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8 342 - 18 21/6(72)
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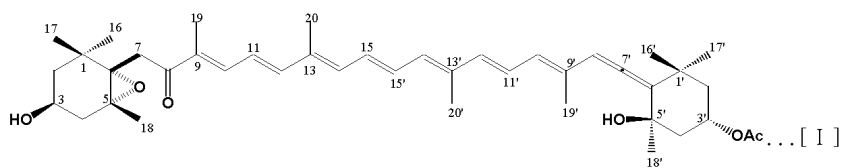
(74)

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(54)

(bacillariophycean)
(peroxynitrite; ONOO⁻)
,
(carboxy - PTIO) 30(Hantzschia marina)
, DPPH (1,1 - diphenyl - 2 - picrylhydrazyl),
(nitric oxide radical; ·NO)
(nitric oxide radical; ·NO)
, 가 .

1



, DPPH,

(Hantzschia marina) CH_2Cl_2 - MeOH

(oil), (sterol), (microalgae) (photosynthetic storage product), (fatty acid), (lipid),
(Metting Jr, 1996).

(carotenoids) (Metting Jr, 1996). (Boczaret al., 1989), (Palermoet al., 1991)
(Yanet al., 1999) (Nishino, 1995) (Nishino, 1998) (Yanet al., 199
9), 가, (Hizikia fusiformis) (Ya
net al., 1999), 가 가

(marine microalgae)
, DPPH,
DPPH (Choiet al., 2000), (peroxynitrite, ONOO^-) (Soung
et al., 1999) (nitric oxide radical, $\cdot\text{NO}$) (Nagataet al., 1999)

가 (Allenic and epoxy carotenoid)

OAc (100 % $\rightarrow$ 0 %) (Hantzschia marina) CH_2Cl_2 - MeOH n - hexane - Et
HPLC DPPH MeOH

(Hantzschia marina) CH_2Cl_2 - MeOH

MR (Hantzschia marina) 가 F/2
 CH_2Cl_2 - MeOH MeOH HPLC UV - visible, IR DPPH, ^1H - ^{13}C - N

(Bacillariophycean) (Hantzschia marina, strain #, KMCC B - 37)
 가 f/2 ; CH_2
 Cl_2 - MeOH (1:1) n - hexane - EtOAc (100 % → 0 %) ; DPPH 4
 7 ; n - hexane
 e/EtOAc (1:1) MeOH (reversed - phase) HPLC , n - hexan
 (fucoxanthin) ([]) ; [] UV - visible, IR
 ^1H - ^{13}C - NMR ;
 ; DPPH, SIN - 1 (· NO)

(optical rotation) Perkin Elmer model 341 (polarimete) , IR
 Bruker FT - IR model IFS - 88 spectrometer . JEOL JNM - ECP 400 NMR spec
 trometer ^1H (400 MHz) ^{13}C (100 MHz) (NMR spectrum) . JE
 OL JMS - 700 spectrometer MS , UV - visible Hitachi U - 2001 UV - Vis
 spectrometer

1 : (Hantzschia marinaHantzschia marina)

(Hantzschia marina)

1 : Hantzschia marinaHantzschia marina

(Bacillariophycean) (Hantzschia marina, strain #, KMCC B - 37)
 (Institute of Fisheries Science, Pukyong National University) (Korea Mar
 ine Microalgae Culture Center) 가 (, 0.3L/min)
 f/2 [NaNO_3 (150 mg), NaH_2PO_4 (8.69 mg), Ferric EDTA (10.0 mg), MnCl_2 (0.22 mg), CoCl_2 (0.11 mg), $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (0.0196 mg), $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ (0.044 mg), $\text{Na}_2\text{SiO}_3 \cdot 9\text{H}_2\text{O}$ (50.0 mg), $\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$ (0.012 mg), vitamin B₁₂ (1.0 μg), biotin (10.0 μg), thiamine · HCl (0.2 mg) per seawater (1 L)]
 500Lux 23 28 . 4 , 20 L
 (lyophilization) .

