

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
11 December 2003 (11.12.2003)

PCT

(10) International Publication Number
WO 2003/102116 A3

- (51) International Patent Classification⁷: **C09B 61/00**, A23L 1/275, A61K 35/78
- (21) International Application Number: PCT/EP2003/005631
- (22) International Filing Date: 28 May 2003 (28.05.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
02253793.0 30 May 2002 (30.05.2002) EP
02257289.5 21 October 2002 (21.10.2002) EP
- (71) Applicant (for all designated States except US): **PHARES PHARMACEUTICAL RESEARCH N.V.** [NL/NL]; P.O. Box 6052, Emancipatie Boulevard 31, Curacao (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **LEIGH, Steve** [GB/CH]; Phares Drug Delivery AG, P.O. Box, Klauenfeldstrasse 30, CH-4132 Muttenz (CH). **LEIGH, Mathew, Louis, Steven** [GB/CH]; Phares Drug Delivery AG, Klauenfeldstrasse 30, CH-4132 Muttenz (CH). **VAN HOOGEVEST, Peter** [NL/CH]; Breitenstrasse 3, CH-4416 Bubendorf (CH). **TIEMESSEN, Henricus** [NL/DE]; Grubenstrasse 7/2, 79576 Weil am Rhein (DE).
- (74) Agents: **SCHREIBER, Wolfgang, F.** et al.; Riederer Hasler & Partner Patentanwälte AG, Elestastrasse 8, CH-7310 Bad Ragaz (CH).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, 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, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
18 March 2004
- 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.

(54) Title: OIL-SOLUBLE PIGMENT COMPOSITIONS

(57) Abstract: The present invention relates to a process for the preparation of an oily solution of a carotenoid, particularly astaxanthin, a composition comprising at least one xanthophyll and at least one suitable solvent, particularly n-methyl-pyrrolidone, a composition comprising a carotenoid and a mixture of mono-, di- and triglycerides subjected to enzyme treatment, glycerolysis and/or fractionation, and a solid homogeneous mixture comprising one xanthophyll in a physiologically acceptable amount and at least one lipophilic dispersing agent. The process is useful for preparing nutrient or pharmaceutical compositions.



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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/05631

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C09B61/00 A23L1/275 A61K35/78

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 C09B A23L A61K A23K

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, WPI Data, PAJ, FSTA, BIOSIS, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 1 270 679 A (MARCUS GMBH & CO KG DR) 2 January 2003 (2003-01-02) paragraphs '0008!, '0031!, '0032! ---	13
X	US 3 886 294 A (EMODI ALEXANDER S ET AL) 27 May 1975 (1975-05-27) column 1, line 41-50,58-61 column 3, line 11-16 examples 1,2,4,5	1,5-7, 13,17,18
A	column 2, line 31,32	2,3
A	column 3, line 63 -column 4, line 20 --- -/--	14-16

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

8 December 2003

Date of mailing of the international search report

17/12/2003

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

Authorized officer

Couzy, F

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/05631

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 007 856 A (COX DONALD JOSEPH ET AL) 28 December 1999 (1999-12-28) column 3, line 16-24,51-63 column 5, line 16-21	1,6,7
A	column 6, line 42-67	14-16
A	column 4, line 6-11	2,3
A	column 6, line 28-32,42-61	5,13
X	US 5 364 563 A (STOLLER HANSJOERG ET AL) 15 November 1994 (1994-11-15) column 1, line 12-15 column 2, line 35-48 column 3, line 54,55	1,6,7,13
A	column 3, line 39-54 column 3, line 23-26 column 3, line 23-26,65-68	2,3,5,14
X	EP 0 278 284 A (BASF AG) 17 August 1988 (1988-08-17) column 1, line 1-6 column 3, line 53 -column 4, line 12 column 8, line 19-24	13
A	column 6, line 28-34	1-3,14, 17,18
A	DE 199 19 751 A (BASF AG) 9 November 2000 (2000-11-09) column 2, line 27-56 column 3, line 19-36	1-18
A	US 6 132 790 A (SCHLIPALIUS LANCE ELLIOTT) 17 October 2000 (2000-10-17) column 2, line 31-53 column 3, line 41-43 column 4, line 32-42	1-18
A	GB 1 284 350 A (HOFFMANN-LAROCHE) 9 August 1972 (1972-08-09) page 1, line 19-35	1-18
A	US 6 296 877 B1 (BOHN HERIBERT ET AL) 2 October 2001 (2001-10-02) column 2, line 12-43 column 3, line 25-42	1-18

