

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
2 November 2000 (02.11.2000)

PCT

(10) International Publication Number
WO 00/64902 A3

(51) International Patent Classification⁷: **C07D 493/04 //**
(C07D 493/04, 311:00, 311:00)

(21) International Application Number: PCT/GB00/01585

(22) International Filing Date: 25 April 2000 (25.04.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
9909592.9 26 April 1999 (26.04.1999) GB

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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

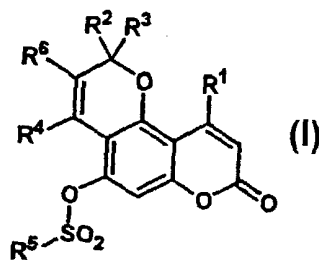
(88) Date of publication of the international search report:
31 May 2001

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.



WO 00/64902 A3

(54) Title: PROCESS FOR THE PREPARATION OF CALANOLIDE PRECURSORS



(57) Abstract: A compound of formula (I) wherein R¹, R², R³, R⁴ and R⁶ each represent H or an organic group of up to 20 C atoms, or any pair of R² and R³ or R² and R⁶ or R⁴ and R⁶ forms a cyclic group, and R⁵SO₂ is a cleavable protecting group in which R⁵ is an organic group of up to 20 C atoms. These compounds are useful as intermediates in the synthesis of calanolide A and related antiviral compounds.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01585

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07D493/04 //(C07D493/04,311:00,311:00)

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 7 C07D

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)

CHEM ABS Data, WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 840 921 A (RIZZO JOHN D ET AL) 24 November 1998 (1998-11-24) column 3 -column 9 column 18 -column 23; examples 8-15 ---	1,6
A	WO 94 14789 A (SMITHKLINE BEECHAM CORP ;PATIL ASHOK DHARMAJI (US); HERTZBERG ROBE) 7 July 1994 (1994-07-07) abstract; claims 22,28-35 --- -/--	1,6

☒ 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

10 October 2000

Date of mailing of the international search report

19/10/2000

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INTERNATIONAL SEARCH REPORT

Inter nal Application No

PCT/GB 00/01585

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CHEMICAL ABSTRACTS, vol. 51, no. 19, 10 October 1957 (1957-10-10) Columbus, Ohio, US; abstract no. 14707d, R.D. DESAI ET AL.: "Heterocyclic Compounds. XXXI. Synthesis of partially methylated esters of polyhydroxy coumarins." XP002124876 cited in the application abstract & JOURNAL OF THE INDIAN CHEMICAL SOCIETY., vol. 33, 1956, pages 661-664, THE INDIAN CHEMICAL SOCIETY, CALCUTTA., IN ISSN: 0019-4522 ---	1,6
A	D.E. GAMES ET AL.: "Synthesis of Some Dimethylpyrano- and 3-Methyl-2-enyl-4-phenyl- and -4-n-propyl-coumarins" JOURNAL OF THE CHEMICAL SOCIETY, CHEMICAL COMMUNICATIONS, 1971, pages 1005-1006, XP002124873 LETCWORTH GB cited in the application page 1005, column 2 ---	1,6
A	JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 120, no. 35, 1998, pages 9074-9075, XP002124874 DC US cited in the application page 9075, column 2 ---	1,6
A	P.P. DESPHANDE ET AL.: "Synthesis of Optically Active Calandolides A and B" JOURNAL OF ORGANIC CHEMISTRY, vol. 60, 1995, pages 2964-1965, XP002124875 EASTON US cited in the application page 2964, column 2; figure 1 -----	1,6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/01585

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5840921 A	24-11-1998	US 6043271 A	28-03-2000
		US 5489697 A	06-02-1996
		WO 9838193 A	03-09-1998
		US 5977385 A	02-11-1999
		US 5892060 A	06-04-1999
		US 5872264 A	16-02-1999
		US 5981770 A	09-11-1999
		US 5847164 A	08-12-1998
		US 5874591 A	23-02-1999
		US 5859050 A	12-01-1999
		US 5869324 A	09-02-1999
		AU 704247 B	15-04-1999
		AU 3274695 A	04-03-1996
		CA 2196656 A	15-02-1996
		EP 0775130 A	28-05-1997
		JP 3043813 B	22-05-2000
		JP 9512829 T	22-12-1997
		WO 9604263 A	15-02-1996
WO 9414789 A	07-07-1994	AU 5958394 A	19-07-1994
		CN 1096786 A	28-12-1994
		EP 0674643 A	04-10-1995
		JP 8505146 T	04-06-1996
		MX 9400082 A	31-08-1994
		US 5723631 A	03-03-1998
		ZA 9309658 A	19-01-1995