Developing New Co-Products for the Ethanol Industry

Jennifer Aurandt, PhD
R&D Program Manager
Developing Value for New Co-Products for the Ethanol Industry

Jennifer Aurandt, PhD
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RECLAIMING MILLIONS OF GALLONS... AND COUNTING!

Reclaim the value from oily waters.

LEARN MORE

SEPARATION. INTEGRATED.
Separating fluids during production improves operations.

LEARN MORE

MAXIMIZE ETHANOL COPRODUCT VALUE.
Extract more value from every bushel.

LEARN MORE

Valicor®
2008 COSS System Developed

2009 Bench Scale and Pilot Development

2013 VFRAC® Patent Issued

2014 Commercial Start-up

Advanced Co-Product Development
Ethanol Plant Process Overview

- **Corn Silo/Milling**
- **Cook**
- **Fermentation**
- **Distillation**
- **Ethanol**
- **Decanter**
- **Evaporators**
- **Dryer**

- **Corn Oil**: 0.6 lbs/bu
- **Thin Stillage**
- **485 tons/day DDGS**

**VITAL FOR TOMORROW**
Corn Silo/Milling → Cook → Fermentation → Distillation → Ethanol

Cook → Fermentation → Distillation

Evaporators → Dryer

Separation Technology

Stickwater

Corn Oil 1.1 lbs/bu

Valicor High Protein Stream 85 tons/day

400 tons/day DDGS
### Protein, Fat, and Fiber

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter</td>
<td>89 %</td>
</tr>
<tr>
<td>Moisture</td>
<td>11 %</td>
</tr>
<tr>
<td>Crude Protein (dw)</td>
<td>53%</td>
</tr>
<tr>
<td>Crude Fiber (dw)</td>
<td>6.0 %</td>
</tr>
<tr>
<td>Fat (dw)</td>
<td>7.0 %</td>
</tr>
<tr>
<td>Ash (dw)</td>
<td>5.0 %</td>
</tr>
</tbody>
</table>

### VFRAC Protein Fraction

<table>
<thead>
<tr>
<th>VFRAC Protein Fraction</th>
<th>TS Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol</td>
<td>nd</td>
</tr>
<tr>
<td>Organic Acids</td>
<td>low</td>
</tr>
<tr>
<td>DP4, DP3, DP2, Glucose</td>
<td>low</td>
</tr>
</tbody>
</table>
The Commission of Patents and Trademarks

A patent application has been filed for a new and useful invention. The title and description of the invention are enclosed. The requirements of the Act have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

The United States of America

United States Patent

Publication Classification

Publication No.: US 2014/0343259 A1
Pub. Date: Nov. 20, 2014

Protein Product

Inventors: James R. Bleyer, Manasseh (OH, US); Jennifer Anzuci, Brighton, MI (US); Thomas J. Caussin, Denter, MI (US)

ABSTRACT

A protein product was obtained from a protein concentrate, including a protein content of 45.0% (wt) as calulated by weight of dry matter, a gluten content of 0.5% (wt) as calculated by weight of dry matter, and a moisture content of 6.0% (wt) as calculated by weight of dry matter. The protein concentrate was prepared by a method for preparing a protein product from a sugar beet byproduct, the protein product having a protein content of at least 45.0% (wt) and a gluten content of not more than 0.5% (wt).

Related U.S. Application Data

Continuation-in-part application No. 13/922,497, filed on Jan. 20, 2013.

Provisional application No. 61/661,020, filed on Jun. 20, 2012.

System and Method for Isolation of Gluten as a Co-Product of Ethanol Production

Inventors: Bob Sander, Columbus, NE (US); Larry H. Joliet, Columbus, NE (US)

ABSTRACT

The present invention is a method for producing gluten as a co-product of ethanol production. The method includes removing yeast residue from a distillate and concentrating the yeast residue to a high purity of gluten, thereby allowing a downstream process to be conducted on the purified gluten. The method further includes removing the gluten product from the distillate and concentrating the gluten product to a high purity of gluten, thereby allowing a downstream process to be conducted on the purified gluten product.

Related U.S. Application Data


Prior Art References


Field of Classification Search

Application filed for complete search history.

VITAL FOR TOMORROW
Nutritionists

- Consistent product from plant to plant
  - Consistent supply of material
- Information in regards to processing
Market

Market Differentiators

Different enough to maintain a separate identity

The difference is identifiable and consistent.
Handling/End Users

Understand Product Handling Characteristics
Understand the Constraints of End Users
Corn Silo/Milling

Cook

Fermentation

Distillation

Ethanol

Separation Technology

Evaporators

Dryer

Stickwater

Corn Oil

1.1 lbs/bu

Valicor

High Protein Stream

85 tons/day

DDGs

400 tons/day DDGS

VFRAC

Integration