

HOW TO USE

KERNZA®

*A Technical Guide for Chefs & Bakers
to Craft Delicious, Sustainable Recipes*

Unique Benefits of Kernza®

Kernza is a perennial grain, meaning it regrows every year without replanting. Bred from intermediate wheatgrass, it's grown by farmers across the U.S. who are committed to sustainability practices. With roots that can reach over 10 feet into the ground, Kernza helps enhance soil health, conserve water, and store carbon, making it a powerful choice for chefs and bakers looking to source sustainably. Its unique flavor and versatility shine in everything from breads and pastries to pastas and savory dishes, offering a way to serve unique tastes with a purpose. It has a nutty, wheat-like flavor with 17–20 g of protein per 100 g¹ and is available in flour, rolled, and whole grain forms.

Meeting the Moment

Today's diners are more curious and conscious than ever. They seek out new flavors, nutrient-rich ingredients, and food choices that reflect their values. From climate impact to culinary innovation, Kernza delivers on multiple fronts, giving makers a way to meet evolving tastes while standing out on the plate and the menu.



Photo credit: University of Minnesota



Kernza Forms and Uses

Whole Grain Kernza

Reminiscent of wheat berries, farro, and rye berries.

- ▶ Pilaf
- ▶ Breakfast porridge
- ▶ Bowls
- ▶ Cooked grain added to baked goods

Rolled Kernza

Reminiscent of rolled wheat berries, firmer texture than rolled oats.

- ▶ Porridge
- ▶ Baked goods (especially muffins, cookies, bars)

Puffed Kernza

Smaller and firmer than puffed rice or wheat.

- ▶ Cereals
- ▶ Granola
- ▶ Cookie bars
- ▶ Mixed snack packs

Kernza Flour

Complex, deep, nutty, rich flavor.

- ▶ Breads (sweet and savory yeasted and quick breads)
- ▶ Pastries
- ▶ Cakes
- ▶ Cookies & bars
- ▶ Pizza dough
- ▶ Crackers
- ▶ Coating for fried and baked foods

Chefs who have used Kernza suggest experimenting with some of these other fun applications:

- ▶ Carrot cake
- ▶ Gingerbread
- ▶ Shortbread
- ▶ The base for cookie bars (e.g., toffee bars)
- ▶ Kernza porridge with coconut milk and steel cut toasted oats in coconut oil



Photo credit: Perennial Pantry

Did you know?

Baker's Field Flour and Bread and Minnesota Farmer's Union created a 10% Kernza flour/90% wheat flour focaccia bread that was served as a delicious, local BLT sandwich at the Minnesota State Fair.

The Flavor of Kernza

As a flour, Kernza brings a unique flavor that is notable in baked goods. Tasting notes described by technical experts:

- ▶ *Nutty*
- ▶ *Almond extract*
- ▶ *Rich*
- ▶ *Hint of vanilla*
- ▶ *Sweet*
- ▶ *Warming flavor*
- ▶ *Full-bodied*
- ▶ *Like caramelized sugar*
- ▶ *Butterscotch*
- ▶ *Raisin bran*
- ▶ *Browned butter*
- ▶ *Full-bodied*
- ▶ *Maple syrup*
- ▶ *Toasted*

Compared to wheat flour, Kernza has a more complex and deeper nutty or rich flavor. It's darker, a bit sweeter, and slightly more bitter — not in a disagreeable way but in the sense that it should pair with something sweet, similar to how chocolate is described as bitter. It's closer to rye than it is to wheat.

The flavor of Kernza goes well with chocolate and warm spices such as cinnamon, nutmeg, and cardamom.

The cooked whole grain is more neutral tasting than the flour, closer to whole grain wheat berries.

Nutritional Benefits

- ▶ Whole grain Kernza contains 17–20 g of protein and 19–29 g of total dietary fiber per 100 g, including 5–6 g of soluble fiber and 14–24 g of insoluble fiber.¹
- ▶ It also contains important vitamins and minerals. 100 grams of whole grain Kernza provides:¹
 - 120–150 mg of calcium
 - 500–580 mg of potassium
 - 0.3–0.35 mg of vitamin B1 (thiamin)
 - 150–160 mg of magnesium
 - 480–510 mg of phosphorus
 - 3.7–5.3 mg of zinc



“A large appeal of using Kernza flour is its flavor; it adds complexity to anything that is made with it and expresses itself differently depending on the type of dough, how it is fermented, different baking temperatures, hydration, and so on.”²

Getting Started with Kernza Flour

Consider these practical tips, notes, and recommendations on Kernza flour behavior.



