Coffee Flour
the new global impact food

an innovation overview
sustainability increasingly dominates corporate agendas

- 93% of CEOs believe that sustainability issues are critical to the future success of their business
- 96% of CEOs believe that sustainability issues must be fully integrated into the strategy and operations of a company (up from 72% in 2007)
- 33% of CEOs say they are unable to keep pace with customer demand for sustainable products and services
today’s consumers want to connect with those who produce their food

- 63% of shoppers look for green products
- 72% expect corporations to take actions to preserve and sustain the environment
- More than 88% of consumers think companies should try to achieve their business goals while improving society and the environment
from the corporate perspective

On one hand, managers at large food companies are under pressure to source in a more sustainable way.

On the other hand, pressures to cut costs and generate growth are tougher than ever.
the world of coffee

- Coffee is grown in the equatorial band between the topics of Cancer and Capricorn
- Coffee is grown in over 60 countries
- In the 2012-2013 crop year, global coffee production was approximately 132 million 60KG bags or 17.5 billion pounds of green coffee, with 110 million bags exported
- Over 25 million people are involved in coffee production
- The two primary species of coffee are Arabica and Robusta
about the coffee fruit

Coffee fruit is grown at high altitude, where the sun’s rays are strongest.

As the plants mature, the cherries develop powerful antioxidants to protect the coffee seed (or bean) from damage caused by high doses of the sun’s radiation and the natural byproducts of photosynthesis.

The result is a vitamin, mineral and anti-oxidant enriched super fruit…
the “yield” from a coffee cherry

- Cherry: 100 lbs.
- Dry Parchment: 24 lbs.
- Green Bean: 20 lbs.
- Grade 1: 15 lbs.
- Roasted: 12 lbs.

- Pulp: 76 lbs.
- Skins & Pulp: 20 lbs.
- Soluble: 16 lbs.
- Water: 40 lbs.

76% Manufacturing By-Product...
the “global yield” of coffee cherries

(measure is in billions B of pounds)

Coffee Cherry

82.5 B lbs.

Dry Parchment

19.8 B lbs.

Green Bean

16.5 B lbs.

Soluble Skins & Pulp

13.2 B lbs.

Skins & Pulp

33 B lbs.

Water

62.7 Billion Pounds

60% Waste

39% Fertilizer

1% Other

Other: Bio-fuel, Cosmetics, Nutritional Beverages

8 to 10 Billion Pounds
it all started with a question...

Surely, there must be something we can do with this pile of stuff other than feeding it to worms..?
week 1 of the harvest
coffee fruit pulp
咖啡面粉：一个历史悠久的农业创新

“made with coffee flour”

...converting unused coffee cherries into flour for baking and cooking
introducing coffee flour®

**the coffee cherry**
- One of the most fiber-rich fruits in the world
- Vitamin, mineral, anti-oxidant “rich”
- Gluten-free
- Nutrients develop in skin to protect bean from sun’s radiation
- Currently billions of pounds go to waste every year

**coffee flour®** The resulting product of milling cherry skins, pulp, pectin & mucilage
- Fortifies wheat, corn, soy and other commodity flours
- Represents powerful price, health, and sustainability proposition for global baked goods companies
a historic innovation and positive disruption

• A new patent pending process converting a global agricultural waste into a food by-product

• A positive disruption to the coffee traditions, positively affecting all of the stakeholders in the global coffee industry

• coffee flour® is a truly sustainable solution for: farmers struggling against poverty, origin communities working to prevent environmental degradation and generate economic growth, and developed world consumers preferring healthy diet options that satisfy their desire for social equity
origin production operations
origin harvest plan—2014/2015

current mills
Nicaragua
Mexico
Guatemala
Vietnam

expansion mills
Colombia
Brazil
El Salvador
parallel supply chains…

QA/QC

Cherry Harvest

Wet / Dry Mill

Wet Parchment

Drying Mill

Dry Parchment

Sort / Bagging

Export Whse

Import Whse

Roasting

Milling

Retail

The Coffee Flour raw material mirrors a worldwide trusted supply chain model that has safely delivered trillions of pounds of green coffee to billions of consumers over the years.
flour milling activities USA los angeles, ca

Apffels Facility:

