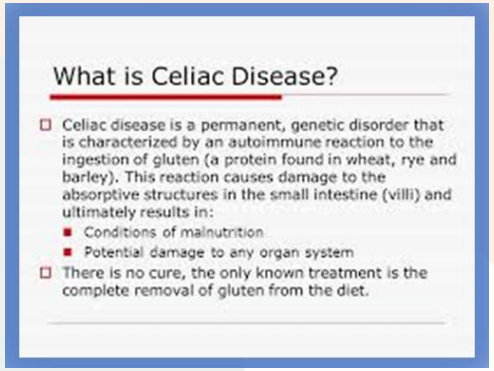
PEKTOS AG
Know-How & Experience

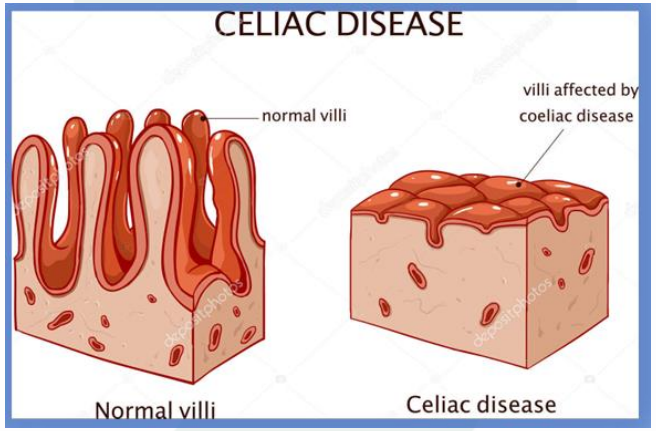
PEKTOS
BEET FIBER BF & APPLE FIBER AF

in Gluten-free Baking

Gluten-free Baking

- Gluten is a protein composite found in several grains including wheat, spelt, rye and barley.
- The immune system responds by affecting the small intestine if people with celiac disease consume foods containing gluten.
- Awareness of and knowledge about the adverse health effects on people diagnosed with Celiac disease, gluten intolerance and some auto-immune diseases has increased over the past decades…
- ..so much so even people without these conditions are increasingly looking to reduce the amount of gluten in their diet.





PEKTOS Fibers in GF baking

- **BEET FIBER BF 5** is a key ingredient for gluten-free baking.
  - Free from gluten (< 20ppm acc. to EU regulation) and with a high fiber content with a mix of insoluble and soluble fiber.
  - The thermo-stable water-binding and water-holding capacity helps to preserve freshness in a natural way.
  - Reduced drying out of bake-off and frozen bread dough, plus better crumb and pore structure are just a few of the functionalities.
  - Available in a range of granulations (ultra-fine, fine, coarse) and shapes (powders, granules, flakes).
- **APPLE FIBER AF 3** works well in combination with Beet Fiber.
  - APPLE FIBER AF works quite similar to BF in gluten-free formulations.
  - Apple Fiber has a favourable soluble vs. insoluble fiber ratio and contains polyphenols, but is not often used in gluten-free formulations, yet.
  - Apple Fiber for its hydration and gel forming ability as well as its thickening and textural effect, can be helpful to reduce nutritional and technological problems common in gluten-free baking.

PEKTOS Fibers in GF baking

- Both **BEET FIBER BF 5** and **APPLE FIBER AF 3** work well together with hydrocolloids commonly used in gluten-free baking.
  - Particularly HPMC, but also Galactomannans like guar gum and locust bean gum, and Xanthan gum are often used to create elasticity for a good gas-holding capability in the dough and a good volume of the finished bread, which usually would be done by gluten.
  - **BEET FIBER BF 5** and **APPLE FIBER AF 3** both contribute to the dough elasticity provided by thickeners like the above mentioned, while also functioning like a binding agent glueing together the recipe components.

Study from 2019

- **BEET and APPLE Fibers** coupled with HPMC as functional ingredients in gluten-free formulations: Rheological, technological and sensory aspects.
  - The presented study examined the influence of HPMC, Sugar Beet Fiber (BF) and Apple Fiber (AF) incorporation, coupled with adequate water levels on gluten-free (GF) batter rheology, bread quality and sensory characteristics. A Box-Behnken experimental design with independent variables: HPMC quantity (2-4 g/100 g), BF and AF quantity (37 g/100 g) and water quantity (180-230 g/100 g depending on the fiber type) based on a maize flour/starch mixture was applied.
  - GF breads with 4 g/100 g HPMC coupled with 3 g/100 g BF & 7 g/100 g AF reached the highest specific volumes (2.44 cm^3/g and 3.97 cm^3/g) accompanied with the lowest crumb hardness (2.29 and 2.10 N, respectively). Appealing crust and crumb color and good sensory characteristics were achieved in GF breads with 4 g/100 g HPMC and 3, 5 and 7 g/100 g BF or AF. The corresponding GF breads showed enhanced fiber content (4.56–6.07 g/100 g).

Start-Point Formulation

Square Tin Loaf

Gluten-free flour blend	800 g
PEKTOS Beet Fiber BF 5 C and/or Apple Fiber AF 3 C	**30 g**
Water	500 ml
Millet flakes	30 g
Psyllium seeds	5 g
Salt	15 g
Sugar	25 g
Margarine (room temp.)	75 g
Instant dry yeast	25 g

- Mix water and yeast. Mix in margarine, fibers, millet flakes and psyllium seeds and let stand for 10 minutes.
- Mix in the sugar and salt, then the GF flour blend, and mix thoroughly for about 3 minutes until smooth.
- Place dough in a greased baking tin dusted with millet flakes (approx. 1.5 l volume).
- Cover with a tea towel and plastic. Let rise for 45 minutes in a warm place.
- Brush with water. Bake at 200°C for approx. 45 minutes.
- Let stand for 5 minutes before turning the loaf onto a cooling rack.