Photo credit: Perennial Pantry

Kernza is NOT gluten free, but its gluten profile is different from wheat. It has less than 10% wet gluten, compared to 30–45% in strong hard red wheat flours and 19–22% in soft wheat flours.³ For this reason, it's a good idea to blend Kernza flour with wheat flour for many applications.

Kernza has 17–20% protein,¹ but the proteins in its flour are not the same as those in wheat flour. It does NOT have enough of the right types of gluten to substitute 1:1 with whole wheat flour. For the deep dive on technical baking standards, consult the Perennial Pantry Malting Report, Chapter 7, or check out the Perennial Pantry blog listed in the Other Resources section.

The texture of Kernza flour depends on the supplier and how it is milled; it can be coarse or more like a pastry flour. Some suppliers offer sifted flour. Kernza flour is most comparable to a cake or pastry flour with a lower gluten content, and it behaves more like a rye flour with larger bran than a wheat flour. But remember, the flavor is entirely different than rye. The significant bran content influences dough behavior and flavor. Kernza flour adds a darker tone to most baked goods, similar to whole wheat.

Other quick notes:

- ▶ Kernza dough can get very sticky. For example, a 100% Kernza flour dough wouldn't be able to form a loaf.
- ▶ Whole grain Kernza flour has many nutrients that are good for yeast and support fermentation rates.³

How to Use Kernza Flour

Kernza flour can substitute in places where you'd typically use whole wheat flour. It works well with baking soda applications such as soda breads, cakes, and cookies. Kernza can and should be mixed with a wheat flour for many applications.

- ▶ It's excellent at up to 30% in **sourdough bread**.
- ▶ For other applications, it can be mixed with a high protein, single variety flour for good results. 43% Kernza flour with 57% Bolles wheat flour worked well for **brioche, gougères, croissants, and pizza crust**.³
- ▶ 30% Kernza flour and 70% soft white wheat flour blended together produced an acceptable substitute for **whole wheat pastry flour**.³
- ▶ Kernza flour is not good for airy, light breads or anything that needs to rise well.
- ▶ For **cookies**, you will need to increase the liquid for higher percentages of Kernza flour.

Pastries in particular are a great way to showcase the flavor of Kernza without altering the end product, like in shortbreads that don't need fermentation or leavening. Sweeter pastries are ideal since Kernza flavor goes well when combined with sugar and fat.

Kernza is great for sourdough! The longer the fermentation time (within proper limits), the more Kernza you can use because it gets broken down more and the flavors round out.

For Non-Sourdough Bread:

- ▶ Kernza will affect the color, flavor, and volume of bread, so it will require some thoughtful adjustments.
- ▶ A good way to explore Kernza breads would be to make your in-house recipe, subbing up to 15% Kernza flour for your preferred flour. Compare, flavor, crumb structure, and overall rise. Make adjustments to the percentage of Kernza used as needed.
- ▶ **Hydration Percentage** – Kernza requires more hydration than a typical wheat dough. A suggested starting point is to substitute 10% of a bread's flour with Kernza flour and then add 5% additional liquid.
- ▶ **Kneading Time** – Kernza breaks down a little faster due to the lack of ideal gluten compounds, so you can knead it up to a certain point and then it gets sticky and messy.
- ▶ **Crumb Structure** – High inclusion percentages of Kernza flour change the crumb structure and rising behavior. See the photo at right for an example comparing whole grain breads with 0–75% Kernza flour.

