



Gluten-Free Goodness

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Objectives

- ▶ Name nutrients commonly lacking in a gluten-free diet.
- ▶ Identify the best gluten-free sources of fiber.
- ▶ Identify a wide variety of gluten-free grains and means of preparation.
- ▶ Identify a variety of sources of calcium.

Common Nutrient Deficiencies/Italy

At diagnosis

- ▶ Calorie/protein
- ▶ Fiber
- ▶ Iron
- ▶ Calcium
- ▶ Magnesium
- ▶ Vitamin D
- ▶ Zinc
- ▶ Folate, niacin, B12, riboflavin

Long-term GFD

- ▶ Fiber
- ▶ Folate, niacin, B12

Nutrient Status/U.S. (Long term GFD)

Women:

- ▶ Fiber 46%
- ▶ Iron 44%
- ▶ Calcium 31%
- ▶ Grains 21%

Men:

- ▶ Fiber 88%
- ▶ Iron 100%
- ▶ Calcium 63%
- ▶ Grains 63%

Thompson T, et al. Gluten-free diet survey: are Americans with coeliac disease consuming recommended amounts of fibre, iron, calcium and grain foods? J Hum Nutr Diet. 2005 Jun ;18(3):163-9.

Common Deficiencies Long-Term GFD

- ▶ B vitamins
- ▶ Calcium
- ▶ Fiber
- ▶ Grains
- ▶ Iron

Enrichment of Grain Products

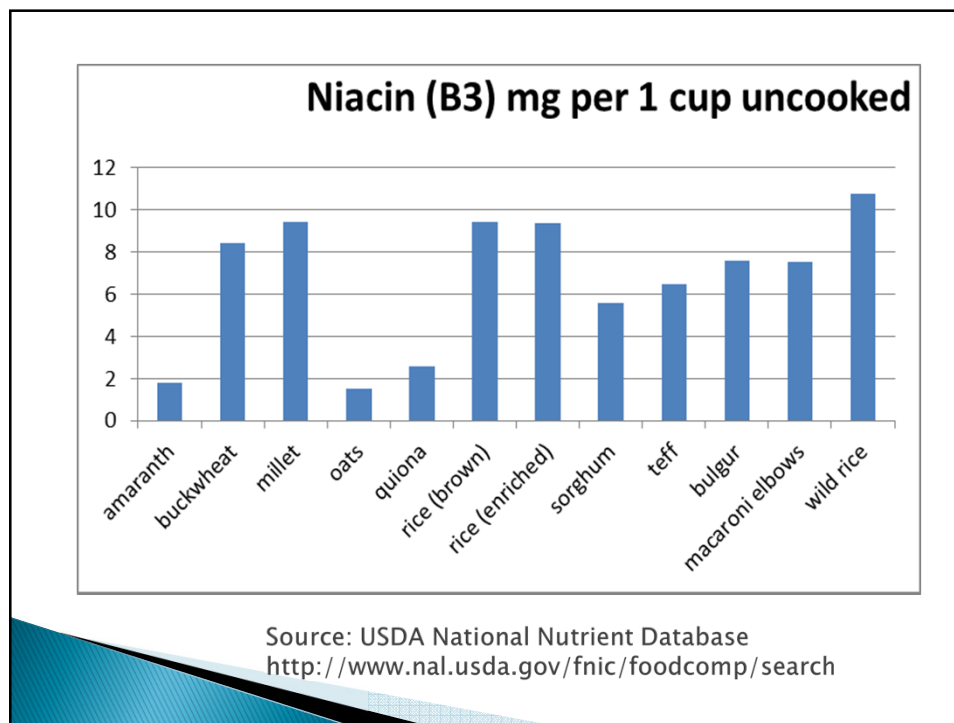
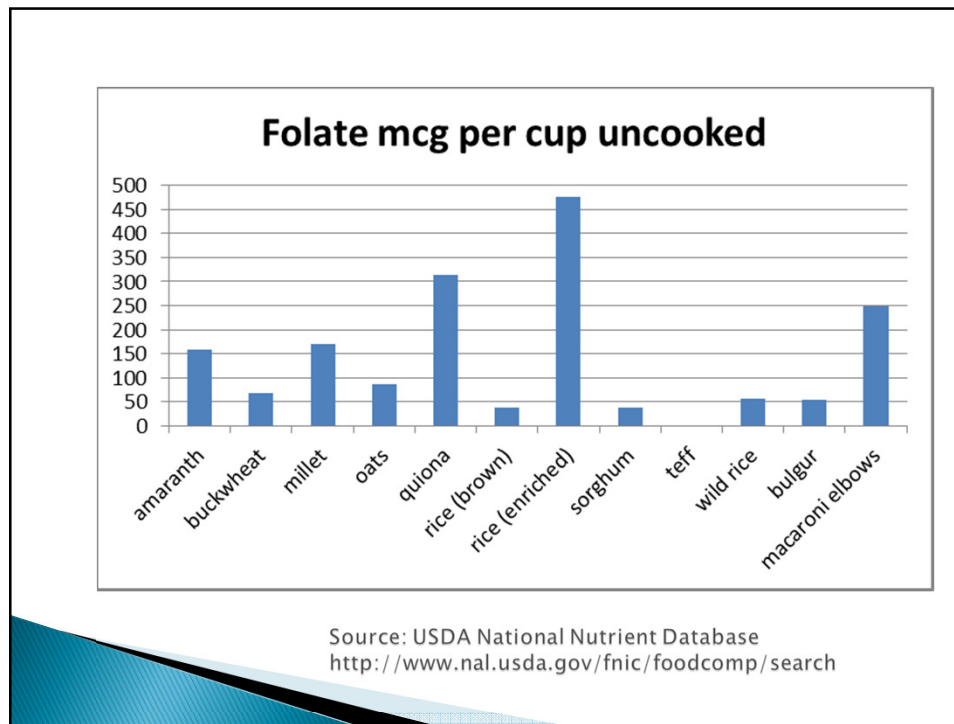
- ▶ Most breads, pastas, baked goods, etc. with white flour are enriched.
- ▶ Thiamin, niacin, riboflavin, folic acid, and iron are added to enriched flour, calcium is optional.
- ▶ White rice is usually enriched, but the rice flour used in gluten-free foods is usually not.

