US007718602B2

(12) **United States Patent**
**Bringe**

(10) **Patent No.: US 7,718,602 B2**
(45) **Date of Patent: May 18, 2010**

(54) **HIGH BETA-CONGLYCININ PRODUCTS AND THEIR USE**

(75) Inventor: **Neal A. Bringe**, Saint Charles, MO (US)

(73) Assignee: **Monsanto Technology LLC**, St. Louis, MO (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 875 days.

(21) Appl. No.: **11/211,175**

(22) Filed: **Aug. 24, 2005**

(65) **Prior Publication Data**

US 2006/0100133 A1 May 11, 2006

**Related U.S. Application Data**

(60) Continuation of application No. 10/430,904, filed on May 6, 2003, now Pat. No. 7,094,751, which is a continuation of application No. 09/742,962, filed on Dec. 20, 2000, now Pat. No. 6,566,134, which is a division of application No. 09/167,810, filed on Oct. 7, 1998, now Pat. No. 6,171,640, which is a continuation-in-part of application No. PCT/US98/06579, filed on Apr. 3, 1998.

(60) Provisional application No. 60/042,643, filed on Apr. 4, 1997.

(51) **Int. Cl.**
***A61K 38/00*** (2006.01)

(52) **U.S. Cl.** ..... **514/2**

(58) **Field of Classification Search** ..... None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|---|---|---|---|---|
| 3,607,860 | A * | 9/1971 | Yamato et al. | 530/378 |
| 3,953,611 | A | 4/1976 | Youngquist | 426/93 |
| 4,061,784 | A | 12/1977 | Youngquist | 426/93 |
| 4,302,473 | A | 11/1981 | Mikami et al. | 426/46 |
| 4,368,151 | A * | 1/1983 | Howard et al. | 530/378 |
| 4,409,248 | A | 10/1983 | Lehnhardt et al. | 426/46 |
| 4,409,256 | A | 10/1983 | Johnson et al. | 426/598 |
| RE32,725 | E * | 8/1988 | Howard et al. | 426/656 |
| 4,771,126 | A | 9/1988 | Hirotsuka et al. | 530/378 |
| 5,270,200 | A | 12/1993 | Sun et al. | 435/240.2 |
| 5,443,974 | A | 8/1995 | Hitz et al. | 800/264 |
| 5,514,655 | A * | 5/1996 | DeWille et al. | 514/21 |
| 5,603,045 | A | 2/1997 | Dockser | 395/800 |
| 5,858,016 | A * | 1/1999 | Bacehowski et al. | 604/408 |
| 5,858,441 | A * | 1/1999 | Reddy et al. | 426/573 |
| 5,936,140 | A | 8/1999 | Beach | 800/312 |
| 6,022,700 | A | 2/2000 | Monks et al. | 435/30 |
| 6,022,702 | A * | 2/2000 | Tsumura et al. | 435/68.1 |
| 6,171,640 | B1 * | 1/2001 | Bringe | 426/656 |
| 6,566,134 | B2 * | 5/2003 | Bringe | 435/410 |
| 6,576,820 | B1 | 6/2003 | Takaiwa et al. | 800/320.2 |
| 6,703,544 | B2 | 3/2004 | Kinney et al. | 800/312 |
| 6,828,491 | B2 | 12/2004 | Kinney et al. | 800/312 |
| 7,186,425 | B2 | 3/2007 | Kohno et al. | 424/757 |
| 2003/0041350 | A1 | 2/2003 | Kinney et al. | 800/281 |
| 2005/0015826 | A1 | 1/2005 | Kinney et al. | 800/260 |
| 2005/0164337 | A1 | 7/2005 | Duranti et al. | 435/68.1 |

FOREIGN PATENT DOCUMENTS

| | | |
|---|---|---|
| EP | 0072617 | 2/1983 |
| EP | 0501117 | 9/1992 |
| EP | 0522800 | 1/1993 |
| EP | 0797928 | 10/1997 |
| EP | 1 323 425 | 7/2003 |
| GB | 1443160 | 7/1976 |
| JP | 59109130 | 6/1984 |
| JP | 3143356 | 6/1991 |
| JP | 09075007 | 3/1997 |
| JP | 11346668 | 12/1999 |
| WO | WO 97/47731 | 12/1997 |

(Continued)

OTHER PUBLICATIONS

Kinsella, et al., Physicochemical and Functional Properties of Oilseed Proteins with Emphasis on Soy Proteins, New Protein Foods 1985, vol. 5, pp. 107-179.*

(Continued)

*Primary Examiner*—Anish Gupta
*Assistant Examiner*—Christina Bradley
(74) *Attorney, Agent, or Firm*—Chungping Li, Esq.; Sonnenschein Nath & Rosenthal LLP

(57) **ABSTRACT**

The utility of soybeans having a composition of greater than 40% of the protein as beta-conglycinin and less than 10% of the protein as glycinin for making highly functional high beta-conglycinin compositions was discovered. The discovered ingredients are useful for mimicking the texturizing properties of casein while also maintaining or improving physiological benefits of soy protein ingredients (e.g., cholesterol and triglyceride lowering properties). The high stability of the high beta-conglycinin compositions against protein-protein aggregation reactions is valuable for creating good tasting beverages and beverage mixes. Cheese with good spreadability, gloss and smoothness was made using an enzyme-modified version of the new ingredient composition. Cheese with good firmness and meltability was also created using a different enzyme-treatment High beta-conglycinin compositions were found to demonstrate excellent emulsifying and gelling properties in the pH region (5.5-6.2) relevant to meet applications. High beta-conglycinin compositions also have possible use for improving the composition of essential amino acids for infant humans and animals.

**1 Claim, No Drawings**