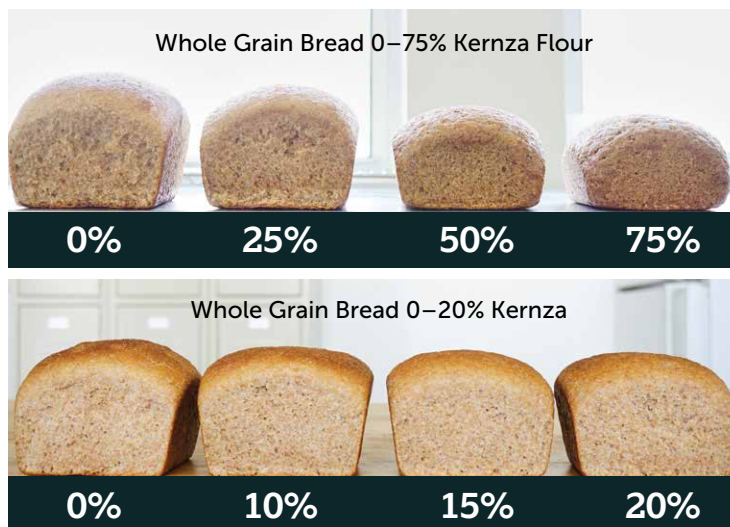


Photo credit: Perennial Pantry

Recommended Inclusion Percentages

(Kernza flour as a percentage of total recipe's flour)

- ▶ Flatbreads: 1–30%
- ▶ Loaf bread: 1–20% (above 20% affects the crumb)
- ▶ Sourdough Bread: 1–30%
- ▶ Crackers: 1–75% (maybe 100% if cost allows)
- ▶ Pasta: 1–35%
- ▶ Cookies, Graham Crackers: 1–50% (some say up to 100%)
- ▶ Scones and Banana Bread: 1–100%
- ▶ Tortillas: 1–25%
- ▶ Pastries: 1–25%



Photo credit: Patrick Wylie

How to Use Kernza Flakes and Whole Grain

Recommended mixing percentages for flakes and whole grain (% Kernza of total grain):

- ▶ Flaked Kernza porridge: 1–100%
- ▶ Grain salad: 50%

Note: Kernza flakes are chewier than rolled oats.

Whole grain Kernza is hard to compare directly — it's not quite rice or barley, but closest in texture to farro or wild rice. It's toothsome and holds its texture well, making it ideal for mixed-grain salads. The bran remains firm no matter how long it's cooked, and it has less starch than rice. The benefit here is that it may be cooked ahead and stored for several days in a covered container in the refrigerator without compromising its flavor or texture.

Product Development and Sourcing Considerations

As a newer ingredient, Kernza is currently priced higher than other grains. Available ingredient forms are evolving as innovation continues, so it's a good idea to check with your suppliers for the latest details. Depending on your order size, lead times may be a bit longer than for more common grains; planning ahead can help ensure you get what you need, when you need it.

New Products in the Works

- ▶ **Puffed Kernza** made an appearance at Expo West in 2025 but is still in pilot phases as of the writing of this guide. Applications might include granola, granola bars, nut butter bars, or a mixed grains puffed cereal.
- ▶ **Kernza Malt Powder** isn't yet commercially available, but pilot research shows that Kernza can produce a diastatic malt powder that may boost fermentation (less than wheat but still meaningful).⁴

Recipe Examples

Contributors to this guide have kindly shared a few recipes to get you started.
See Other Resources for more!

Kernza Whole Grain Crackers

by Chris Nye

YIELD: Makes 8 oz of crackers

INGREDIENTS:

1 ½ cup (200g) whole grain Kernza + plus extra for rolling the dough

½ Tbsp (8g) sugar

Pinch (2g) salt + more for seasoning

½ Tbsp (5g) baking powder

¼ cup (40g) flax seed meal

½ Tbsp (1g) ground cumin

½ Tbsp (1g) ground coriander

½ cup (115g) water

2 Tbsp (25g) olive oil + more for brushing

DIRECTIONS:

1. In a mixer fitted with the paddle attachment, combine all dry ingredients. Mix on speed two until thoroughly combined. Add the olive oil, then add the water slowly. Mix the dough for two minutes. Once mixed combine the dough into a ball and cover with plastic wrap. Rest the dough for 30 minutes.
 2. After the resting period remove the plastic and roll the dough out on your counter. Use the reserved flour to prevent the dough from sticking. Roll the dough to 1/16 of an inch or as thinly as possible. Dock the dough by poking it all over with the tines of a fork.
 3. In a preheated oven set to 350°F cook the sheeted crackers for 20 minutes or until firm and golden brown. After you remove the crackers from the oven, brush with olive oil and season with salt.
 4. Once the crackers have chilled to room temperature they can be broken into smaller pieces. Alternatively, before cooking the sheet of dough can be cut into any desired shape.
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Rolled Kernza Granola

By Chris Nye

YIELD: Makes 2 cups

INGREDIENTS:

1 cup (100g) rolled Kernza
¼ cup (32g) coconut chips
2 Tbsp (18g) sesame seeds
¼ cup (30g) pepitas
2 Tbsp (15g) sunflower seeds
½ cup (40g) shaved almonds
2 Tbsp (14g) olive oil
½ cup (150g) honey
Pinch (2g) salt

DIRECTIONS:

In a medium mixing bowl combine all the ingredients and mix well. On a cookie sheet, bake the granola in a 350°F preheated oven for 10–15 minutes stirring frequently until the mixture is golden brown and evenly toasted. Chill to room temperature and crumble into small pieces.