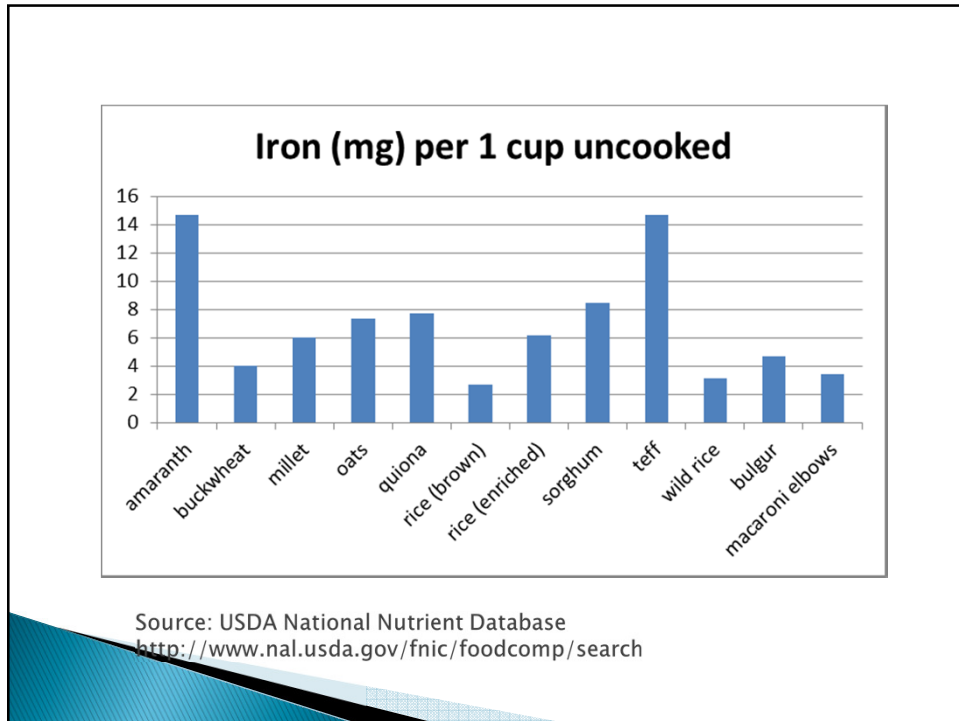
B Vitamins: Study of Grains/U.S.