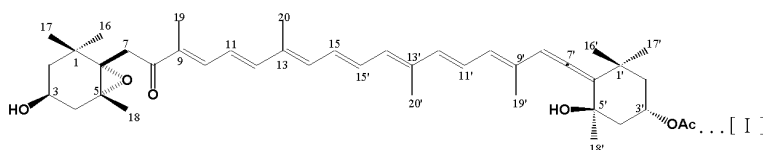
2 : (fucoxanthin)

(11.0 g) CH_2Cl_2 - MeOH (1:1) (r.t)
 4.1 g . 1.0 g n - hexane - EtOAc (100 % → 0 %)
 7 DPPH (1,1 - diphenyl - 2 - picrylhydrazyl)
 4 (60 mg) n - hexane - EtOAc (100 % → 0 %)
 .n - hexane/EtOAc (1:1)
 MeOH (reversed - phase) HPLC (YMC, ODS - A, 10 x 250 mm, 1 mL/min, detection at 445 nm)
 22 mg .
 , $[\alpha]_D + 18^\circ$ (c0.2,
 CHCl_3) IR (KBr) , 3438, 2361, 2332, 1723, 165
 4, 1605, 1251, 1030 cm^{-1} , 3438 cm^{-1} (hydroxyl), 2361, 2332 cm^{-1}
 1 sp - (allenic), 1723, 1251 cm^{-1} (ester), 1654, 1605 cm^{-1} (polyene)
 1

[1]

C#	δ_H	δ_C		C#	δ_H	δ_C	
1		35.2	(s)	1'		35.8	(s)
2	1.24(m), 1.46(m)	47.1	(t)	2'	1.35(m), 1.93(m)	45.5	(t)
3	3.80(m)	64.4	(d)	3'	5.37(m)	68.0	(d)
4	1.77(m), 2.29(m)	41.7	(t)	4'	1.46(m), 2.29(m)	45.3	(t)
5		66.2	(s)	5'		72.7	(s)
6		67.2	(s)	6'		117.5	(s)
7	2.58, 3.64(eachd,18.3)	40.8	(t)	7'		202.4	(s)
8		197.9	(s)	8'	6.04(s)	103.4	(d)
9		134.5	(s)	9'		132.5	(s)
10	7.14(d, 10.7)	139.1	(d)	10'	6.11(d, 11.5)	128.5	(d)
11	6.59(m)	123.4	(d)	11'	6.59(m)	125.7	(d)
12	6.59(m)	145.0	(d)	12'	6.33(d, 15.1)	137.1	(d)
13		135.4	(s)	13'		138.1	(s)
14	6.39(d, 11.5)	136.6	(d)	14'	6.73(dd, 14.2, 11.7)	132.5	(d)
15	6.25(d, 11.5)	132.2	(d)	15'	6.59(m)	129.4	(d)
16	0.94(s)	28.1	(q)	16'	1.33(s)	31.3	(q)
17	1.02(s)	25.1	(q)	17'	1.05(s)	32.1	(q)
18	1.20(s)	21.4	(q)	18'	1.37(s)	29.2	(q)
19	1.93(s)	11.8	(q)	19'	1.80(s)	14.0	(q)
20	1.98(s)	12.8	(q)	20'	1.98(s)	12.9	(q)
				Ac	2.03(s)	21.4	(q)
						170.4	(s)
[] CDCl_3 400MHz(^1H) 100MHz(^{13}C) (chemical shift) TMS($\delta = 0$ ppm) CDCl_3 ($\delta = 77.0$ ppm) HMBC, HMQC, COSY, DEPT							