- HACCP and SQF Certified Food Facility
- Dedicated Space for Milling Equipment
- Access to Cleaning and De-stoning Equipment
- Access to QA lab and procedures
- Ample inventory holding space
- Order staging and shipping capabilities
To date scientists have identified over 1,000 compounds in coffee, which when compared to products such as wine and chocolate that are composed of a few hundred, pale in comparison to that of coffee.
## Product Information

<table>
<thead>
<tr>
<th>Origin</th>
<th>Brazil, Guatemala, Mexico, Nicaragua, Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Fine Powder to Course Grind</td>
</tr>
<tr>
<td>Particle Size</td>
<td>30 μm to 800 μm</td>
</tr>
<tr>
<td>Color</td>
<td>Browns with hints of Plum, Amber, Gold and Raisin</td>
</tr>
<tr>
<td>Aroma</td>
<td>Dry, Roasted, Dark Fruity Notes</td>
</tr>
<tr>
<td>Taste</td>
<td>Earthy to Bright</td>
</tr>
</tbody>
</table>

### Analyte

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Avg. Value</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td><strong>Proximate Composition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calories</td>
<td>180</td>
<td>cal/100g</td>
</tr>
<tr>
<td>Crude Protein</td>
<td>10.3</td>
<td>%</td>
</tr>
<tr>
<td>Crude Fat</td>
<td>2.4</td>
<td>%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>0.3</td>
<td>%</td>
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<tr>
<td>Cholesterol</td>
<td>&lt; 5</td>
<td>mg/100g</td>
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<tr>
<td>Ash</td>
<td>10</td>
<td>%</td>
</tr>
<tr>
<td>Moisture</td>
<td>8.6</td>
<td>%</td>
</tr>
<tr>
<td><strong>Carbohydrates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Carbohydrates</td>
<td>68.7</td>
<td>%</td>
</tr>
<tr>
<td>Total Dietary Fiber</td>
<td>59.3</td>
<td>%</td>
</tr>
<tr>
<td>Soluble Fiber</td>
<td>17.8</td>
<td>%</td>
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<tr>
<td>Insoluble Fiber</td>
<td>41.5</td>
<td>%</td>
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<tr>
<td>Sugars</td>
<td>7.8</td>
<td>%</td>
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<tr>
<td><strong>Caffeine</strong></td>
<td>750</td>
<td>mg/100g</td>
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<tr>
<td><strong>Macro Minerals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>334</td>
<td>mg/100</td>
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<tr>
<td>Phosphorus</td>
<td>152</td>
<td>mg/100</td>
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<tr>
<td>Magnesium</td>
<td>113</td>
<td>mg/100</td>
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<tr>
<td>Sodium</td>
<td>8</td>
<td>mg/100</td>
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<tr>
<td>Potassium</td>
<td>3720</td>
<td>mg/100</td>
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<tr>
<td><strong>Trace Minerals</strong></td>
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<tr>
<td>Iron</td>
<td>18</td>
<td>mg/100</td>
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<tr>
<td>Manganese</td>
<td>12</td>
<td>mg/100</td>
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<tr>
<td>Copper</td>
<td>2</td>
<td>mg/100</td>
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<tr>
<td>Sulfur</td>
<td>205</td>
<td>mg/100</td>
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<tr>
<td>Zinc</td>
<td>14</td>
<td>mg/100</td>
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<tr>
<td><strong>Vitamins</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>550</td>
<td>IU/100</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>0</td>
<td>mg/100</td>
</tr>
</tbody>
</table>
fiber comparisons

coffee flour® has approximately 55% fiber by weight…

Top Fiber Flours

grams of fiber / cup

Top Fiber Foods

grams of fiber / cup
Phenolic Compounds Concentration (g/kg) on a Dry Matter Basis in Fresh Coffee Pulp of Eight Cultivars

