeel
- Rich in fiber
- Plant-based
- Low-carb
- Gluten-free



7 SWEET TREATS & FAT BOMBS

Keto diets aim for three goals: high fat, medium protein, low to zero carbs. Keeping that in mind, it's clear that most conventional sweets that contain sugar are off limits. However, more and more keto-friendly products are hitting the market, especially chocolate-tasting fat bombs.

Examples include soft caramels with heavy cream for a rich, delicious mouthfeel. So are zero carb chocolates based on peanut butter, hazelnut butter and real cocoa butter.

Because potato fiber is neutral in taste and smell, it can be profitably used in these treats. In particular, their ability of bulking and thickening ideally supports sweet fillings such as peanut butter or custard creams. At the same time, the fibers are responsible for product softness & mouthfeel enhancement. Due to the insoluble fibers, the product itself can also be made of rich in fiber, which is a particularly pleasant side effect in confectionery.



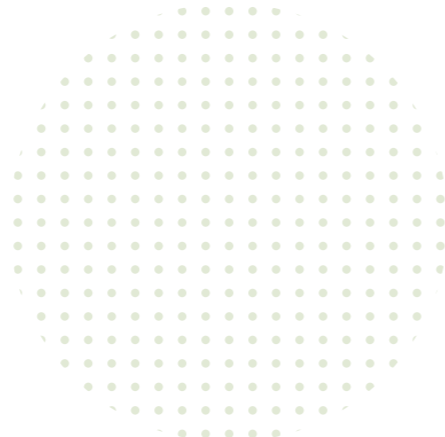
8 SMOOTHIES, SHAKES & BEVERAGES

Smoothies and shakes are relatively straightforward to incorporate into a keto diet if you look for low-sugar berries and fruits in the ingredients, as well as plant-based carrier liquids like unsweetened almond or coconut milk instead of regular milk. Both milk and many fruits naturally contain carbohydrates and fructose. Berries, including strawberries, blueberries, and raspberries, are lower in carbs than most other fruits.

Specifically for juice drinks and smoothies, plant-based proteins and fiber can help enrich the fiber content and also provide the desired mouthfeel and sweetness without adding sugar and thereby reducing calories.

Nutrition & Meal replacement drinks with a highprotein and low calories claim play a major role here. A water-insoluble organic potato fiber like AGENAFIBER is the perfect ingredient in smoothies to enrich fiber and supply the desired pulpy texture. Being guaranteed gluten-free it is suitable in gluten-free applications. The product is derived from non-GMO potatoes and thus meets all the high requirements for modern, healthy and sustainable nutrition.

AGENAFIBER
Great replacement
for hard-to-find
fibers!



ABOUT ORGANIC POTATO FIBER

AGENAFIBER 19.050 / 19.051

WHAT IS AGENAFIBER?

AGENAFIBER 19.050 / 19.051 is used in most cases for fiber enrichment. Due to its well-developed water-binding properties and texturizing characteristics the insoluble fiber of various additional benefits in food products.



- Organic & GMO-free
- Plant-based
- Clean label
- Fiber enrichment
- Low-carb
- Gluten-free

SOURCE OF FIBER!

AREAS OF APPLICATION

- Bakery, bread & cakes
- Breakfast cereals & muesli bars
- Crackers & biscuits
- Processed meat & sausages
- Pizza, tortilla & wraps
- Pasta & potato puree
- Soups & sauces
- Smoothies and infant drinks
- Petfood & animal feed

FIBER & CODEX ALIMENTARIUS

PRODUCT CLAIM "SOURCE OF FIBER"

- At least 3 g fiber per 100 g
- At least 1.5 g fiber per 100 kcal

PRODUCT CLAIM "HIGH IN FIBER"

- At least 6 g fiber per 100 g
- At least 3 g fiber per 100 kcal

IMPORTANT FACTS

Average particle size (d50): 150 – 300 µm
WBC* [g H₂O/100 g] AGENAFIBER 19.050: 1 100 – 2 000 g
WBC* [g H₂O/100 g] AGENAFIBER 19.051: 750 – 1 500 g
Dietary fiber content: min. 75 %
Insoluble fiber – HMWDF: min. 60 %

* Water-binding capacity



ABOUT ORGANIC POTATO FIBER



ADVANTAGES

- 1 Bread, bakery & cakes
- 2 Snacks & cereals
- 3 Processed meat, sausages
- 4 Meat alternatives
- 5 Pizza, pasta, tortillas & wraps
- 6 Plant-based dairy
- 7 Sweet treats & fat bombs
- 8 Smoothies, shakes & beverages

About organic potato fiber

PRODUCT CHARACTERISTICS

- 100 % from potato
- Insoluble dietary fiber
- Neutral odour and taste
- High water-binding capacity
- Bulking/thickening agent
- Increase viscosity
- Carrier substance
- Prevention of phase
- Separation and syneresis

Learn more on

Marroquin Organic International
www.marroquin-organics.com/keto

DIETARY FIBER

PRODUCT CHARACTERISTICS

Dietary fiber is that part of plant material in the diet which is resistant to enzymatic digestion which includes cellulose, non-cellulosic polysaccharides such as hemicellulose, pectic substances, gums, mucilages and a non-carbohydrate component lignin.

