

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 09 JUN 2005

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To:

see form PCT/ISA/220

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/NL2005/000025

International filing date (day/month/year)
14.01.2005

Priority date (day/month/year)
16.01.2004

International Patent Classification (IPC) or both national classification and IPC
C12M1/00

Applicant
WAGENINGEN UNIVERSITY

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/NL2005/000025

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-16
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

1. The following documents are referred to:

D1: US-B-6287852

D2: JP-A-07146011 (Patent Abstracts of Japan and Japanese publication)

D3: JP-A-2001-269162 (Patent Abstracts of Japan and Japanese publication)

D4: US-A-5162051

D5: US-A-5232855

2. The present application does not meet the requirements of Article 33(3) EPC, because the subject-matter of claims 1 and 14 does not involve an inventive step.

2.1 Document D1 is considered to represent the closest prior art. This document describes a reactor and a process for cultivation of phototrophic microorganisms. The reactor comprises (see col. 3, line 54-col. 4, line 27; figures 1-8) several compartments holding a microorganisms-containing liquid, separated by light-conducting walls (reference 8), inlet for CO₂ (reference 5), an outlet (reference 7), and collector assemblies (references 13, 12, 22, 23 and 32) to provide the light radiation to the walls of the compartment.

2.2 The difference between the disclosure of D1 and the subject-matter of claims 1 and 15 is the regulation of the temperature of the culture using suitable means and the provision as light collector of a lens which can rotatably and horizontally be moved.

2.3 The problem to be solved by the present invention can be regarded as to provide an photobioreactor and a method for culturing phototrophic microorganisms having an improved photochemical efficiency.

2.4 The solution to this problem disclosed in the present application cannot be regarded as inventive.

It is obvious for the skilled person that any device suitable for this kind of process has to be provided with temperature control and regulation means because the temperature is a

critical factor for any biological process. Similar processes and reactors for cultivating phototrophic microorganisms, as shown, for example, in D3 (reference 3 in the drawing) D4 (see col. 3 line 65-col. 4, line 49; figures) and D5 (see col. 2, line 32-col. 3, line 30; col. 3, line 64-col. 4, line 7; figures 1 and 2) comprise means for regulating the temperature of the culture bath. It would be obvious for the skilled person to include also temperature regulating means in the reactor described in D1, arriving to the subject-matter of claims 1 and 14.

It is also obvious for any skilled person that the efficiency of a photobioreactor depend on the efficiency in collecting light. The skilled person willing to solve the stated problem would consider the use of a more efficient collecting assembly, as those disclosed in D2, comprising movable lenses which can be rotated or horizontally moved, arriving to the subject-matter of claims 1 and 14. Thus, the subject-matter of claims 1 and 14 relates to the combination of known features which does not give rise to any unexpected technical effect.

3. The dependent claims 2-13, 15 and 16 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirement of inventive step (Article 33(3) PCT), since they are related to subject-matter already disclosed in the prior art or to constructional details, not giving rise to an unexpected technical effect.