^1H - ^{13}C - (NMR spectral data),
 (acetyl), (conjugated keton), 4 (two quaternary geminal dimethyls),
 4 (two quaternary geminal methyls of oxygen), 4 (four olefinic methyls)
 (allene functionalities).
 (carotenoid) UV/visible
 [468 nm (ϵ 51,000) (sh), 446 (56,000), 332 (17,000), 267 (24,000)] UV (MeOH): 468 nm (ϵ 51,000) (sh), 446 (56,000), 332 (17,000), 267 (24,000); EI - MS (LREIMS)
 m/z 658 [(M^+), rel. int. 3], 640 [($\text{M}^+ - \text{H}_2\text{O}$), 15], 580 [($\text{M}^+ - \text{AcOH}$), 25], 562 [(580 - H_2O), 3], 313 (2), 287 (24), 263 (24), 247 (55), 237 (36), 221 (100), 207 (50)
 (Palermo et al., 1991; Yan et al., 1999)
 [] ($\text{C}_{42}\text{H}_{58}\text{O}_6$) []



2 : (marine microalgae)

(marine microalgae) 30 20 L
 TLC [Merck, 60F₂₅₄ precoated plate, n-hexane - EtOAc (1:1), $R_f = 0.4$]
 HPLC (, $t_R = 12.0$ min)
 [] (green alga) Chlorophyceae, (diatom) Bacillariophyceae
 (blue-green algae) Cyanophyceae 10 []
 [] 3 (family) (chemotaxonomic marker)
 (Choiet al., 2000).

3 : [] (Free radical :DPPH) (scavenging activity assay)

(Choiet al., 2000)

[] MeOH 160 μL 96 - well microtiter tray we
 II 40 μL DPPH (1,1 - diphenyl - 2 - picrylhydrazyl) (1.5×10^{-4} M) 가
 30 (absorbance) microplate reader (Packard Co., Spectra CountTM)
 520nm OD (optical density) DPPH IC₅₀ [MeOH (160 μL) DPPH (40 μL) 50 %]

Soung (Soung et al., 1999) (peroxynitrite; ONOO^-) . DMF DHR 123 (dihydrorhodamine 123) 5 mM - 80°C (stock solution) (pH 7.4) 90 mM NaCl, 50 mM Na_3PO_4 , 5 mM KCl (pH 7.4) 100 μM diethylenetriaminepentaacetic acid (DTPA) . DHR 123 5 μM (peroxynitrite; SIN - 1) 5 (1) , SIN - 1 DHR 123 가 , DHR 123 DHR 123 480 nm (excitation wavelength) 525 nm (emission wavelength) microplate fluorescence reader (FL 500, Bio - Tex Instruments) , DHR 123 %

Nagata (Nagata et al., 1999) (·NO)

·NO 4,5 - diaminofluorescein (DAF - 2) ·NO 490 - 495 nm triazolofluorescein (Nagata et al., 1999). DAF - 2 (1mg) 0.55mL (dimethyl sulfoxide) , 50mM (pH 7.4) 1/400 - fold . ·NO (donor) sodium nitroprusside (f.c., 2 mM) DA F - 2 (f.c., 3.14 μM) 96 - well microplate 가 . (fluorescence intensity) DAF - 2 ·NO . DAF - 2 ·NO 10 , 485nm 530nm fluorescence spectrometer (FL 500, Bio - Tek instruments)

DPPH, (peroxynitrite; ONOO^-), (nitric oxide radical; ·NO) [] , IC₅₀ 32 μM , 60 μM , 0.5 μM (·NO)

chia marina) CH_2Cl_2 - MeOH , (Bacillariophyceae) (Hantzschia marina) DPPH n - hexane - EtOAc , Me OH HPLC DPPH, , 가 ,

(57)

1.

(Hantzschia marina) CH_2Cl_2 - MeOH n - hexane - EtOAc ; DPPH n - hexane - EtOAc ; MeOH HPLC

2.

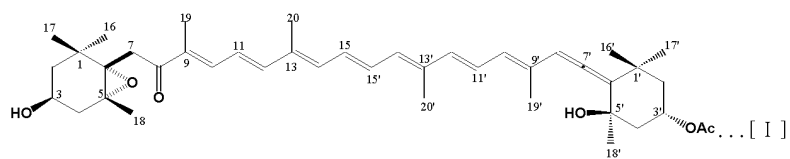
1

, DPPH

[]

(C₄₂ H₅₈ O₆ =

658).



3.

2

[]