

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 1594-P06528WO00	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2018/052895	International filing date (<i>day/month/year</i>) 26 September 2018	(Earliest) Priority Date (<i>day/month/year</i>) 26 September 2017
Applicant RUTGERS, THE STATE UNIVERSITY UNIVERSITY OF NEW JERSEY		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

the international application in the language in which it was filed.

a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (see Box No. II).

3. **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b. none of the figures is to be published with the abstract.

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International application No.

PCT/US2018/052895

Box No. 1 Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:
- a. forming part of the international application as filed:
 in the form of an Annex C/ST.25 text file.
 on paper or in the form of an image file.
- b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
- c. furnished subsequent to the international filing date for the purposes of international search only:
 in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
2. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

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Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

Compositions and methods to produce maize with improved nutritional content are disclosed. Provided is a method for obtaining maize with kernels that have altered essential amino acid content, comprising crossing a maize plant that has a transgene for leaf-specific expression of 3'-phosphoadenosine-5'-phosphosulfate reductase (PAPR) enzyme with another maize plant that has a RNAi transgene that downmodulates expression of one or more of α -zein, β -zein, and γ -zein. The present invention also provides for compositions with kernels or ground kernel material obtained from maize plants that have altered essential amino acid content.

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A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - C12N 15/113; C12N 15/82 (2018.01)
 CPC - C12N 15/8216; C12N 15/8218; C12N 15/8261 (2018.08)

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)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC - 424/94.4; 800/286; 800/287 (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012/0198583 A1 (MESSING et al) 02 August 2012 (02.08.2012) entire document	1, 2, 3a, 3b, 4a, 4b, 5, 7-13
Y	WO 2000/049157 A2 (UNIVERSITY OF FLORIDA et al) 24 August 2000 (24.08.2000) entire document	1, 2, 3a, 3b, 4a, 4b, 5, 7-13
Y	US 2004/0078848 A1 (LEBEL et al) 22 April 2004 (22.04.2004) entire document	3a
Y	GEPTS et al. "Enhanced available methionine concentration associated with higher phaseolin levels in common bean seeds," Theoretical and Applied Genetics, 30 November 1984 (30.11.1984), Vol. 69, No. 1, Pgs. 47-53. entire document	8
Y	MBUYA et al. "Nutritional Analysis of Quality Protein Maize Varieties Selected for Agronomic Characteristics in a Breeding Program," International Journal of Plant Breeding and Genetics, 31 December 2011 (31.12.2011), Vol. 5, No. 4, Pgs. 317-327. entire document	13
A	US 2014/0325706 A1 (BASF PLANT SCIENCE GMBH) 30 October 2014 (30.10.2014) entire document	1, 2, 3a, 3b, 4a, 4b, 5, 7-13
A	WO 2017/000018 A1 (THE AUSTRALIAN NATIONAL UNIVERSITY) 05 January 2017 (05.01.2017) entire document	1, 2, 3a, 3b, 4a, 4b, 5, 7-13

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

20 November 2018

Date of mailing of the international search report

10 JAN 2019

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