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**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv))

**Published:**

— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments  
— with sequence listing part of description published separately in electronic form and available upon request from the International Bureau

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4 September 2008

(54) Title: GENERATION OF PLANTS WITH ALTERED OIL, PROTEIN, OR FIBER CONTENT

(57) Abstract: The present invention is directed to plants that display an improved oil quantity phenotype or an improved meal quality phenotype due to altered expression of an HIO nucleic acid. The invention is further directed to methods of generating plants with an improved oil quantity phenotype or improved meal quality phenotype.



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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/87444

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A01H 1/00, C12N 15/82 (2008.04)

USPC - 800/281, 435/419

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
SPC- 800/281, 435/419Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC: 800/281, 278, 435/419, 410  
(text search)Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
PubWEST(PGPB,USPT,USOC,EPAB,JPAB); Google  
Search terms: SEQ ID NCM, SEQ ID NO:2, plant, transgenic, oil content, altered, increased, decreased

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/0150283 A 1 (ALEXANDROV, N. et al.) 6 July 2006 (06 07.2006) para [0027], [0470]-[0477], [0746]-[0750]; SEQ ID NO:104063, SEQ ID NO:104065.	1-1 1 and 15-26
X	US 2006/0277630 A 1 (LIGHTNER, J. et al.) 7 December 2006 (07.12.2006) para [0057], [0140]; claim 9	12-14 and 27-29
A	ROOK, F. et al. Impaired sucrose induction encodes a conserved plant-specific protein that couples carbohydrate availability to gene expression and plant growth. Plant J. June 2006 (06 2006), Vol. 46, No 6, pages 1045-1058.	1-29
A	ROOK, F. et al Arabidopsis thaliana mRNA for impaired sucrose induction 1 (is1 gene) GenBank Accession No AJ697740. 06 June 2006 (06 06.2006)	1-29
A	US 2006/0206961 A 1 (CIRPUS, P et al ) 14 September 2006 (14.09 2006)	1-29
A	US 2005/0155106 A 1 (RUEZINSKY, D.M et al.) 14 July 2005 (14.07 2005)	1-29

D Further documents are listed in the continuation of Box C. 

* Special categories of cited documents	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 10 June 2008 (10 06.2008)	Date of mailing of the international search report <b>24 JUN 2008</b>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk 571-272-4300 PCTOSP 571-272-7774

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons

- 1  Claims Nos  
because they relate to subject matter not required to be searched by this Authority, namely
- 2 **D** Claims Nos  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically
- 3  Claims Nos  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6 4(a)

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows

See extra sheet

- 1  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
- 2  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees
- 3  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos
- 4  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims, it is covered by claims Nos  
Claims 1-29 restricted to SEQ ID NO 1 and SEQ ID NO 2

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation
- No protest accompanied the payment of additional search fees

## Continuation of Box III (Lack of Unity)

In order for more than one species to be examined, the appropriate additional examination fees must be paid. The species are as follows:

The species are the 8 polypeptides coded by nucleic sequences represented by SEQ ID NO 1, SEQ ID NO 3, SEQ ID NO 5, SEQ ID NO 7, SEQ ID NO 9, SEQ ID NO 11, SEQ ID NO 13, and SEQ ID NO 15 or the corresponding amino acid sequences represented by SEQ ID NO 2, SEQ ID NO 4, SEQ ID NO 6, SEQ ID NO 8, SEQ ID NO 10, SEQ ID NO 12, SEQ ID NO 14, and SEQ ID NO 16.

The claims are deemed to correspond to the species listed above in the following manner:

Claims 1-11 and 15-26 are directed to the polypeptide represented by a particular amino acid sequence or the nucleic acid coding for that particular amino acid sequence (e.g., the nucleic acid sequence of SEQ ID NO 1 codes for the amino acid sequence of SEQ ID NO 2, the nucleic acid sequence of SEQ ID NO 3 codes for the amino acid sequence of SEQ ID NO 4, etc.). 8 species of polypeptides are represented in claims 1-29.

Claims 12-14 and 27-29 are generic.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons:

The common technical feature of the listed groups is the transgenic plant altered in oil content. However, this is not an improvement over the prior art of US 2006/0277630 to Lightner et al. (7 December 2006) that discloses plants that display an altered oil content phenotype due to altered expression of a HIO103.1 nucleic acid. The invention is further directed to methods of generating plants with an altered oil content phenotype using transgenics (abstract, para [0008]).

The different amino acid sequences represented by the peptide content of the subspecies and the different nucleic acid sequences represented by the nucleic acid content of the subspecies are different structures that are not common to one another but are different because they are composed of unique amino acid sequences and nucleic acid sequences. Thus, the various subspecies within Group I lack unity of invention because they do not share a same or corresponding special technical feature.