Steel Cut Oat and Kernza Porridge

By Montana Rasmussen

INGREDIENTS:

3 Tbsp coconut oil
2 cups steel cut oats
1 can coconut milk (13.66 fl oz)
8 cups water
2 cups milk (or milk substitute)
1 cup Kernza flakes

DIRECTIONS:

In a large soup pot, heat coconut oil on medium high heat. Add steel cut oats, stirring constantly for 2–3 minutes to toast (they should start to brown slightly and give off a toasty aroma). If they are getting too dark, turn down your heat. Add the coconut milk, water and milk. Bring to a gentle boil and let cook for 30 minutes. You will want to stir periodically and more so as you get closer to the 30 minute mark. At the 30 minute mark, stir in Kernza® flakes. Let cook for another 15 minutes, stirring every couple of minutes to avoid mixture sticking to the bottom of the pan. Turn down to more of a simmer if you are getting excessive stickage. After the last 15 minutes, cover the pot and let stand for 10 minutes. Enjoy topping as you would for oatmeal. Leftovers reheat wonderfully with a little additional milk or water in a pan on the stove top.

Kernza Sourdough Starter

By Dan Rusoff

Note: Kernza is an excellent sourdough starter because the large bran picks up the yeast. It only takes 3–4 days to make a Kernza starter from scratch whereas it takes wheat all purpose flour 5–7 days.

STARTER FOR 1 LOAF OF BREAD

- ▶ Find an ambient room temperature around 75–85 degrees.
 - ▶ Combine 25g whole Kernza flour and 25g of 80–85 degree water in a jar.
 - ▶ Store it in a dark, warm place, ideally where you would be fermenting your bread too so it can acclimatize.
 - ▶ Leave the jar for 24 hours.
 - ▶ Feed the starter on day two with another 25g whole Kernza flour and 25g water.
 - ▶ By day 3 some bubbles will be forming and volume should be increasing. This indicates healthy yeast fermentation. Add another 25g Kernza flour and 25g water. (Note: No discarding of starter is required. You can track volume by marking the dough level with tape.)
 - ▶ This method can go up to 5 days with just the Kernza flour, but you could also start adding all purpose flour after day 3.
 - ▶ Keep feeding the starter until day 5. If it's not working by day 5, something went wrong.
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Kernza Sourdough Bread

By Dan Rusoff

YIELD: 1 Boule

INGREDIENTS:

100g ripe sourdough starter at 100% hydration (*50g chlorine-free water, 50g whole Kernza flour*)

320g water at 80°F (spring water preferred)

8g salt (Himalayan preferred)

100g whole Kernza flour

350g unbleached high-gluten/bread flour (organic, with the germ preferred)

Total Weight: 878g/1.94 lbs per loaf

DIRECTIONS:

1. Combine the water, Kernza flour and ripe sourdough starter in a mixing bowl until fully incorporated.
 2. Add the rest of the ingredients and mix just until the ingredients are all incorporated and uniform. Wrap the bowl in plastic and set in a room temperature (70–75°F) environment for a 25 minute rest (autolyse).
 3. Fold the dough, return to the bowl for 2 hours at room temperature. Fold the dough again, return to the bowl for 2 more hours at room temperature. Fold the dough a final time, return to the bowl for 1 more hour at room temperature.
 4. Turn the dough onto your work surface, shape into a boule and place seam side up in a bowl/basket lined with a well-floured linen. Cover and refrigerate overnight, 8–10 hours.
 5. Preheat oven to 460°F for at least 30 minutes before loading bread. Remove dough from bowl onto a floured peel or sheet pan. Score your loaf, transfer it to the oven and add steam or cover the loaf for the first half of the bake, if possible. Bake the loaf for 30 minutes at 460°F, then turn the oven down to 375°F to finish out the bake for another 25–30 minutes or so. Remove the bread once you like the color and the internal temperature is 205°F or greater. Allow to cool to room temperature before slicing for maximum flavor.
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Kernza Shortbread