- ▶ “Gluten-free products contain inferior amounts of thiamin, riboflavin and/or niacin than the wheat products they are intended to replace.” Published in 1999
- ▶ Breads, pastas and most cereals not fortified according to U.S. study from 2000.

The difference enrichment makes...

	Thiamin (B1) mg	Riboflavin(B2)	Niacin (B3) mg	B6 mg	Folate mcg
cornstarch	0.0	0.0	0.0	0.0	0.0
tapioca flour	0.0	0.0	0.0	0.0	5.0
potato starch	0.0	0.0	0.0	n/a	n/a
rice flour	0.2	0.0	4.1	0.7	6.0
enriched flour	1.0	0.6	7.4	0.6	229.0
whole wheat	0.6	0.2	6.0	0.5	53.0
All per 1 cup uncooked					





Rice



Wild rice



Corn



Buckwheat (kasha)



Quinoa



Millet



Teff



Sorghum



Amaranth



COOKING WHOLE GRAINS

To 1 cup of this grain...	Add this much water or broth:	Bring to a boil, then simmer for:	Amount after cooking
Amaranth	2 cups	20-25 minutes	3 1/2 cups
Buckwheat	2 cups	20 minutes	4 cups
Cornmeal (polenta)*	4 cups	25-30 minutes	2 1/2 cups
Millet, hulled	2 1/2 cups	25-35 minutes	4 cups
Oats**, steel cut	4 cups	20 minutes	4 cups
Quinoa	2 cups	12-15 minutes	3+ cups
Rice, brown ***	2 1/2 cups	25-45 minutes (varies by variety)	3-4 cups
Sorghum	4 cups	25-40 minutes	3 cups
Wild rice	3 cups	45-55 minutes	3 1/2 cups



Chart courtesy of the Whole Grain Council
(www.wholegrainscouncil.org). Used with permission.

Sprouting Grains

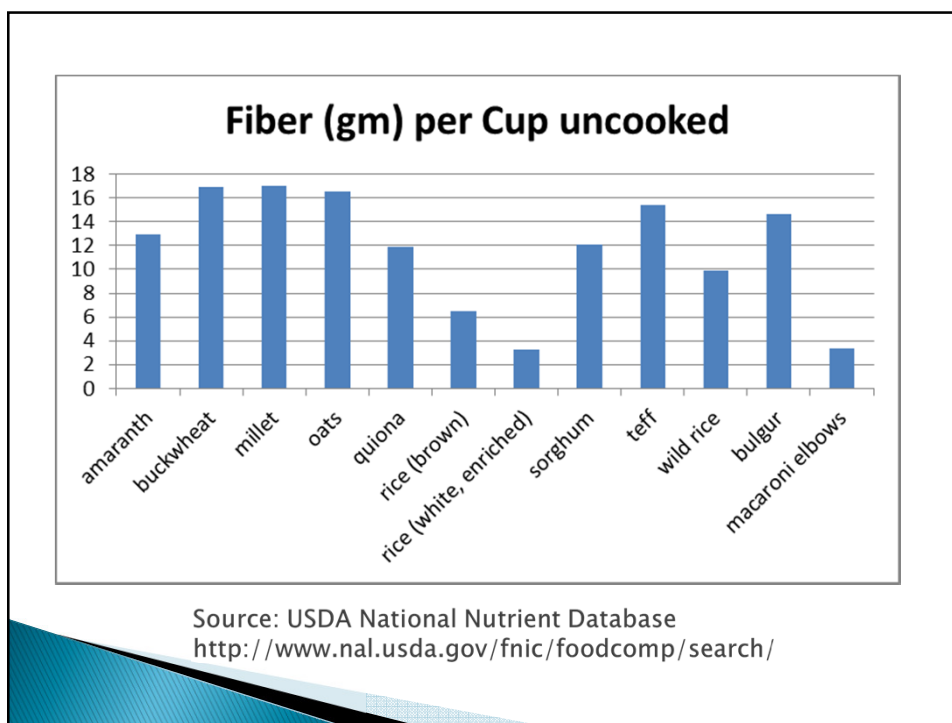
- ▶ Sprouting seems to offer some additional health benefits. However, there is no standard definition of the term “sprouted grains”.
- ▶ <http://wholegrainscouncil.org/whole-grains-101/health-benefits-of-sprouted-grains>

Soaking and Toasting Grains

- ▶ Soaking grains decreases cooking time, and usually decreases amount of fluid needed.
- ▶ Toasting gives a different and more robust flavor. This can be done on the stovetop or in the oven.

