



(12) **United States Patent**
Myers et al.

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(54) **ISOLATION OF SU1, A STARCH DEBRANCHING ENZYME, THE PRODUCT OF THE MAIZE GENE SUGARY1**

(58) **Field of Classification Search** 800/278, 800/284, 286; 435/320.1, 419; 536/23.6, 536/24.5, 23.2
See application file for complete search history.

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 332 days.

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This patent is subject to a terminal disclaimer.

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(57) **ABSTRACT**

Related U.S. Application Data

SU1, a starch debranching enzyme active in maize endosperm (*Zea mays*), and the cDNA and genomic sequences encoding SU1 are disclosed. The amino acid sequence is significantly similar to that of bacterial isoamylases, enzymes that hydrolyze α -(1 \rightarrow 6) glycosidic bonds. Amino acid sequence similarity establishes SU1 as a member of the α -amylase superfamily of starch hydrolytic enzymes. Also disclosed are antibodies reactive with the SU1 protein, methods of producing antibodies to the SU1 protein, methods of producing fusion proteins including SU1 as well as recombinant SU1 and methods of producing transgenic plants with a modified Su1 gene. The native or expressed SU1 protein can serve as a replacement for the bacterial and fungal enzymes currently used in the starch processing industry.

(63) Continuation-in-part of application No. 09/256,741, filed on Feb. 24, 1999, now Pat. No. 6,410,716, which is a continuation-in-part of application No. 08/410,784, filed on Mar. 24, 1995, now Pat. No. 5,912,413.

(51) **Int. Cl.**
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(52) **U.S. Cl.** **800/284**; 800/278; 800/286; 435/320.1; 435/419; 536/23.2; 536/23.6; 536/24.5

11 Claims, 41 Drawing Sheets