<table>
<thead>
<tr>
<th>Phenolic Compound</th>
<th>Yellow Bourbon</th>
<th>Red Bourbon</th>
<th>Yellow Catuai</th>
<th>Yellow Caturra</th>
<th>Red Caturra</th>
<th>Mundo Novo 385</th>
<th>Semper-florens</th>
<th>Red Typica</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocatechuic acid</td>
<td>0.11</td>
<td>0.20</td>
<td>0.15</td>
<td>0.09</td>
<td>0.20</td>
<td>0.18</td>
<td>0.13</td>
<td>0.31</td>
<td>0.17</td>
</tr>
<tr>
<td>Catechin</td>
<td>0.07</td>
<td>0.58</td>
<td>0.06</td>
<td>0.06</td>
<td>0.31</td>
<td>0.23</td>
<td>0.18</td>
<td>0.60</td>
<td>0.26</td>
</tr>
<tr>
<td>Chlorogenic acid</td>
<td>3.86</td>
<td>7.39</td>
<td>5.88</td>
<td>2.38</td>
<td>4.64</td>
<td>6.82</td>
<td>5.12</td>
<td>8.76</td>
<td>5.61</td>
</tr>
<tr>
<td>Epicatechin</td>
<td>1.85</td>
<td>4.36</td>
<td>1.53</td>
<td>1.87</td>
<td>2.72</td>
<td>3.21</td>
<td>1.71</td>
<td>3.88</td>
<td>2.64</td>
</tr>
<tr>
<td>Ferulic acid</td>
<td>0.05</td>
<td>0.13</td>
<td>0.10</td>
<td>0.11</td>
<td>0.17</td>
<td>0.12</td>
<td>0.09</td>
<td>0.21</td>
<td>0.12</td>
</tr>
<tr>
<td>Isochlorogenic acid I</td>
<td>0.77</td>
<td>1.13</td>
<td>0.65</td>
<td>0.30</td>
<td>0.67</td>
<td>0.51</td>
<td>0.49</td>
<td>0.95</td>
<td>0.68</td>
</tr>
<tr>
<td>Isochlorogenic acid II</td>
<td>2.19</td>
<td>4.45</td>
<td>2.52</td>
<td>0.90</td>
<td>2.28</td>
<td>2.08</td>
<td>2.02</td>
<td>3.70</td>
<td>2.52</td>
</tr>
<tr>
<td>Isochlorogenic acid III</td>
<td>0.43</td>
<td>1.22</td>
<td>0.50</td>
<td>0.29</td>
<td>0.67</td>
<td>0.52</td>
<td>0.39</td>
<td>0.70</td>
<td>0.59</td>
</tr>
<tr>
<td>Rutin</td>
<td>0.12</td>
<td>0.38</td>
<td>0.30</td>
<td>0.09</td>
<td>0.23</td>
<td>0.33</td>
<td>0.21</td>
<td>0.70</td>
<td>0.30</td>
</tr>
<tr>
<td>Total</td>
<td>9.45</td>
<td>19.84</td>
<td>11.69</td>
<td>6.09</td>
<td>11.89</td>
<td>14.00</td>
<td>10.34</td>
<td>19.81</td>
<td>12.89</td>
</tr>
</tbody>
</table>

## Cocoa Powder vs Coffee Flour Comparison

<table>
<thead>
<tr>
<th></th>
<th>Cocoa Powder</th>
<th>Coffee Flour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td>228 kcal</td>
<td>339 kcal</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>20 g</td>
<td>11 g</td>
</tr>
<tr>
<td>Total lipid (fat) (g)</td>
<td>14 g</td>
<td>2 g</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>58 g</td>
<td>68 g</td>
</tr>
<tr>
<td>Fiber, total dietary (g)</td>
<td>33 g</td>
<td>55 g</td>
</tr>
<tr>
<td>Sugars, total (g)</td>
<td>2 g</td>
<td>8 g</td>
</tr>
<tr>
<td>Calcium, Ca (mg)</td>
<td>128 mg</td>
<td>298 mg</td>
</tr>
<tr>
<td>Iron, Fe (mg)</td>
<td>14 mg</td>
<td>9 mg</td>
</tr>
<tr>
<td>Sodium, Na (mg)</td>
<td>21 mg</td>
<td>6 mg</td>
</tr>
<tr>
<td>Ash (g)</td>
<td>6 g</td>
<td>10 g</td>
</tr>
<tr>
<td>Cholesterol (mg)</td>
<td>0 mg</td>
<td>5 mg</td>
</tr>
<tr>
<td>Fatty acids, total saturated (g)</td>
<td>8 g</td>
<td>0 g</td>
</tr>
<tr>
<td>Vitamin A (IU)</td>
<td>0 IU</td>
<td>578 IU</td>
</tr>
<tr>
<td>Fatty acids, total trans (g)</td>
<td>0 g</td>
<td>0 g</td>
</tr>
<tr>
<td>Vitamin C, total ascorbic acid (mg)</td>
<td>0 mg</td>
<td>0 mg</td>
</tr>
<tr>
<td>Caffeine (mg)</td>
<td>230 mg</td>
<td>800 mg</td>
</tr>
</tbody>
</table>
Select a food product or ingredient to substitute:

| Cocoa mix, NESTLE, Rich Chocolate Hot Cocoa Mix | 10.0 grams | Weight of substitution |

