BREAD NUTRITION FACTS CALCULATOR

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Designed using Microsoft Excel version 16.12 on an Apple iMac computer.

References:
McCance & Widdowson's The Composition of Foods, B Holland et al., Royal Society of Chemistry and MAFF, 1988

Food Labeling Guide 2013 (FDA)

New Nutrition Facts 2017 (FDA)

CFR- Code of Federal regulations Title 21 Parts 101.12 and 101.9 (updates at eCFR)

Disclaimer
This calculator has been designed in good faith but may still contain errors. The values obtained are intended only as an estimate of the nutrient content of bread and similar products. We cannot accept responsibility for the accuracy of the nutrient content in a bread product; this responsibility rests with the user.

*Introduction to the **Bread Nutrition Facts Calculator***

The initial purpose for building this calculator was to generate the values needed to fill out a Nutrition Facts panel on a label for 100% whole grain sourdough leavened bread. As development proceeded I saw that a calculator could serve the professional baker and also the home baker in other ways than the original intention: by estimating the nutritional value of a test formulation. Even in this era of local miller-bakers, many bakers still use considerable amounts of refined flour, both enriched and un-enriched. Refined flour as an ingredient possibility was therefore added late in the design process, as were yeast and baking powder, so that bakers could easily make comparisons of nutritional quality between refined and whole grain flour, as well as leavening methods. In general, when baker's yeast is used as the leavening there is also **added sugar**, which is sometimes further added as a texturizer. The differences in **calcium, iron** and **potassium** in a formulation for bread can be seen by varying the type of flour between un-enriched refined flour, enriched refined flour and 100% whole grain flour. Values for these minerals change dramatically when dried fruits and nuts are included in a formulation. Calcium and potassium will be increased when milk is added. Also, the difference in **dietary fiber** content between refined flour and whole grain flours, and their contribution to the daily need, can be made plain to the baker as well as eventually to the customer. Some of the differences and the amounts involved may look trivial for a single serving, but it is important to remember that for most people grain foods are a major staple served several times a day. The trivial amount in a single serving can become a major contributor if, for example 6 or more servings of whole grain bread are eaten in a day by an energetic young adult. Conversely six servings of an un-enriched refined flour bread can result in nutrient deprivation.

Only a limited number of nutrients are required to be estimated for the FDA approved Nutrition Facts. It's easy to overdo **sodium** in the diet, hence its inclusion on the label as a check to prevent this. The effect on sodium content, by changing amounts of salt, or including baking powder, can be seen easily by entering a test formulation into the calculator. Fortunately, we have by now learned not to use hydrogenated fats, and there are no hydrogenated fats listed in this calculator; no **trans-fats** are expected in a baker's formulation. Grains do not contain **cholesterol**, so that cholesterol will only be introduced into a bread with milk products, lard or egg yolk. Except for lard, these products can be a source of **vitamin D**, which otherwise would not normally be found in bread. A surprise ingredient: orange peel, which might be included in festive breads can also be a source of vitamin D. **Fat, protein** and **carbohydrates** are present in similar amounts in most whole grain flours. Values for a wide range of whole grains are grouped together, since the variations in the macro-nutrients: fat, protein and carbohydrate due to growing conditions, are similar to the differences in literature values for the individual grains. Oats are an exception; they contain considerably more fat, than most other grains. Fat contributes 9 **Calories** per gram, versus the 4 Calories per gram contribution by protein and digestible carbohydrate. This explains large increases in Calories from a serving, when fat or oil is introduced. We can make these and similar observations as a result of using this calculator, and perhaps be inspired to look further into how to improve the nutritional value of the products that we make. For comparison of the content of other valuable nutrients, such as B-vitamins in whole grain breads versus refined flour breads, see www.wholegrainconnection.org

It will be easiest if formulations are written for ingredients to be weighed out on a digital scale and are measured in grams or Kilograms. Note that the values for the **final dough piece weight** and for the **baked product weight** will always need to be measured in **grams.** In this way the results from this calculator, will already be in the

units required for the Nutrition Facts table. If you are highly attached to pounds or ounces as your unit of choice, one or the other, then most digital scales will decimalize pounds or ounces and these values can be used. *The Bread Nutrition Facts calculator is not designed to accommodate volume measurements, or the combination of pounds and ounces.*

