High Fiber Nutrition Drink

**Goals and Objectives**

**Goal:** To create a high fiber nutritional drink to meet the needs of the average adult in a market lacking such products.

**Objectives:**
- Provide higher amounts of fiber and protein than competitors
- Provide easy way for consumers in 18 - 24 age demographic to meet nutrition requirements

**Motivation:**
- Dietary fiber intake reduces risk of stroke, hypertension, diabetes, etc.
- Most individuals in America consume less than half their recommended levels of dietary fiber

**Market and Market Size**

- Purdue students, West Lafayette, Lafayette, and Indianapolis (1 million)
- The target demographic is primarily millennials, ages 18 - 24
- Millennials are largest group of consumers with 26% of population
- The 18 - 24 age demographic consumes more smoothie type drinks than any other demographic
- Beverage consumption data shows a 5.1% increase in nutritional drink sales between 2014 – 2015

**Constraints**

- Competitors: Odwalla, Evolutions Fresh, Kombucha, Ensure, Boost
- Consumer preferences in IN
- Processing Time
- Availability of fresh ingredients

**Impact and Sustainability**

- Spent grain makes up 85% of beer brewing byproducts
- Average water consumption during brewing is 5 - 6 L/beer
- Encourage consumption of nutrient dense food in a high obesity state

**Prototype Analysis**

**Parameters:** Mixing speed, consistency, ingredient amounts, and taste

**Observations:** spinach particles, color, and semi-stable emulsion

**Product Recipe**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Functionality</th>
<th>Amount per Batch [lbs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>Flavor/Nutrition</td>
<td>552</td>
</tr>
<tr>
<td>Bananas</td>
<td>Flavor/Nutrition</td>
<td>552</td>
</tr>
<tr>
<td>Spinach</td>
<td>Nutrition</td>
<td>165</td>
</tr>
<tr>
<td>Cocoa Powder</td>
<td>Flavor</td>
<td>11</td>
</tr>
<tr>
<td>Water</td>
<td>Reduce Viscosity</td>
<td>2,370</td>
</tr>
<tr>
<td>PB2</td>
<td>Flavor/Protein</td>
<td>165</td>
</tr>
<tr>
<td>Spent Grain</td>
<td>Fiber</td>
<td>88</td>
</tr>
<tr>
<td>Oil</td>
<td>Emulsifier</td>
<td>552</td>
</tr>
</tbody>
</table>

For a serving size of 8 fluid ounces, we meet 33% of the daily recommended amount of fiber and 24% of the daily recommended amount of protein for an adult female.

**Process Flow**

**Schedule**

**Processing Requirements**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Amount</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce/Powder Inputs</td>
<td>1,202</td>
<td>lbs</td>
</tr>
<tr>
<td>Spent Grain input</td>
<td>88</td>
<td>lbs</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>2</td>
<td>days</td>
</tr>
<tr>
<td>Water Req. for Product</td>
<td>75</td>
<td>L</td>
</tr>
<tr>
<td>Water Req. for Processing</td>
<td>1,000</td>
<td>L</td>
</tr>
<tr>
<td>Thermal Load</td>
<td>2,522.32</td>
<td>MJ</td>
</tr>
<tr>
<td>Monthly Production</td>
<td>150,000</td>
<td>bottles</td>
</tr>
</tbody>
</table>

**Alternatives**

1. Drying spent grain was considered, but was deemed a waste of energy
2. Blending/Milling: food processor, blender
3. Emulsification: high pressure homogenizer
4. Pasteurization: UV, pulse light treatment, high speed pressure

**Economic Analysis**

**Processing Time**

**Future Work**

Determine most effective plant location for market
Create and implement public marketing strategies
Research additives to alter the finished appearance
Develop defined roles for managerial positions

**Costs Per Bottle**

Costs: Production $4.73, Raw Price $5.40, Profit $0.67

**Equipment Costs**


**Technical Advisor and Instructor:** Dr. Martin Okos

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References:

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