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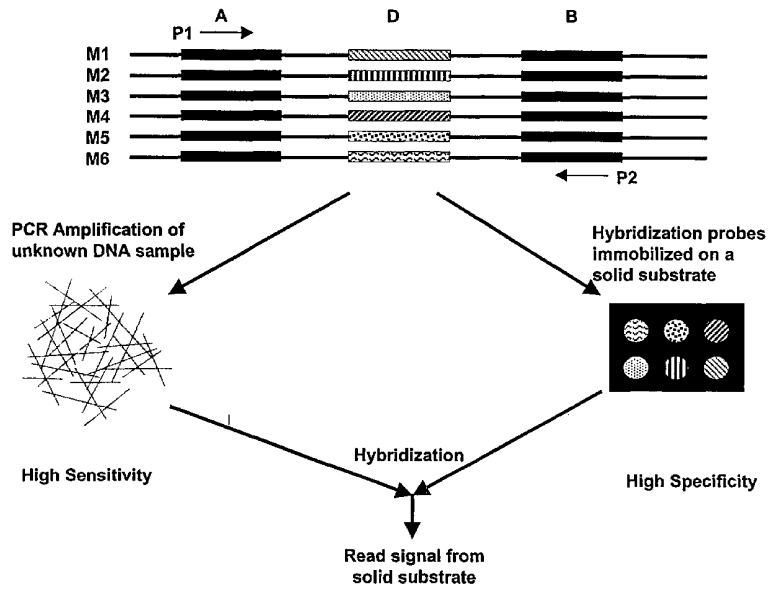
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*[Continued on next page]*

(54) Title: METHOD FOR RAPID AND ACCURATE IDENTIFICATION OF MICROORGANISMS




(57) Abstract: Methods and compositions useful for rapid identification of microorganisms are provided. Methods and compositions useful for rapid and simultaneous identification in a biological sample of multiple microorganisms, including bacteria, yeast, fungi and viruses are also provided. The methods and compositions utilize amplification techniques and sequence specific hybridization to detect species specific polynucleotide sequence in a sample. Novel methods for coupling oligonucleotide probes to glass surfaces with increased efficiency are also provided.

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26 September 2002

*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.*

# INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 00/31579

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/31 C12Q1/68 C12Q1/70 B01J19/00 C07K14/195

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)
IPC 7 C12Q B01J C07K

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, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
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| | -/-- | |

[X] Further documents are listed in the continuation of box C.

[X] 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

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"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

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 12 March 2002 | 10.06.02 |

| Name and mailing address of the ISA | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | van Klompenburg, W |

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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 | WO 98 28444 A (UNIV CHICAGO)<br>2 July 1998 (1998-07-02)<br>page 10; figure 7; examples 1,5 | 16-19 |
| | --- | |
| X | NOWAK A ET AL: "Genomic species typing of acinetobacters by polymerase chain reaction amplification of the recA gene."<br>FEMS MICROBIOLOGY LETTERS,<br>vol. 130, no. 2-3, 1995, pages 327-332,<br>XP002192745<br>ISSN: 0378-1097 | 39-42 |
| A | page 327 -page 332; figures 1,2; table 1 | 1-32 |
| | --- | |
| A | BRENDEL V ET AL: "EVOLUTIONARY COMPARISONS OF RECA-LIKE PROTEINS ACROSS ALL MAJOR KINGDOMS OF LIVING ORGANISMS"<br>JOURNAL OF MOLECULAR EVOLUTION, SPRINGER VERLAG, NEW YORK, NY, US,<br>vol. 44, no. 5, May 1997 (1997-05), pages 528-541, XP001001339<br>ISSN: 0022-2844<br>figure 2 | 1-32, 39-42 |
| | --- | |
| A | KARLIN S ET AL: "BACTERIAL CLASSIFICATIONS DERIVED FROM RECA PROTEIN SEQUENCE COMPARISONS"<br>JOURNAL OF BACTERIOLOGY, WASHINGTON, DC, US,<br>vol. 177, no. 23, December 1995 (1995-12), pages 6881-6893, XP000857476<br>ISSN: 0021-9193<br>page 6892, left-hand column | 1-32, 39-42 |
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| A | EP 0 899 337 A (SMITHKLINE BEECHAM)<br>3 March 1999 (1999-03-03)<br>page 2, line 43 -page 3, line 33; claims 1-22 | 1 |
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# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/31579

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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.:

32, 39-42 completely 1-31 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:

Invention 1: Claims 32, 39-42 completely,
claim 1-31 partially

A primer oligonucleotide and a hybridization probe for RecA. A method of identifying a target sequence, microorganism or diagnosing a disease or disorder, comprising amplifying a less conserved target sequence using primers for conserved regions; contacting a solid support comprising a probe sequence complementary to (a part of) the target sequence with the amplified target sequence. A method for identifying or distinguishing at least two organisms.
An array of RecA oligonucleotide probes immobilized on a solid support.

The general methods and arrays as described in claims 1-31 are searched together with the first invention as described above.

Invention 2: Claims 33, 35-38 completely,
claims 1-31 partially

As invention 1, but only relating to FtsY

Invention 3: Claims 34, 43-46 completely,
claims 1-31 partially

As invention 1, but only relating to human RSV

Invention 4: Claims 47-49 completely

A polynucleotide corresponding to a ftsY gene of Bacteroides fragilis and hybridization probes and pcr primers

Invention 5: Claim 50 completely

A method for increasing the efficiency of coupling an oligonucleotide to a solid substrate, the method comprising applying a positive electrostatic potential.

Invention 6: Claims 51,52 completely

A method for increasing the efficiency of coupling an oligonucleotide to a glass substrate, the method comprising derivatizing the glass with an epoxygroup.

# INTERNATIONAL SEARCH REPORT

nation on patent family members

Intern[illegible]al Application No
PCT/US 00/31579

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