Cross Contamination

- ▶ We know that oats are cross-contaminated w/gluten except when specifically marked.
- ▶ Tricia Thompson et. al published a study on cross-contamination and showed that many grains & flours NOT marked GF have measurable amounts of gluten. (Millet, soy, buckwheat, sorghum and white rice)
- ▶ J Am Diet Assoc. 2010 Jun;110(6):937-40



Sources of Fiber

The usual suspects:

- ▶ Fruits
- ▶ Vegetables
- ▶ Nuts
- ▶ Seeds
- ▶ Beans/lentils
- ▶ Gluten-free grains/pseudograins

Beans and Lentils

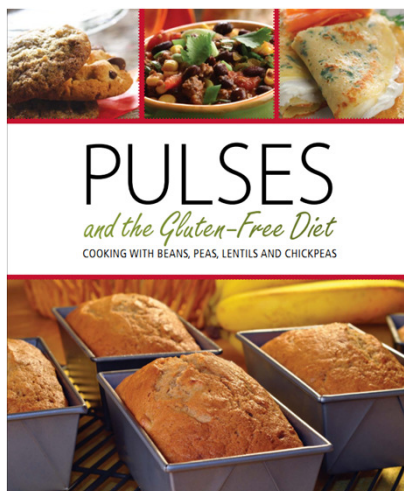
- ▶ Superb source of fiber
- ▶ Good source of protein
- ▶ Good source of iron
- ▶ Some calcium, too

TABLE B - COMPARISON OF PULSE FLOURS AND COMMONLY USED GLUTEN FREE FLOURS AND STARCHES (PER 1 CUP/250 ml)

Nutrients & Units		Pulse Flours				Gluten-Free Flours & Starches				
Nutrients	Units	Black Bean	Navy Bean	Chickpea	Yellow Pea	White Rice Flour	Brown Rice Flour	Cornstarch	Potato Starch	Tapioca Starch/Flour
Protein	g	30.9	30.2	25.7	24.7	9.4	11.4	0.3	0.2	0
Fibre	g	28.0	26.9	17.3	20.6	3.8	7.3	1.2	0	0
Carbohydrate	g	91	81	73	71	127	121	117	158	119
Iron	mg	11.8	9.3	6.8	5.4	0.6	3.1	0.6	2.9	0
Calcium	mg	189	347	92	90	16	17	3	19	0
Zinc	mg	4.7	4.0	3.5	3.9	1.3	3.9	0.1	n/a	0
Thiamin (B1)	mg	0.88	0.77	0.70	0.73	0.22	0.70	0	0	0
Riboflavin (B2)	mg	0.21	0.15	0.16	0.15	0.03	0.13	0	0	0
Niacin (B3)	mg	3.8	3.5	1.8	3.0	4.1	10.0	0	0	0
Pyridoxine (B6)	mg	0.56	0.41	0.54	0.12	0.69	1.2	0	n/a	0
Folate	mcg	343	303	334	15	6	25	0	n/a	0

Note: n/a = not available

New (free!) e-book from Shelley Case & Carol Fenster
<http://tinyurl.com/6k66qe6> or
www.pulsecanada.com



Nuts and Seeds

- ▶ Portable, shelf-stable, naturally gluten-free, fiber-rich and high in a variety of vitamins and minerals.

Seeds:

- ▶ Sunflower
- ▶ Pumpkin
- ▶ Sesame
- ▶ Flax
- ▶ Chia/Salba
- ▶ Hemp

Chia Seeds/ Salba® Seeds

- ▶ Seed native to Mexico/Central America
- ▶ Both Chia and Salba® are the species “Salvia Hispanica”
- ▶ Contains magnesium, folate, iron, and calcium
- ▶ Good source of ALA
- ▶ Small studies on Salba® have showed lowered blood pressure in Type 2 Diabetics

