



# Low Calorie Biscuit (Cookie)

## Healthy and indulgent

**Purpose:** To create a tasty biscuit with minimal calories. Citri-Fi's® unique texturizing properties make it easier to use a multitude of high-fiber and low-glycemic index ingredients, yet without the texture problems that are often associated with fiber ingredients. Citri-Fi enables formulating of high-fiber baked-food applications that have tender bites and pleasant mouthfeel.

### Base Formulation:

Ingredient	Description	Wet Dough Basis	Dry Basis	Caloric Density	Caloric Contribution
		%	%	kcal/100g of ingredient	Kcal/100g of cookie
Wheat Bran	Fine milled	19.7	26.0	187.5	48.8
Isomalt		19.7	26.0	200.0	52.0
Resistant High-Amylose Corn Starch	HiMaize*	13.4	17.7	181.8	32.2
Resistant Wheat Starch	Fibersym**RW	7.8	10.2	60.0	9.9
Fructose	Dry, crystalline	9.2	12.1	375.0	45.4
Wheat Gluten	Vital	2.0	2.6	400.0	10.4
Citrus Fiber	Citri-Fi 100FG ***	1.4	1.9	131.1	2.5
Citrus Fiber with Xanthan Gum	Citri-Fi 300FG ***	1.4	1.9	131.1	2.5
Salt		1.1	1.5	0.0	0.0
Baking Soda	Sodium Bicarbonate	0.1	0.1	0.0	0.0
Water		24.2	0.0	0.0	0.0
Cookie Flavor	(optional)			0.0	0.0
<b>Total</b>		<b>100.0</b>	<b>100.0</b>		<b>203.7</b>

\* Hi-Maize® is a registered trademark of Ingredion Inc.

\*\*Fibersym® is a registered trademark of MGP Ingredients, Inc.

\*\*\* Citri-Fi® is a registered trademark of Fiberstar, Inc.

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**Procedure:**

Dry blend all ingredients except for water. With slow agitation add water to create a dough. Some small adjustments of the water content may be necessary dependent upon the starting moisture content of the ingredients; for example, if they were stored in a very humid or very dry environment. Final dough consistency will be pliable but stiff with minimal water content. Knead dough for 3 minutes maximum and roll into small balls. Flatten into a disc shape 5-10 mm thick. Bake at 177 °C using a forced air oven until moisture content is 10% or less, about 30 mins. For a softer texture, adjust procedure for less oven time; for a crispier texture, adjust slightly longer. If the oven conditions do not generate the desired color, the color can be fine-tuned ranging from a light tan to a golden-brown color just by adjusting the fructose content (more is darker).

**Results and Conclusions:**

The above formulation using Citri-Fi citrus fibers is tasty and palatable, with a flavor, color and texture in-line with consumer expectations of a sweet biscuit. Typically, products with this much are unpalatable due to dryness, toughness, and lack of fine flavor. In the current recipe, a calorie reduction of nearly 60% has been achieved. For a crispier bite, adjust the baking time to be longer. As with many crisp snacks, the moisture content should be below 5%. A softer texture is also possible at moisture contents of 5-10% and may be desired in some cases.

	Estimated Calories (per 100 g)	Estimated Fiber* (per 100g)
Low Calorie Biscuit	203.7	32.2
Reference Biscuit**	481.5	1.9
<b>Change from Control</b>	<b>57.7% less</b>	<b>17 times more</b>
* Does not consider Isomalt as fiber, although it has some fiber-like nutritional properties		
** Bordeaux Cookies by Pepperidge Farm		



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