The diets rich in fibre such as cereals, nuts, fruits and vegetables have a positive effect on health since their consumption has been related to decreased incidence of several diseases.

Dietary fibre can be used in various functional foods like bakery, beverages and meat products. The influence of different processing treatments (like extrusion cooking, canning, grinding, boiling, frying) alters the physico-chemical properties of dietary fibre and improves their functionality.

COMPARISON OF VEGETABLE FIBERS

FIBER	WATER BINDING CAPACITY		VISCOSITY	
	without shear	with shear stress	without shear	with shear stress
Psyllium husk	High	High	High	High
Carrot fiber	Medium	Medium	Low	Medium
Potato fiber – AGENAFIBER®	Medium	Medium	Low	Medium
Citrus fiber	Medium	Medium	Low	Medium
Pea fiber	Low	Low	Low	Low
Bamboo fiber	Low	Low	Low	Low
Oat fiber	Low	Low	Low	Low
Apple fiber	Low	Low	Low	Low
Wheat stalk fiber	Low	Low	Low	Low

FIBER	OIL BINDING CAPACITY
Bamboo fiber	High
Citrus fiber	Medium
Carrot fiber	Medium
Potato fiber – AGENAFIBER®	Medium
Wheat stalk fiber	Low
Apple fiber	Low
Pea fiber	Low
Oat fiber	Low
Psyllium	Low

WATER BINDING CAPACITY

- Maximum absorbed water per mass of dry material
- Ability to suck in and hold water by capillary action
- Particularly relevant for meat (alternatives) and baked goods
- Avoiding syneresis and achieve juiciness
- Slowing down aging of products

AGENAFIBER is characterized by an exceptionally high water-binding capacity and thus water retention in the final product. Potato fiber retains and strengthens its stability under the influence of shear.

VISCOSITY

- Texturizing and stabilization
- Particularly relevant for vegan meat alternatives and fiber-enriched smoothies
- Increasing via pre-activation

AGENAFIBER develops significant viscosity, especially after pre-activation or in more shear-intensive processes, and is therefore an excellent additive for stabilizing food systems.

OIL BINDING CAPACITY

- Amount of oil absorbed and retained by fibers
- Relevant for a large number of applications with water and fat components

AGENAFIBER shows a moderate oil binding capacity which contributes well in fat-containing, but water-dominated food systems.

PASSIONATE ABOUT
OUR INGREDIENTS

Starches
Fibers
Maltodextrins
Yeasts
Proteins
Glycerin
Oils
Dried Dairy

DRIVING ORGANIC INDUSTRY

Marroquin Organic International has the only organic potato fiber on the market worldwide and helps you innovate keto products easily. We are proud to have contributed to the dynamic evolution of the organic industry for nearly three decades. We provide our customers in the food, beverage, nutraceutical, pet, and cosmetic industries with a reliable supply chain for the quality organic and non-GMO ingredients they need to innovate and grow.

As a part of the AGRANA group, a pioneer in the production of organic and non-GMO starches and starch products, we are able to leverage our knowledge and support our customers even more on their organic journey. Let us show you how we can make a difference together.

INTERESTED IN ORGANIC? PLEASE CONTACT US!

In the US:

Marroquin Organic International
303 Potrero St., Suite 18
Santa Cruz, CA 95060 USA
info@marroquin-organics.com

Global Headquarters:

AGRANA Stärke GmbH
Conrathstr. 7
3950 Gmünd, AUSTRIA
starch.us@agrana.com

SOURCES

Keto is Most Searched Diet of 2020. trends.google.co.uk/trends/explore?q=keto,paleo

Mehta N. et al. (2018) Development of Dietary Fiber-Rich Meat Products: Technological Advancements and Functional Significance. In: Mérillon JM., Ramawat K. (eds) Bioactive Molecules in Food. Reference Series in Phytochemistry. Springer, Cham.

Mintel Promote healthy fats in plant-based milks.

Ophélie Buchet. April 2021
www.healthline.com



IMPRINT, OWNER, EDITOR AND PUBLISHER:
Marroquin Organics International, member of AGRANA Group.
Email: info.staerke@agrana.com; PHOTOS: AGRANA, Tatjana Figl-Wolfsberger; Shutterstock 2021