<table>
<thead>
<tr>
<th>Input Nutrient Label Values</th>
<th>Values Removed</th>
<th>Values Added</th>
<th>New Nutritionals</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values per 100.0 g</td>
<td>10.0 g</td>
<td>10.0 g</td>
<td>100.0 g</td>
<td></td>
</tr>
</tbody>
</table>
| Calories | 400.0 kcal | 40 kcal | 33.90 kcal | |%
| Fat | 15.0 g | 0.24 g | 15.0 g | |%
| Saturated Fat | 10.0 g | 0.03 g | 10.0 g | |%
| Trans Fat | 0.0 g | 0.00 g | 0.0 g | |%
| Polyunsaturated Fat | 0.0 g | 0.00 g | 0.0 g | |%
| Cholesterol | 0.0 mg | 0.00 mg | 0.0 mg | |%
| Sodium | 100.0 mg | 0.63 mg | 99.37 mg | |%
| Potassium | 0.0 mg | 0.00 mg | 0.0 mg | |%
| Total Carbohydrate | 75.0 g | 6.84 g | 68.16 g | |%
| Dietary Fiber | 4.0 g | 5.53 g | 1.53 g | |%
| Sugars | 60.0 g | 4.78 g | 55.22 g | |%
| Protein | 3.0 g | 1.13 g | 1.87 g | |%
| Vitamin A | 11.0 IU | 57.80 IU | 57.69 IU | |%
| Vitamin C | 0.0 mg | 0.01 mg | 0.01 mg | |%
| Calcium | 100.0 mg | 1.96 mg | 1.96 mg | |%
| Iron | 1.8 mg | 0.91 mg | 0.91 mg | |%
| Vitamin B | 0.0 IU | 0.00 IU | 0.00 IU | |%
| Thiamin | 0.0 mg | 0.00 mg | 0.00 mg | |%
| Riboflavin | 0.0 mg | 0.00 mg | 0.00 mg | |%
| Niacin | 0.0 mg | 0.00 mg | 0.00 mg | |%

<table>
<thead>
<tr>
<th>Adjusted for Serving Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Size</td>
</tr>
</tbody>
</table>
| Calories | 139.0 kcal | |%
| Fat | 6.9 g | 11% |
| Saturated Fat | 4.5 g | 23% |
| Trans Fat | 0.7 g | |
| Polyunsaturated Fat | - g | |
| Monounsaturated Fat | - g | |
| Cholesterol | 0.3 mg | 0% |
| Sodium | 7.8 mg | 0% |
| Potassium | 155.0 mg | 3% |
| Total Carbohydrate | 37.2 g | 12% |
| Dietary Fiber | 4.6 g | 18% |
| Sugars | 27.4 g | |
| Protein | 1.9 g | 4% |

**Nutrition Facts**

- **Calories**: 400 kcal
- **Fat**: 15 g (23% DV)
- **Saturated Fat**: 10 g (50% DV)
- **Trans Fat**: 0 g (0% DV)
- **Polyunsaturated Fat**: 0 g (0% DV)
- **Monounsaturated Fat**: 0 g (0% DV)
- **Cholesterol**: 0 mg (0% DV)
- **Sodium**: 100 mg (4% DV)
- **Potassium**: 0 mg (0% DV)
- **Total Carbohydrate**: 75 g (25% DV)
- **Dietary Fiber**: 4 g (16% DV)
- **Sugars**: 60 g (6% DV)
- **Protein**: 3 g (6% DV)
- **Vitamin A**: 11.0 IU (0% DV)
- **Vitamin C**: 0.0 mg (0% DV)
- **Calcium**: 100.0 mg (10% DV)
- **Iron**: 1.8 mg (10% DV)
- **Thiamin**: 0.0 mg (0% DV)
- **Riboflavin**: 0.0 mg (0% DV)
- **Niacin**: 0.0 mg (0% DV)

