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(54) Title: FUNCTIONAL IDENTIFICATION OF THE HYOSCYAMUS MUTICUS GENE CODING FOR PREMNASPIRODIENE HYDROXYLASE ACTIVITY

(57) Abstract: Isolated and purified nucleic acid molecules encoding *Hyoscyamus muticus* premnaspirodiene oxidase (HPO) have been prepared by gene cloning. These nucleic acid molecules encode the oxidase enzyme which can catalyze the hydroxylation of valencene to β -nootkatol and nootkatone, which is industrially important and used in food products. Also within the scope of the invention are vectors including the nucleic acid molecules, host cells transformed or transfected by the vectors, and methods of producing proteins by expression of the nucleic acid molecules in the host cells. Further within the scope of the invention are methods of producing an oxidized terpene substrate from an unoxidized terpene substrate using proteins or expressed nucleic acid molecules according to the invention.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/02265

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: C12P 7/26(2006.01), C07H 21/04, C12N 9/02
 A01H 1/00(2006.01)

USPC: 435/148,536/23.2,435/189,800/178
 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)
 U.S. : 435/148,536/23.2,435/189,800/178

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 east, google scholar, scirus

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20060218661 (Chappell et al) 28 September, 2006	1-2, 23, 35-37, 71, 83, 90
A	US 20050233336 (Omaille et el) 20 October 2005	1-2, 23, 35-37, 71, 90

Further documents are listed in the continuation of Box C. See patent family annex.

<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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INTERNATIONAL SEARCH REPORT

International application No. ...

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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. Claims Nos.: 3-22,24-34,38-70,72-82,85-89 and 91-120
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:
These claims recite Nucleic/ amino acid sequences. Applicant did not comply sequence rule. These sequences can not be searched because applicants did not supply any valid CRF with this application .

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:

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 any 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.:
- 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.