The **serving size** can be measured as the amount containing 28 grams (1 ounce) of grain ingredient, in which case we can truly compare the nutritional value of the grains used. However, the FDA requires the serving size to be the reference amount customarily consumed (**RACC**); e.g. 50 grams for a serving of bread. A table of these RACC values is included on page 5, copied directly from the Code of Federal regulations (CFR 21. 101.12 dated April 1, 2017), which also includes the descriptive word for the serving, such as "piece" or "½ -inch slice". We can refer to this table to determine the serving size appropriate for a product. We can calculate nutritional values either for the RACC, or for a serving size containing an ounce (28 grams) of grain product, using the Bread Nutrition Facts Calculator

As a check on the validity of values produced, please compare the calculated Bread Nutrition Facts with the provided example, and with a store item with similar ingredient content that already has a Nutrition Facts label. If you need further help contact, by e-mail: barmbaker@aol.com

Your comments are welcome and can help improve the usefulness of the **Bread Nutrition Facts Calculator**; e-mail: barmbaker@aol.com

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To use the **Bread Nutrition Facts** calculator:

1. When prompted on opening **Bread Nutrition Facts**, enter the password provided. A second password is not provided or required; simply open in "**read only**" mode. *Note that "**read only**" mode means that your entries can only be saved for future reference as a **printed copy** or as a **pdf**, made before closing. Close by clicking "do not save". The worksheet can only be saved as a copy requiring your password to open it.*

2. Enter your formulation values ONLY in the green colored boxes.

*Formulation values can be consistently in any decimal units such as **Kilograms**, **grams** or **baker's percent**. Either decimal pounds or decimal ounces can also be used; pounds together with ounces cannot be used. **Entries for "dough piece weight for loaf" and "baked loaf weight" must be in grams.***

If you accidentally make entries in the white boxes, the calculator will no longer function; close the worksheet, re-open it and start again.

*The "**search**" bar is inactive in "**read only** "mode. To find an ingredient for your formulation, use the row number index below.*

3. The following amounts are essential for completing the **Nutrition Facts** table:

*Dough piece weight (**grams**) for loaf make-up*
*Baked loaf weight **(grams)***
Choice of number of servings or serving size

4. Record your results as a print-out or as a pdf, before closing.
"Set Print Area" on the worksheet before printing out, or making a pdf.

INDEX
To find an ingredient for your formulation, use the following index; the "search" bar is inactive in "read only "mode.

Row number	Ingredient
55	**Added Water**
68	Almonds*
62	Baking Powder
49, 52	Barley
83	Barley Malt extract*
50, 52	Buckwheat
59	Butter
85	Chickpeas
77	Chocolate (100%) baking*
78	Cocoa powder (100%)*
76	Coconut (desiccated)
50, 52	Corn
64	Currants
66	Dates
65	Dried Figs
61	Egg white
60	Egg yolk
73	Flax seed*
82	Ghee
81	Jaggery
69	Lard
87	Lentils
50, 52	Malt grain (including enzyme active malt)
58	Milk
50, 52	Millet
80	Molasses
70	Mozzarella cheese
84	Oats
53	Olive oil
72	Olives (brined, pitted)
75	Orange peel (dried)

63	Raisins
40, 57	Refined wheat flour - enriched
39, 56	Refined wheat flour (un-enriched)
50, 52	Rice
49, 51	Rye
54	**Salt**
71	Sesame seeds
50	Sorghum
48	**Sourdough starter**
86	Soybeans
79	Sugar, refined
74	Sunflower seed
50, 52	Teff
67	Tomato paste
69	Walnuts
55	Water, added
49, 51	Wheat
57	Wheat flour – enriched, refined
56	Wheat flour (un-enriched), refined
62	Whole egg
49	**Whole grain flour**
51	**Whole, cracked or sprouted grain**
58	Yeast (compressed)
59	Yeast (dried)

RACCs
Reference amounts customarily consumed
Copied from CFR title 21. Part 101. Section 101.12

Product category	Reference amount	Label statement [4]
Bakery Products:		
Bagels, toaster pastries, muffins (excluding English muffins)	110 g	_piece(s) (_g)
Biscuits, croissants, tortillas, soft bread sticks, soft pretzels, corn bread, hush puppies, scones, crumpets, English muffins	55 g	_piece(s) (_g)