**Nutritional Values**

- **Calories**: 393.9 kcal
- **Fat**: 13.7 g (21% DV)
- **Saturated Fat**: 9.0 g (45% DV)
- **Polyunsaturated Fat**: 0 g (0% DV)
- **Cholesterol**: 0 mg (0% DV)
- **Sodium**: 85.0 mg (84.4% DV)
- **Potassium**: 310.0 mg (45% DV)
- **Total Carbohydrate**: 74.3 g (25% DV)
- **Dietary Fiber**: 9.1 g (25% DV)
- **Sugars**: 54.8 g (128.3% DV)
- **Protein**: 3.8 g (27.7% DV)
- **Vitamin A**: 67.70 IU (2% DV)
- **Vitamin C**: 0.01 mg (0% DV)
- **Calcium**: 139.76 mg (12% DV)
- **Iron**: 2.53 mg (14% DV)
- **Thiamin**: 0.00 mg (0% DV)
- **Riboflavin**: 0.00 mg (0% DV)
- **Niacin**: 0.00 mg (0% DV)
sensory profile

• Made from the skin and fleshy portion of the cherry (pulp) and gently dried, it expresses more floral, citrus and roasted fruit type notes.

• Contains less caffeine than brewed coffee. The amount per serving is dependent on the varietal, concentration and particular recipes.

• Is typically blended in concentrations of 5% - 30%, typical serving size is 1 – 4 g

• Different grind profiles impart differing textures for applications

• Differing grind profiles impart differing flavor notes depending on the application
functional attributes

• High fiber content holds more moisture for any given recipe and hence adds more volume
• Excellent humectant properties, binding agent, thickener
• Caramel color to any recipe or product
• Early trials to date indicate shelf life extension
• Different grind profiles impart varying textures and mouthfeel
• Excellent processability relative to other fibers
• Excellent processability relative to other gluten free ingredients
...and a few more
coffee flour®—integrated sustainability

Social-Environmental
Natural Resource Stewardship

Environmental-Economic
From Waste to Revenue

Environmental
Natural Resource Use
Environmental Management
Pollution Prevention
(water, land, waste)

Economic
Profit
Cost Savings
Economic Growth
Research & Development

Social
Standard of Living
Education
Community

Economic-Social
Job Creation

SUSTAINABILITY
impacts at origin on economy, environment and health

- Job creation
- Waste reduction
- New product

- More income
- Diversified revenue streams
- Less waste to manage
- Better access to food
- Improved health

- New products
- Job creation
- Economic growth
- Poverty reduction
- Cleaner water
- Cleaner soil
- Hunger reduction
- Improved health
Mercon Trading
- [www.merconcoffeegroup.com](http://www.merconcoffeegroup.com)
- One of the leading traders of green coffee
- Over half a century experience in all areas of the coffee industry: growing, milling, shipping, importing, logistics and vendor management inventories (VMI)

ECOM Agroindustrial
- [www.ecomtrading.com](http://www.ecomtrading.com)
- One of the largest traders of green coffee and other soft commodities globally
- Currently adding additional trading reach in coffee and cocoa sectors through the acquisition of Armajaro Trading

Intellectual Ventures
- [www.intellectualventures.com](http://www.intellectualventures.com)
- IV is the global leader and innovator in the “capital market of inventions”
- IV brings expertise across IP spectrum, from patent generation and product research development, to product licensing and protection.

NohBell Corporation
- [www.nohbell.com](http://www.nohbell.com)
- NohBell is an international business think tank and innovations company
- NohBell brings a cross functional management and technical team
- NohBell is the inventor of the coffee flour process and hold 7 patents on the product
—a timely answer to U.N. pledge for global food sustainability

- Ensure access to nutritious foods and safety nets for the most vulnerable
- Reduce losses and waste in food systems
- Develop resilience of communities and ecosystems
- Expand market opportunities
- Find coherent approach to:
  - Poverty Reduction
  - Health and Nutrition
  - Social Equity
  - Job Creation

Source: Food and Agriculture Organization of the United Nations
make an impact

www.coffeeflour.com