

Daftar Pustaka

- AARASON S., T. BERNER dan Z. DUBINSKY. 1980. Microalgae as source of chemicals and natural product. In *Algal Biomass*. Shelef G and Soeder C.J Eds. Elsevier/North-Holland Biomedical Press, Amsterdam. 575-601.
- AHERN T.J., S. KATOH., dan E. SADA. 1983. Arachidonic acid production by red alga *Porphyridium cruentum*. *Biotech. Bioeng.* 25: 1057-1070.
- AHMAD M.R dan P.S MISRA. 1989. Protein and amino acid contents of green alga *Botryococcus barunii* (Chlorophyceae, Chlorococcales) *Cryptogamie Algol.* 10: 301-304.
- AL-HINTY J.S dan A.E SALMAN. 1989. Growth and ω 3-fatty acid and amino acid composition of microalgae under different temperature regimes. *Aquaculture* 77: 337-351.
- ALLEN M.B. 1960. List of culture maintained by the laboratory of comparative biology. Richmond, CA: Kaiser Foundation Research Institute, USA. 450 hal.
- AL-MOUDI A.O dan K.J FLYNN. 1989. Effect of nitrat-N incorporation on the composition of intracellular amino acid pool of N-deprived *Tetraselmis marina*. *Br. Phycol. J.* 24: 53-61.
- ARAD S.M., G. KERISTOVESKY., B. SIMON, Z. BARAK dan S. GERESH. 1993. Biodegradation of the sulfated polysaccharide of *Porphyridium* by soil bacteria. *Phytochemistry* 32: 287-290.
- ARAD S.M., M. ADDA dan E. COHEN. 1985. the potential production of sulfated polysaccharides from *Porphyridium*. *Plant and Soil* 89; 117-127.
- ARAD S.M., M. ADDA dan E. COHEN. 1985. the potential production of sulfated polysaccharides from *Porphyridium*. *Plant and Soil* 89; 117-127.
- ARAS MULYADI. 1995. Etudes in vitro de la croissance et de la composition biochimique de *Porphyridium cruentum* et de *Porphyridium aerugineum* (Rhodophyceae). Implication sur la toxicite cutanee. These Doctorat, Universite de Montpellier II. 288 hal.
- ARAS MULYADI. 1997. Potensi asam lemak seri linoleat dan linolenat *Porphyridium aerugineum* (Rhodophyceae) yang diproduksi pada fotoperioda dan salinitas berbeda. *J. Penelitian Unri* 3: 171-174.



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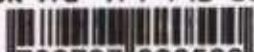
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- ARAS MULYADI. 1998. Bioteknologi Mikroalga: Porphyridium sebagai sumber bahan biokimia. *Dalam Strategi Pembangunan Perikanan dan Kelautan Nasional dalam Meningkatkan Devisa Negara*. Unri Press Pekanbaru : 144-157
- ARAS MULYADI. 1998. Studi komparatif sifat halotoleran *Porphyridium cruentum* dan *Porphyridium aerugineum* (Rhodophyceae). *Berkala Perikanan Terubuk* 68:39-50.
- AUDINEAU P dan J. BLANCHETON. 1986. Production d'algues unicellulaires. IFREMER-Equipe MERE, DEVA SUD Palavas, France. 20 hal.
- BECKER E.W dan L. V VENKATAMARAN. 1984. Production and utilization of blue green algae Spirulina in India. *Biomass* 4: 105-125.
- BECKER E.W. 1984. Biotechnology and exploitation of the green algae *Scenedesmus obliquus* in India. *Biomass* 4: 1-19.
- BIARD J.F. 1980. Recherche et etude de substances antimicrobiennes et antineoplastiques dans les algues benthiques des cotes atlantiques francaises. These Doctorat es-Sciences Pharmaceutiques, Universite Nantes. 292 hal.
- BOROWITZKA M.A. 1986. Microalgae as source of fine chemicals. *Microbiol. Sci.* 3: 372-375.
- BOROWITZKA M.A. 1988. Vitamins and fine chemicals from microalgae. In M.A Borowitzka and L.J Borowitzka Eds. Cambridge University Press, Cambridge. 154-196.
- BOURGES H., A. SOTOMAYOR., E. MENDOZA dan A. CHAVEZ. 1971. Utilization of the alga Spirulina as protein source. *Nutr. Rep. Int.* 4: 31-43.
- BRODY N dan A.E VATTER. 1959. Observation on cellualr structure of *Porphyridium cruentum*. *J. Biophys. And Biochem. Cytol.* 5: 289-298.
- BRODY N dan R. EMERSON. 1959. The effect of wave length and intensity of lighth on the proportion of pigments in *Porphyridium cruentum*. *Am. J. Bot.* 46:433-440.
- BROWN M.R. 1991. The amino acid and sugar composition of 16 species of microalgae used in mariculture. *J. Exp. Mar. Biol. Ecol.* 145: 79-99.
- CALAF R. 1990. L'etude acide alpha-kainique et ses derives: son indentification au sein d'une structure peptidiques d'*Alsidium helmithochorton* Kutzing. These Doctorat es Sciences Pharmaceutiques, Universite Aix Marseille II. 178 hal.
- CALVIN M. 1955. the photosynthetic cycle. Thesis University of California, Berkley USA. 110 hal.