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/05631

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1270679	A	02-01-2003	DE 20109224 U1 EP 1270679 A2	17-10-2002 02-01-2003
US 3886294	A	27-05-1975	CH 585525 A5 DE 2411529 A1 FR 2221499 A1 GB 1407779 A JP 49126727 A	15-03-1977 26-09-1974 11-10-1974 24-09-1975 04-12-1974
US 6007856	A	28-12-1999	AU 9181098 A BR 9811882 A CA 2299281 C CN 1268872 T EP 1006809 A1 WO 9907238 A2 JP 2001513331 T	01-03-1999 28-11-2000 30-09-2003 04-10-2000 14-06-2000 18-02-1999 04-09-2001
US 5364563	A	15-11-1994	AT 96312 T DE 59003205 D1 DK 410236 T3 EP 0410236 A2 JP 2572877 B2 JP 3066615 A	15-11-1993 02-12-1993 13-12-1993 30-01-1991 16-01-1997 22-03-1991
EP 0278284	A	17-08-1988	DE 3702030 A1 AT 63752 T AU 599196 B2 AU 1070888 A CA 1330270 C DE 3862872 D1 EP 0278284 A1 GR 3002493 T3 IL 85084 A JP 2620277 B2 JP 63196242 A	04-08-1988 15-06-1991 12-07-1990 28-07-1988 21-06-1994 27-06-1991 17-08-1988 30-12-1992 21-06-1992 11-06-1997 15-08-1988
DE 19919751	A	09-11-2000	DE 19919751 A1 AU 4551400 A CN 1125145 B DE 50000657 D1 WO 0066665 A1 EP 1173521 A1 JP 2002543263 T NO 20015238 A	09-11-2000 17-11-2000 22-10-2003 21-11-2002 09-11-2000 23-01-2002 17-12-2002 28-12-2001
US 6132790	A	17-10-2000	US 6428816 B1 AT 212195 T AU 654876 B2 WO 9304598 A1 DE 69232376 D1 DE 69232376 T2 EP 0602137 A1 ES 2172508 T3 JP 7501211 T JP 3302999 B2	06-08-2002 15-02-2002 24-11-1994 18-03-1993 14-03-2002 26-09-2002 22-06-1994 01-10-2002 09-02-1995 15-07-2002
GB 1284350	A	09-08-1972	CH 539677 A AT 303695 B	31-07-1973 11-12-1972

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/05631

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
GB 1284350	A	AT 298210 B	25-04-1972	
		BE 758244 A1	01-04-1971	
		CA 966147 A1	15-04-1975	
		CH 529713 A	31-10-1972	
		DE 2053381 A1	06-05-1971	
		ES 385045 A1	16-03-1973	
		ES 402817 A1	16-04-1975	
		FR 2066721 A5	06-08-1971	
		HU 166240 B	28-02-1975	
		IE 34667 B1	09-07-1975	
		IL 35408 A	29-11-1974	
		IT 1003009 B	10-06-1976	
		NL 7013551 A	04-05-1971	
		TR 16822 A	01-07-1973	
		US 3922368 A	25-11-1975	
ZA 7006636 A	30-06-1971			
US 6296877	B1	02-10-2001	DE 19651681 A1	18-06-1998
			AT 222278 T	15-08-2002
			AU 743203 B2	24-01-2002
			AU 5559698 A	03-07-1998
			CN 1239977 A ,B	29-12-1999
			DE 59707985 D1	19-09-2002
			DK 944675 T3	07-10-2002
			WO 9826008 A1	18-06-1998
			EP 0944675 A1	29-09-1999
			ES 2182139 T3	01-03-2003
			JP 2001506685 T	22-05-2001
			NO 992874 A	11-06-1999
			NZ 336133 A	27-04-2001
TW 493976 B	11-07-2002			