Breads (excluding sweet quick type), rolls	50 g	_piece(s) (_g) for sliced bread and distinct pieces (e.g., rolls); 2 oz (56 g/_inch slice) for unsliced bread
Bread sticks--see crackers		
Toaster pastries--see bagels, toaster pastries, muffins (excluding English muffins)		
Brownies	40 g	_piece(s) (_g) for distinct pieces; fractional slice (_g) for bulk
Cakes, heavyweight (cheese cake; pineapple upside-down cake; fruit, nut, and vegetable cakes with more than or equal to 35 percent of the finished weight as fruit, nuts, or vegetables or any of these combinations) [5]	125 g	_piece(s) (_g) for distinct pieces (e.g., sliced or individually packaged products); _fractional slice (_g) for large discrete units
Cakes, mediumweight (chemically leavened cake with or without icing or filling except those classified as light weight cake; fruit, nut, and vegetable cake with less than 35 percent of the finished weight as fruit, nuts, or vegetables or any of these combinations; light weight cake with icing; Boston cream pie; cupcake; eclair; cream puff) [6]	80 g	_piece(s) (_g) for distinct pieces (e.g., cupcake); _fractional slice (_g) for large discrete units
Cakes, lightweight (angel food, chiffon, or sponge cake without icing or filling) [7]	55 g	_piece(s) (_g) for distinct pieces (e.g., sliced or individually packaged products); _fractional slice (_g) for large discrete units
Coffee cakes, crumb cakes, doughnuts, Danish, sweet rolls, sweet quick type breads	55 g	_piece(s) (_g) for sliced bread and distinct pieces (e.g., doughnut); 2 oz (56 g/visual unit of measure) for bulk products (e.g., unsliced bread)
Cookies	30 g	_piece(s) (_g)
Crackers that are usually not used as snack, melba toast, hard bread sticks, ice cream cones [8]	15 g	_piece(s) (_g)
Crackers that are usually used as snacks	30 g	_piece(s) (_g)

Croutons	7 g	_tbsp(s) (_g); _cup(s) (_g); _piece(s) (_g) for large pieces
Eggroll, dumpling, wonton, or pot-sticker wrappers	20 g	_sheet (_g); wrapper (_g)
French toast, crepes, pancakes, variety mixes	110 g prepared for French toast, crepes, and pancakes; 40 g dry mix for variety mixes	_piece(s) (_g); _cup(s) (_g) for dry mix
Grain-based bars with or without filling or coating, e.g., breakfast bars, granola bars, rice cereal bars	40 g	_piece(s) (_g)
Ice cream cones--see crackers		
Pies, cobblers, fruit crisps, turnovers, other pastries	125 g	_piece(s) (_g) for distinct pieces; _fractional slice (_g) for large discrete units
Pie crust, pie shells, pastry sheets, (e.g., phyllo, puff pastry sheets)	the allowable declaration closest to an 8 square inch surface area	_fractional slice(s) (_g) for large discrete units; _shells (_g); _fractional _sheet(s) (_g) for distinct pieces (e.g., Pastry sheet).
Pizza crust	55 g	_fractional slice (_g)
Taco shells, hard	30 g	_shell(s) (_g)
Waffles	85 g	_piece(s) (_g)
Cereals and Other Grain Products:		
Pastas, plain	140 g prepared; 55 g dry	_cup(s) (_g); _piece(s) (_g) for large pieces (e.g., large shells or lasagna noodles) or 2 oz (56 g/visual unit of measure) for dry bulk products (e.g., spaghetti)
Pastas, dry, ready-to-eat, e.g., fried canned chow mein noodles	25 g	_cup(s) (_g)
Stuffing	100 g	_cup(s) (_g)

This template is in Microsoft Word and is based on the format requirements given by the FDA.

Copy this template into a new Word document before working on it.

Substitute values for your own bread product where there is an "x" and where the wording needs to be changed to describe package and serving pieces. Take care not to change the font or any other element of the table format.

Word does not provide *Helvetica* font in "black", but does for *Arial*, which is the font used here. Also, in Word, table border lines can only be 6-point whereas 7-point thick lines are required. Therefore, lines were drawn separately from the table cell borders, *as an inserted "shape"*.

Nutrition Facts

X servings per bag

Serving size   x slices (xxg)

Amount per serving

Calories   X

	% Daily Value*
Total Fat xg	**X%**
Saturated Fat xg	**X%**
Trans Fat xg	
Cholesterol xmg	**X%**
Sodium xmg	**X%**
Total Carbohydrate xmg	**X%**
Dietary Fiber xg	**X%**
Total Sugars xg	
Includes xg Added Sugars	**X%**
Protein xg	**X%**

Vitamin D xmcg x%	•	Calcium xmg x%
Iron xmg x%	•	Potassium xmg x%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

For detailed description, and other allowed formats refer to: 21 CFR 101 9