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(75) Inventors/Applicants (for US only): WYROBNIK,

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: AGENT FOR REDUCING THE USEABLE CALORIE CONTENT OF FOOD AND FOR THERAPEUTIC REDUCTION OF WEIGHT, IN PARTICULAR FOR USE IN THE CASE OF ADIPOSITY (OBESITY)

(57) Abstract: An agent for reducing the useable calorie content of food is described which contains a compound effecting the dehydrogenation of fructose to 5-keto-D-fructose. In addition, a combination agent is described which also contains a compound that converts glucose to fructose. These agents can be used in particular in the therapy of adiposity (obesity).



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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/011231

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K38/44 A23L1/307 A61P3/04

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)

A61K A23L

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, BIOSIS, MEDLINE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HOLMES EARLE W: "Coupled enzymatic assay for the determination of sucrose" ANALYTICAL BIOCHEMISTRY, vol. 244, no. 1, 1997, pages 103-109, XP009080627 ISSN: 0003-2697 abstract page 104, right-hand column, paragraph 2 figure 3 ----- -/--	6-9, 193-204

☒ 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 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

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/011231

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>PAREDES P A ET AL: "AMPEROMETRIC MEDIATED CARBON PASTE BIOSENSOR BASED ON D-FRUCTOSE DEHYDROGENASE FOR THE DETERMINATION OF FRUCTOSE IN FOOD ANALYSIS" BIOSENSORS & BIOELECTRONICS, ELSEVIER SCIENCE PUBLISHERS, BARKING, GB, vol. 12, no. 12, 1997, pages 1233-1243, XP000874801 ISSN: 0956-5663 the whole document</p> <p style="text-align: center;">-----</p>	<p>6-15, 28-39, 62-162, 193-230</p>
X	<p>DATABASE BIOSIS [Online] BIOSCIENCES INFORMATION SERVICE, PHILADELPHIA, PA, US; 1995, KAJINO KAZUYO ET AL: "Rapid and simple determination of D-glucose, D-fructose and sucrose in food by combination of quinone-dependent dehydrogenase reactions and self-driven coulometry" XP002424299 Database accession no. PREV199598280193 abstract & JOURNAL OF THE JAPANESE SOCIETY FOR FOOD SCIENCE AND TECHNOLOGY, vol. 42, no. 3, 1995, pages 169-175, ISSN: 0029-0394</p> <p style="text-align: center;">-----</p>	<p>6-9, 11-15, 28-39, 62-162, 193-230</p>
X	<p>CAMPUZANO S ET AL: "An integrated bienzyme glucose oxidase-fructose dehydrogenase-tetrathiafulvalene-3-mercaptopropionic acid-gold electrode for the simultaneous determination of glucose and fructose" BIOELECTROCHEMISTRY, ELSEVIER, AMSTERDAM, NL, vol. 63, no. 1-2, June 2004 (2004-06), pages 199-206, XP002380332 ISSN: 1567-5394 the whole document</p> <p style="text-align: center;">-----</p>	<p>6-15, 28-39, 62-162, 193-230</p>
X	<p>STREDANSKY M ET AL: "Determination of D-fructose in foodstuffs by an improved amperometric biosensor based on a solid binding matrix" ANALYTICAL COMMUNICATIONS, vol. 36, no. 2, February 1999 (1999-02), pages 57-61, XP002439276 ISSN: 1359-7337 the whole document</p> <p style="text-align: center;">-----</p>	<p>6-15, 28-39, 62-162, 193-230</p>
A	<p>US 6 395 299 B1 (BABICH JOHN W [US] ET AL) 28 May 2002 (2002-05-28) column 3, line 33 - column 4, line 5 column 41, line 27 - column 42, line 6 claim 139</p> <p style="text-align: center;">-----</p>	<p>1-5</p>

