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Barley in the Marketplace: An Industry Perspective

Opportunities for Sustagrain® High Fiber Barley

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National Barley Foods Forum
January 30, 2009**



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Sustagrain® Barley

- Commercialized identity-preserved barley
 - Waxy, hulless, shrunken endosperm

- Unique carbohydrate composition
 - Fiber rich ($\geq 30\%$)
 - Higher soluble fiber ($\geq 12\%$ beta-glucan)
 - Lower starch ($\leq 30\%$)

- Whole grain in all forms (kernel, flakes, flour)



Sustagrain Benefits

- Evidence to Support Health & Wellness Benefits
 - Heart Health (CFR 101.81)
 - Blood Sugar Management
 - Compared to oats, barley
 - Shown to significantly lower glycemic response in a range of products (hot cereal, bars, baked goods, beverages)
 - Satiety – Shown to keep subjects full longer compared to whole wheat and refined rice
 - Digestive Health

- Broad Range of Applications
 - Including breads, pilaf, pasta, bars, cereals, tortillas, toppings, meats, coatings, quick breads, cookies, crackers, extruded cereals and snacks

Fiber Comparison

Grams Grain Needed	FDA Heart Health (1)	FDA Heart Health (2)	Good Source Fiber	Excellent Source Fiber
Sustagrain	5	6.3	8.5	17
Barley (USDA 20004)	13.7	17.1	14.5	28.9

- 1) 0.6 g soluble fiber from fruit, veg or grains (CFR 101.77)
- 2) 0.75 g beta-glucan soluble fiber from barley or oats (CFR 101.81)

Product Development Benefits

- Low inclusion to boost fiber – clean label, wholesome appeal
 - 4 g Sustagrain – 1.2 g fiber

- Intermediate inclusion for health & wellness benefits and claims/messaging opportunities
 - e.g., 9 g Sustagrain & meets other claims criteria –
 - Good source of fiber
 - Barley soluble fiber heart health claim (CFR 101.81)
 - Whole Grain factual claim – “9 g whole grain per serving”

- Higher inclusion for targeted health & wellness benefits, including
 - Blood sugar management
 - Digestive health
 - Weight management/satiety

Sustagrain Product Development Opportunities

- Enables claims in a broad range of products
 - Smaller serving size
 - Where percentage grain ingredients limited
 - Multigrain blends

- Can also provide functional benefits
 - Moistness (muffins)
 - Tenderness (baked goods)
 - Flexibility (tortillas)
 - Binding (meat applications)
 - Staling (breads)

Fiber Comparison

Ingredient	Refined wheat flour	Whole Wheat flour	Sustagrain barley	Inulin/Oat Fiber/Cotton seed Fiber
Fiber/4 g ingredient	0.11 g	0.5 g	1.2 g	3.6 g
Fiber/6 g ingredient	0.16 g	0.73 g	1.8 g	5.4 g

Brown Rice & Sustagrain® Barley Pilaf Blend

All are ConAgra Food Ingredients estimates

Formula % Sustagrain	Dietary Fiber per RACC*	Claims Examples
0	1.6 g	<p>All Qualify: “100% Whole Grain” “45 grams of whole grain per serving” Whole Grains Council 100% Stamp</p> <p>FDA Whole Grain/Heart, Cancer (99P-2209)</p>
10	2.7 g (0.65 g sol. Fiber)	<p>FDA Good Source of Fiber FDA Soluble Fiber from Fruit, Veg, Grain/Heart (101.77) FDA Fiber from Grains, Fruit & Veg/Cancer (101.76) FDA Whole Grain/Heart, Cancer (99P-2209)</p>
15	3.4 g (0.8 g sol. fiber)	<p>FDA Good Source of Fiber FDA Soluble Fiber from Barley/Heart (101.81) FDA Fiber from Grains, Fruits & Veg/Cancer (101.76) FDA Whole Grain/Heart, Cancer (99P-2209)</p>
30	5.2 g (1.6 g sol. fiber)	<p>FDA Excellent Source of Fiber FDA Soluble Fiber from Barley/Heart (101.81) FDA Fiber from Grains, Fruit & Veg/Cancer (101.76) FDA Whole Grain/Heart, Cancer (99P-2209)</p>

* Reference Amount Customarily Consumed (RACC) for uncooked grain is 45 g

Pasta

- Generally 56 g/serving (dry)
- RACC is 55 g
- Grain amount 100% for traditional

- Sources of fiber in pasta:
 - Whole wheat & other grains
 - Legume flour
 - Oat fiber – numerous choices to meet functional needs
 - Resistant starch – low water absorption

Pasta with Sustagrain® Barley

All are ConAgra Food Ingredients estimates

Formula % Sustagrain	Whole Grain per RACC*	Dietary Fiber per RACC*	Claims Examples
0	0 g	1.5 g	-----
7	3.8 g	2.6 g (0.4 g sol. fiber)	3 grams of whole grain per serving FDA Good Source of Fiber
15	8.2 g	3.8 g (0.9 g sol. fiber)	8 grams of whole grain per serving FDA Good Source of Fiber FDA Soluble Fiber from Barley/Heart FDA Fiber from Grains/Cancer
25	13.7 g	5 g (1.6 g sol. fiber)	13 grams of whole grain per serving FDA Excellent Source of Fiber FDA Soluble Fiber from Barley/Heart FDA Fiber from Grains/Cancer

* Reference Amount Customarily Consumed (RACC) for dry pasta is 55 g
51% whole wheat pasta 3.4 g fiber/55 g

Why Use Sustagrain?

- Whole Grain – rounded nutrient profile, proven benefits
- Rich in Fiber
- Provides a ‘balance’ of soluble and insoluble fiber
 - Rounded health and wellness benefits
 - Higher ratio of soluble:insoluble compared to most other grain, fruit & veg (ratio similar to oats)
- Qualifies for FDA approved food specific heart health claim
- Proven benefits
 - Whole grain benefits
 - Blood sugar management
 - Hunger management
- Clean label