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(21) Internationales Aktenzeichen: PCT/EP98/07124 (22) Internationales Anmeldedatum: 9. November 1998 (09.11.98) (30) Prioritätsdaten: 197 49 480.3 8. November 1997 (08.11.97) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): SIGMA-TAU INDUSTRIE FARMACEUTICHE RI- UNITE S.P.A. [IT/IT]; Viale Shakespeare, 47, I-00144 Roma (IT). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): KLEBER, Hans-Peter [DE/DE]; Platanenweg 42, D-04416 Großdeuben (DE). CANOVAS-DIAZ, Manuel [ES/ES]; Cuesta de la Luz, 31, Urb. Azahar D 3, E-30001 Santo Angel-Murcia (ES). OBON, José Maria [ES/ES]; Libertad, 1.7 A, E-30009 Murcia (ES). IBORRA, José Luis [ES/ES]; Nuestra Sedora de los Buena Libros, 5.4 F, E-30008 Murcia (ES). (74) Anwalt: MARSH, Roy, D.; Hoffmann . Eitle, Arabellastrasse 4, D-81925 München (DE).		(81) Bestimmungsstaaten: AU, BR, CA, CN, JP, KR, MX, US, europäisches Patent (AT, BE, CH, CY, DE, DK, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Veröffentlicht <i>Mit internationalem Recherchenbericht.</i> <i>Vor Ablauf der für Änderungen der Ansprüche zugelassenen</i> <i>Frist; Veröffentlichung wird wiederholt falls Änderungen</i> <i>eintreffen.</i>
(54) Title: METHOD FOR PRODUCING L-CARNITINE FROM CROTONOBETAINE (54) Bezeichnung: VERFAHREN ZUR HERSTELLUNG VON L-CARNITIN AUS CROTONOBETAIN (57) Abstract The invention relates to a method for producing L(-)-carnitine. The aim of the invention is to depict a method which permits the synthesis of L(-)-carnitine from crotonobetaine, crotonobetaine salts or derivatives in an ecologically advantageous manner by immobilizing cells of <i>Escherichia coli</i> 044 K74 in a continuously operating cell recycle reactor. Growing or resting cells of <i>E. coli</i> are retained in a continuously operating cell recycle reactor by micro or ultrafiltration membranes which are arranged as a flat membrane module or hollow chamfer module. (57) Zusammenfassung Die Erfindung betrifft ein Verfahren zur Herstellung von L(-)-Carnitin. Das Wesen der Erfindung besteht darin, ein Verfahren dazustellen, daß in ökonomisch vorteilhafter Weise die Synthese von L(-)-Carnitin aus Crotonobetain, Crotonobetainsalzen oder Derivaten durch immobilisierte Zellen von <i>Escherichia coli</i> 044 K74 in einem kontinuierlich arbeitenden Zell-Recycle-Reaktor erlaubt. Wachsende oder ruhende Zellen von <i>E. coli</i> werden in einem kontinuierlich arbeitenden Zell-Recycle-Reaktor durch Mikro- bzw. Ultrafiltrationsmembranen, die als Flachmembran- oder Hohlfasermodul angeordnet sind, zurückgehalten.		

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 98/07124

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C12P13/00 C12P1/00

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 6 C12P

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CHEMICAL ABSTRACTS, vol. 115, no. 1, 8 July 1991 Columbus, Ohio, US; abstract no. 6956, JUNG, H. ET AL: "Production of L(-)- carnitine by biotransformation" XP002096268 see abstract & DECHEMA BIOTECHNOL. CONF. (1990), 4(P.T. B, LECT. DECHEMA ANNU. MEET. BIOTECHNOL. 8TH, 1990), 1041-4 CODEN: DBCOEU, --- -/--	1

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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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	CHEMICAL ABSTRACTS, vol. 117, no. 19, 9 November 1992 Columbus, Ohio, US; abstract no. 187989, JUNG, HEINRICH ET AL: "L-(-)- Carnitine synthesis by stereoselective hydration of crotonobetaine" XP002096269 see abstract & PROC. - EUR. CONGR. BIOTECHNOL., 5TH (1990), VOLUME 1, 251-4. EDITOR(S): CHRISTIANSEN, CLAUS; MUNCK, LARS; VILLADSEN, JOHN. PUBLISHER: MUNKSGAARD, COPENHAGEN, DEN. CODEN: 57RVAO, ----	1
A	EP 0 320 460 A (SIGMA TAU IND FARMACEUTI) 14 June 1989 see claims ----	1
P,X	CHEMICAL ABSTRACTS, vol. 128, no. 2, 12 January 1998 Columbus, Ohio, US; abstract no. 12603, OBON, JOSE MARIA ET AL: "L-(-)- Carnitine production with immobilized Escherichi coli cells in continuous reactors" XP002096270 see abstract & ENZYME MICROB. TECHNOL. (1997), 21(7), 531-536 CODEN: EMTED2; ISSN: 0141-0229, -----	1