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/011231

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/051391 A (NUTRICIA NV [NL]; VAN LAERE KATRIEN MARIA JOZEFA [NL]; NIEUWENHUIZEN A) 26 June 2003 (2003-06-26) abstract paragraph [0024] - paragraph [0052] -----	1-5, 16-27, 163-192
X	DATABASE WPI Week 199950 Derwent Publications Ltd., London, GB; AN 1999-585931 XP002439278 & JP 11 255802 A (NICHIDEN KAGAKU KK) 21 September 1999 (1999-09-21) abstract -----	1-5, 16-27, 163-192
X	US 4 107 291 A (ISHIBASHI KEIJIRO) 15 August 1978 (1978-08-15) abstract -----	1-5
X	US 2002/187536 A1 (KULKARNI SUNANDA R [US] ET AL KULKARNI SUNANDA R [US] ET AL) 12 December 2002 (2002-12-12) abstract -----	1-5
X	WO 98/57653 A (NOVONORDISK AS [DK]) 23 December 1998 (1998-12-23) abstract -----	1-5
A	AMEYAMA ET AL: "D-fructose dehydrogenase of Gluconobacter industrius: purification, characterization, and application to enzymatic microdetermination of D-fructose." JOURNAL OF BACTERIOLOGY FEB 1981, vol. 145, no. 2, February 1981 (1981-02), pages 814-823, XP002424188 ISSN: 0021-9193 cited in the application the whole document -----	1-5, 16-27, 40-42, 60-204
A	US 4 396 602 A1 (ENDO AKIRA [JP]) 2 August 1983 (1983-08-02) the whole document -----	163-192
X	WO 99/57986 A (NOVO NORDISK BIOTECH INC [US]; NOVONORDISK AS [DK]) 18 November 1999 (1999-11-18) page 13, line 25 - line 32 example 4 claims 1,9,31 -----	11-15, 28-59, 61-162, 193-262
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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/011231

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 92/07947 A (ALKO AB OY [FI]) 14 May 1992 (1992-05-14) abstract page 2, line 18 - page 3, line 13; claims 1-3 -----	11-15, 28-37
X	EP 0 968 719 A2 (AMANO PHARMA CO LTD [JP] AMANO ENZYME INC [JP]) 5 January 2000 (2000-01-05) paragraph [0005] - paragraph [0008] examples 1,4 paragraph [0052] claims 1,2,4-6,9,11-13 -----	1-5, 10-27, 29-37
X	KAKINOKI K ET AL: "KINETICS OF ASSOCIATION PROCESSES OF D-FRUCTOSE DEHYDROGENASE ONTO LIPOSOME SURFACES" POLYMER BULLETIN, SPRINGER, HEIDELBERG, DE, vol. 37, no. 3, 1 September 1996 (1996-09-01), pages 407-414, XP000626416 ISSN: 0170-0839 the whole document -----	193-204
X	ANONYMOUS: "Enzymatic Therapy DGL Fructose Free Chewables" INTERNET ARTICLE, [Online] 20 May 2004 (2004-05-20), XP002439247 Retrieved from the Internet: URL:http://www.good-earth.com/enzymatic-th erapy-dgl-fructose-free-chewables.html> [retrieved on 2007-03-12] the whole document -----	205-207

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2006/011231

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:

Although claims 163-192 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
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:

see FURTHER INFORMATION sheet PCT/ISA/210
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.:

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

Continuation of Box II.1

Although claims 163-192 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Continuation of Box II.1

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

Continuation of Box II.2

Claims Nos.: -

Present claims 40, 41, 42, 163, 164, 165, 193, 208, 231 relate to an enzyme which has a given desired property or effect, namely the conversion of D- fructose into a form that is at least one of (a) biologically inactive in a cho- sen mammalian body, (b) not digestible in the digestive tract of said mammalian body and (c) not metabolizable in said mammalian body. However, the description does not provide support and disclosure in the sense of Article 6 and 5 PCT for any such enzymes having the said property or effect and there is no common general knowledge of this kind available to the person skilled in the art. This non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of the claim (PCT Guidelines 9.19 and 9.20).

The search of claims 40-42, 193, 208 and 231 was consequently restricted to the specifically disclosed enzyme having the desired property or effect, 5-D-fructose dehydrogenase.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1,2,16,27,40 (in part), 41 (in part), 42 (in part), 60 (in part), 62 (in part), 163, 164, 165, 193 (in part)

5-D-fructose dehydrogenase for use in medicine (first medical use)

2. claims: 6, 40 (in part), 41 (in part), 42 (in part), 60 (in part), 62 (in part), 193 (in part)

Medical device comprising 5-D-fructose dehydrogenase

3. claims: 10, 11, 28, 29, 38, 40 (in part), 60 (in part), 62 (in part), 193 (in part), 205, 208, 231

Foodstuff comprising 5-D-fructose dehydrogenase

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2006/011231

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