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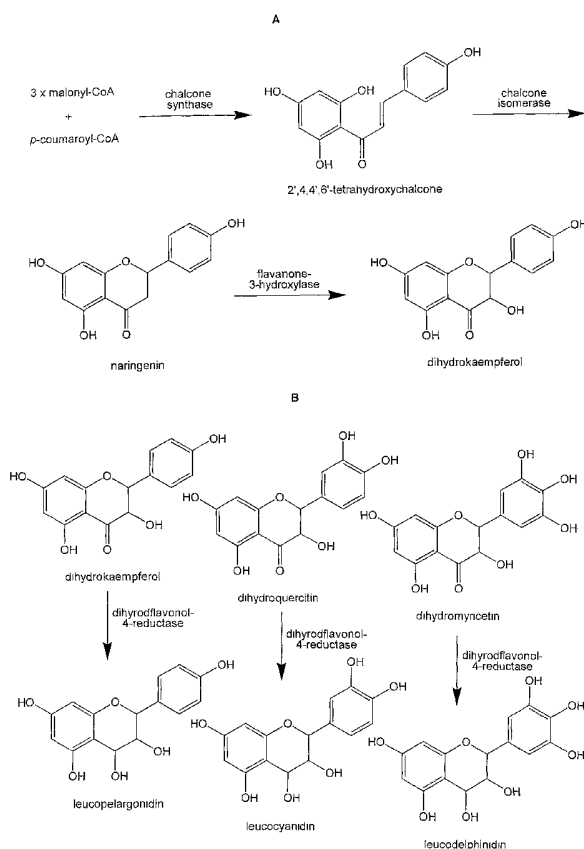
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[Continued on next page]

(54) Title: DIHYDROFLAVONOL-4-REDUCTASE



(57) Abstract: This invention relates to an isolated nu-  
cleic acid fragment encoding a dihydroflavonol-4-reduc-  
tase. The invention also relates to the construction of a  
recombinant DNA construct encoding all or a portion of  
dihydroflavonol-4-reductase, in sense or antisense orien-  
tation, wherein expression of the recombinant DNA con-  
struct results in production of altered levels of the dihy-  
droflavonol-4-reductase in a transformed host cell.

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/029541

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 C12N15/82 C12N9/04 A01H5/00

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
EPO-Internal, WPI Data, PAJ, EMBASE, Sequence Search, EMBL, BIOSIS

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/031622 A (AGRICULTURE VICTORIA SERV PTY ; EMMERLING MICHAEL (AU); ONG ENG KOK (A) 17 April 2003 (2003-04-17) the whole document SEQ ID NO: 168 & 169	1-21
X	WO 02/101023 A (DU PONT ; ODELL JOAN T (US); YU XIAODAN (US)) 19 December 2002 (2002-12-19) the whole document SEQ ID NO: 11 & 12	1-10
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Further documents are listed in the continuation of box C.

Patent family members are listed in 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 document 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 December 2004

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## INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE EMBL [Online]  10 September 1999 (1999-09-10), "Glycine  max dihydroflavono1-4-reductase DFR1 mRNA,  complete cds."  XP002311362  retrieved from EBI accession no.  EM PRO:AF167556  Database accession no. AF167556  the whole document</p> <p>-----</p>	1,7-10, 14
Y	<p>WO 96/36716 A (INT FLOWER DEV PTY LTD ;  HOLTON TIMOTHY ALBERT (AU))  21 November 1996 (1996-11-21)  the whole document</p> <p>-----</p>	1-21
Y	<p>EP 1 182 257 A (KOREA KUMHO PETROCHEM CO  LTD) 27 February 2002 (2002-02-27)  the whole document</p> <p>-----</p>	1-21
Y	<p>TANAKA Y ET AL: "MOLECULAR CLONING AND  CHARACTERIZATION OF ROSA HYBRIDA  DIHYDROFLAVONOL 4-REDUCTASE GENE"  PLANT AND CELL PHYSIOLOGY, JAPANESE  SOCIETY OF PLANT PHYSIOLOGISTS, XX,  vol. 36, no. 6, September 1995 (1995-09),  pages 1023-1031, XP001079999  ISSN: 0032-0781  the whole document</p> <p>-----</p>	1-21
A	<p>MEYER P ET AL: "A NEW PETUNIA FLOWER  COLOR GENERATED BY TRANSFORMATION OF A  MUTANT WITH A MAIZE GENE"  NATURE (LONDON),  vol. 330, no. 6149, 1987, pages 677-678,  XP002311408  ISSN: 0028-0836  the whole document</p> <p>-----</p>	1-21
A	<p>SPARVOLI F ET AL: "CLONING AND MOLECULAR  ANALYSIS OF STRUCTURAL GENES INVOLVED IN  FLAVONOID AND STILBENE BIOSYNTHESIS IN  GRAPE (VITIS VINIFERA L.)"  PLANT MOLECULAR BIOLOGY, NIJHOFF  PUBLISHERS, DORDRECHT, NL,  vol. 24, no. 5, 1994, pages 743-755,  XP001161123  ISSN: 0167-4412  the whole document</p> <p>-----</p>	1-21

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2004/029541

## Box 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.  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 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 additional 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 an additional fee, this Authority did not invite payment of any additional fee.
  
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.:

1-21 (partially)

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Inventions 1 to 6: claims 1 to 21, all partially

an isolated polynucleotide encoding a polypeptide having dihydroflavonol-4-reductase activity, the polypeptide encoded by said polynucleotide, plants transformed with said polynucleotide, uses thereof,

wherein invention 1 is represented by SEQ ID NO: 3 & 4,

wherein invention 2 is represented by SEQ ID NO: 5 & 6,

wherein invention 3 is represented by SEQ ID NO: 7 & 8,

wherein invention 4 is represented by SEQ ID NO: 11 & 12,

wherein invention 5 is represented by SEQ ID NO: 13 & 14,

and

wherein invention 6 is represented by SEQ ID NO: 15 & 16

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/029541

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