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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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[Continued on next page]

(54) Title: METHOD FOR THE REMEDIATION OF WATER GENERATED FROM NATURAL RESOURCE PRODUCTION OPERATIONS

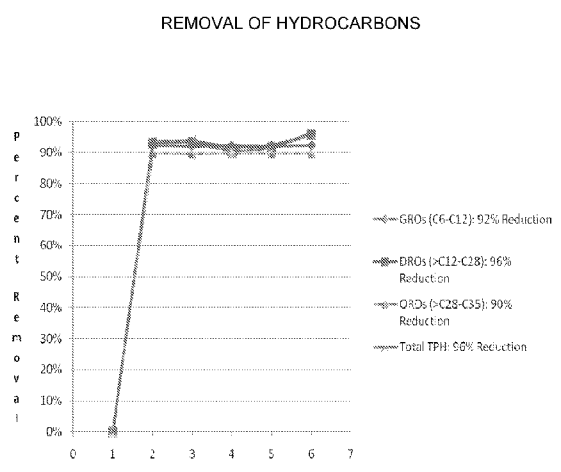


FIG. 12

(57) Abstract: In some embodiments, a wastewater treatment system may reduce contaminants in water. A system may include one or more bioreactors which include a substrate that supports a biofilm. The bacteria used to form the biofilm may be selected to maximize the reduction of contaminants in water. Various components of the wastewater treatment system may be optimized to improve the efficiency and energy consumption of the wastewater system.

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A. CLASSIFICATION OF SUBJECT MATTER*C02F 3/00(2006.01)i, C02F 3/34(2006.01)i, C02F 3/10(2006.01)i, C02F 1/58(2006.01)i*

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)

C02F 3/00; C02F 3/12

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: salts, precipitat*, coagulat*, biofilm

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Biodegradation, 2009, Vol. 20, Pages 165-175 (VYRIDES, I. et al.) 31 December 2009	1-9, 11-13, 18, 19
Y	See abstract and pages 165-175.	10
Y	Applied and Environmental Microbiology, December 2003, Pages 7063-7072 (HOCKIN, S. L. et al.) 31 December 2003 See abstract and pages 7063-7072.	10
A	Bioresource Technology, 2003, Vol. 89, Pages 229-236 (NELSON, N. O. et al.) 31 December 2003 See abstract and pages 229-236.	1-13, 18, 19
A	Water Environment Research, Vol. 83, No. 3, Pages 220-232 (GOODE, C., et al.) 31 March 2011 See abstract and pages 220-232.	1-13, 18, 19
A	KR 20-0368392 Y1 (CHANG, Y. H.) 20 November 2004 See abstract, figures 2-4, pages 2-4 and claim 1.	1-13, 18, 19

 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 application or patent 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 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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Date of mailing of the international search report

10 DECEMBER 2012 (10.12.2012)

Name and mailing address of the ISA/KR


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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.: 15-17
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:

Claims 15-17 are too unclear to make meaningful search, because the claims refer to claim which does not comply with PCT Rule 6.4(a).

3. Claims Nos.: 14
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:

See EXTRA 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 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.

I. Claims 1-7 are directed to a method of preparing bacteria capable of reducing contaminants in a wastewater stream, comprising the steps of growing bacteria in a first growth medium, collecting live bacteria, and growing the collected live bacteria in a second growth medium, wherein the concentration of inorganic salts in the second growth medium is greater than the concentration of inorganic salts in the first growth medium.

II. Claim 8 is directed to bacteria capable of reducing contaminants in a waste water stream, wherein the bacteria are prepared by the method of any one of claims 1-7.

III. Claims 9-13 are directed to a system for reducing contaminants in a wastewater stream comprising inorganic salts, comprising a system inlet, bioreactor coupled to the system inlet, wherein the bioreactor comprises substrates and bacteria of claim 8, wherein the bacteria is capable of reducing the concentration of contaminants in a wastewater stream comprising inorganic salts at a concentration of at least 0.5% by weight.

IV. Claim 18 is directed to a method of preparing bacteria capable of reducing contaminants in a wastewater stream, comprising growing bacteria in a growth medium with inorganic salts.

V. Claim 19 is directed to a method for reducing contaminants in a wastewater stream comprising inorganic salts, comprising bioreactor with bacteria capable of reducing the concentration of contaminants in a wastewater stream with inorganic salts.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/039373

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20-0368392 Y1	20.11.2004	KR 10-0502543 B1	20.07.2005