By Beth Dooley

YIELD: 18 to 20 Bars

INGREDIENTS:

- 1 cup unsalted butter, softened
- ½ cup maple sugar or light brown sugar
- 2 tablespoons confectioner's sugar
- 2 cups Kernza flour
- ¼ cup rolled Kernza, plus more for topping the bars

DIRECTIONS

1. Preheat the oven to 325°F. Line a 10-inch square baking pan with parchment.
 2. In a large bowl, cream together the butter and both sugars until light and fluffy. Slowly work in the flour and the rolled Kernza.
 3. Transfer the dough to the prepared baking pan and smooth out to fill the pan. Scatter the rolled Kernza over the dough.
 4. Bake for about 20 minutes or until the bars are light brown and have pulled slightly away from the sides of the pan.
 5. Remove from the oven and set the pan on a rack to cool for about 15 minutes before cutting into bars.
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Kernza Supplier Sourcing Information

Please speak directly with your supplier for information about pricing and the ingredient forms they carry (raw grain, flakes, flour). Visit [Kernza.org](https://kernza.org) to locate a list of suppliers.

Credit to Contributors

These individuals have helped make this guide possible. We extend to them our sincere gratitude.

- **Christine “Montana” Rasmussen**, River Rock Kitchen and Baking Company
- **Joe Kaplan**, experienced Kernza product developer, formerly at Perennial Pantry
- **Dan Rusoff**, Chef/Owner, Bread Enthusiast
- **Beth Dooley**, Cookbook Author and UMN Minnesota Institute of Sustainable Agriculture Endowed Chair
- **Chris Nye**, Executive Chef, Soigne Hospitality Group

Other Resources

- ▶ **AURI (2022): Kernza Perennial Grain Value Chain Development in Central Minnesota;** Agricultural Utilization Research Institute. To obtain a copy, contact reports@auri.org. Appendices A, B, C, J, and P have great detail on baking uses and technical analyses of Kernza flour.
- ▶ **“Malting Kernza Perennial Grain: Assessing Characteristics, Quality, and Flavor of Kernza Malt”;** Joe Kaplan and Christopher Abbott (2023). Chapters 6 and 7 have detailed flour analysis and functional experiments.
Available at: <https://perennial-pantry.com/pages/kernza%C2%AE-malting-research>
- ▶ **Montana Rasmussen, River Rock Kitchen and Baking Company**, is willing to talk to chefs and bakers about her experiences with Kernza. riverrockbakery@gmail.com
- ▶ **Joe Kaplan**, one of the leading and most experienced Kernza product developers, is willing to discuss his experiences. jmkaplan9590@gmail.com
- ▶ **The Forever Green Cookbook**, Beth Dooley (2021), Minnesota Institute for Sustainable Agriculture.
Available at: <https://misa.umn.edu/publications/forever-green-cookbook>
- ▶ **The Perennial Kitchen: Simple Recipes for a Healthy Future;** Beth Dooley and Mette Nielsen, University of Minnesota Press (2021).
Available at: <https://www.upress.umn.edu/9781517909499/the-perennial-kitchen/>
- ▶ **The Perennial Test Kitchen: In Depth Baking Analysis & Introduction**, Joe Kaplan (2021).
Available at: <https://perennial-pantry.com/blogs/perennial-test-kitchen/kernza-in-depth>
- ▶ **The Perfect Loaf: Kernza Sourdough Bread Recipe**, Maurizio Leo (2025).
Available at: <https://www.theperfectloaf.com/kernza-sourdough-bread-recipe/>
- ▶ **Dr. George Annor**, Associate Professor in the Department of Food Science and Nutrition at the University of Minnesota is willing to discuss his research on functional uses of Kernza.
Learn more at: <https://fscn.cfans.umn.edu/people/george-annor>

¹Great Plains Analytical Laboratory tests of 2024 harvested grain from 24 fields across three regions. g = grams and mg = milligrams.

²Perennial Pantry malting report, p. 40

³Perennial Pantry malting report, p. 49

⁴Perennial Pantry malting report, p. 7

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