Hemp Seeds

Source:
Nutiva.com

Nutrition Facts			
Serving Size: 3 tbs (30g)			
Servings Per Container: 12			
Amount Per Serving			
Calories 174		Calories from Fat 127	
% Daily Value			
Total Fat 13.5g		21%	
Saturated Fat 1g		4%	
Trans Fat 0g			
Cholesterol 0mg		0%	
Sodium 0mg		0%	
Total Carbohydrate 2g		1%	
Dietary Fiber 1g		5%	
Sugars <1g			
Protein 11g		22%	
Iron 16%		Zinc 23%	
Phosphorus 48%		Magnesium 48%	
Not a significant source of sugars, vitamin A, vitamin C, and calcium.			
*Percent Daily Values are based on a 2,000-calorie diet. Your daily values may be higher or lower, depending on your calorie needs.			
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber	25g	30g	
Calories per gram:			
Fat 9	Carbohydrate 4	Protein 4	

Miscellaneous fiber sources

- ▶ Mesquite powder—high in iron, fiber & calcium
- ▶ Montina fiber--high in fiber, protein, iron
- ▶ Psyllium husk—high in fiber, may lower cholesterol
- ▶ Rice bran/rice polish--high in fiber, magnesium, niacin, phosphorous

Calcium

- ▶ Particularly important due to predisposition toward osteopenia and osteoporosis due to malabsorption of many bone-building vitamins and minerals.
- ▶ High overlap between Celiac Disease and lactose intolerance, especially shortly after diagnosis.

Non-Dairy GF Calcium Sources

300-600 mg calcium	200 mg calcium	100 mg calcium	75 mg calcium	50 mg calcium
Sardines, 1 can in oil, drained (570mg)	Apple juice, calcium fortified 8 oz	Kale, <u>cooked</u> , 1 cup	Almond butter, 2 tablespoons	Navy beans, Northern or black beans, ½ cup <u>cooked</u>
Fortified orange juice, 1 cup (500 mg)	Blackstrap molasses, 1 tablespoon	Soybeans, 1 cup <u>cooked</u> 125 mg	Chickpeas (garbanzo beans), 1 cup <u>cooked</u>	Vegetarian baked beans, ½ cup <u>cooked</u>
Fortified soymilk, 8 oz, (340 mg)	Tofu, calcium set, ½ cup	Instant oatmeal, 1 package	Bok choy or mustard greens, ½ cup <u>cooked</u>	Orange
Spinach, 1 cup <u>cooked</u>	Calcium fortified breakfast cereal, 1 oz	Dried figs, 5	Dandelion greens, 1/2 cup <u>cooked</u>	¾ cup raw arugala
V-8, calcium fortified, 1 cup	Black eyed peas, cooked, 1 cup	Teff grain, 1 cup <u>cooked</u> (123 mg)	Okra, 1/2 cup <u>cooked</u>	Trout/ salmon, 1 cooked fillet
Fortified rice milk, 8 oz (280 mg)	Chia seeds, 2 TBSPs (200 mg)	Sesame seeds, dried, 1 TBSP	Tahini, 1tablespoon	Ground flax seed, 3 tablespoon
Turnip greens, 1 cup <u>cooked</u> =(288mg)		Edamame, 1 cup prepared	Broccoli, 1 cup <u>cooked</u> (62 mg)	Larabar (<u>not</u> PB, cashew or coconut varieties)
Collard greens, 1 cup <u>cooked</u> (250 mg)		Almonds, ¼ cup		Mesquite flour: 40 mg per ¼ cup
		Swiss chard, 1 cup <u>cooked</u>		Carob pwr, 2 TBSP(40 mg)

Gluten-Free Whole Grain Recipes

- ▶ www.Quinoa.com *
- ▶ www.Quinoa.net *
- ▶ <http://glutenfreegoddess.blogspot.com/>
- ▶ www.bobsredmill.com *
- ▶ <http://www.whfoods.com/> *
- ▶ <http://glutenfreecooking.about.com/>
- ▶ <http://wholegrainscouncil.com/> *
- ▶ <http://www.101cookbooks.com/> *
- ▶ <http://nuworldamaranth.com/> *
- ▶ www.teffco.com
- ▶ <http://lesliecierier.com/> *

*website also has gluten-containing recipes

Cheryl's Hit List of GF Goodness

- ▶ Mary's Gone Crackers
- ▶ Larabars
- ▶ Kind Bars
- ▶ Amy's Soups
- ▶ Dr. Mc Dougall's soups
- ▶ Mighty Tasty Hot Cereal from Bob's Red Mill
- ▶ Nutsonline.com GF Snacks
- ▶ Sunrise Cereals from Nature's Path