- CAMPOS J.R. 1992. Effets d'extraits de l'algues *Ascophyllum nodosum* et de conservateurs antimicrobiens utilises en cosmetologie. Reposes sur deux lignes fibroblastiques: L929 et humaine diploid. These Doctorat, Universite Aix Marseille II. 296 hal.
- CAPLANCQ J. 1982. Phytoplankton et production primaire. Dans Ecologie du phytoplankton des eux continentales. Porriot Eds. Masson Paris, Farnce. 1-45.
- CHAPMAN V.J. 1962. The algae. Mc Millan and Co Eds, London, England. 404 hal.
- CHRETIENNOT-DINNET M.J. 1990. Classe des rhodophyceae Rabenhorst, 1863. Dans Atlas du Phytoplankton Marin. Tomes 3. Eds. Du CNRS. 108-111.
- CLEMENT G., C. GIDDEY dan R. MENZY. 1967. Aminoacid composition and nutritional value of the alga *Spirulina maxima*. J. Sci. Fd. Agric. 18: 497-501.
- COHEN Z. 1986. Product from microalgae. In Handbook of Microalgal Mass Culture. Amos Richmond Eds. CRC Press, inc. Boca Raton, Florida USA. 421-454.
- COHEN Z., A. VONSHAK dan A. RICHMOND. 1988. Effect of environmental condition on fatty acid composition of the red alga *Porphyridium cruentum*: correlation to growth rate. J. Phycol. 24: 328-332.
- DAUTA A. 1983. Conditions de development du phytoplankton: Etude comparative du comportement de huit especes en cultur. Cinetiques d'assimilation et de croissance: etude experimentale. Modelisation appliquee aux cultures et a un milieu naturel: Le lot. These de Doctorat d'Etat, Universite Paul Sabatier Toulouse. 92 hal.
- DERMOUN D. 1987. Ecophysiology de *Porphyridium cruentum*. Validation experimentale d'un modele de croisance, etude de la production de polycharides. These Doctorat, Universute Technologiques de Compiegne, France. 211 hal.
- DERMOUN D., D. CHAUMONT., J.M THEBAULT dan A. DAUTA. 1992. modelling of growth of *Porphyridium cruentum* in connection with two interdependent factors: light and temperature. Bioresour. Technol. 42: 113-117.
- DI MATINO-RIGANO V.D.M., C. DI MARTINO., V. VONA., S. ESPOSITO dan C. RIGANO. 1989. Nitrogen nutrition and changes in amino acid pools of *Cyanidium caldarium*, Phytochemistry 28: 2891-2895.

- DICKSON L.G dan G.O KIRST. 1987. Osmotic adjustment in marine eukaryotic algae: the role of inorganic ions, quaternary ammonium, tertiary sulphonium and carbohydrate solute. I. Diatoms and rhodophyte. *New Phytol.* 106: 645-655.
- DONNAN L., E.P CARVILL., T.J GILLILAND dan P.C.L John. 1985. The cell cycles of *Chlamydomonas* and *Chlorella*. *New Phytol.* 99: 1-40.
- DROOP M.R. 1958. Optimum relative and actual ionic concentration for growth of some euryhaline algae. *Verhand. Intern. Ver. Limnol.* 13: 722-730.
- DUBINSKY Z., T. BERNER dan S. AARANSON. 1978. Potential of large scale algal culture for biomass and lipid production in arid lands. *Biotechnol. And Bioeng. Symp.* 8: 51-68.
- EKMAN P dan M. PEDERSEN. 1990. the influence of photon irradiance, day length, dark treatment, temperature and growth rate on the agar composition of *Gracilaria sordida* W. Nelson and *Gracilaria verrucosa* (Huds) Papenfuss (Gigartinales, Rhodophyta) *New Phytol.* 106: 645-655.
- EKMAN P., S. YU dan M. PEDERSEN. 1991. Effect of altered salinity, darkness and algal nutrient status on floridide and starch content, alfa-galactoside activity and agar yield of cultivated *Gracilaria sordida*. *Br. Phycol. J.* 26: 123-131.
- EL-FOULY M.M., F.H MOHN dan C.J SOEDER. 1985. Intensive protein production through microalgae. Final Report of Egyptian German Project. 1-48.
- ENRIGHT C.T., G.F NEWKIRK., J.S CRAIGIE dan J.D CASTELL. 1986. Evaluation of phytoplankton as diets for juvenile *Ostrea edulis* L. *J. Exp. Mar. Biol. Ecol.* 96: 1-13.
- ERNEST G dan O. PRINGSHEIM. 1949. The growth requirements of *Porphyridium cruentum*: with remarks on the ecology of brackish water algae. *J. Ecol.* 37: 57-64.
- ETZOL L. 1991. Optimisation de la production de souches monospécifiques de microalgues en conditions contrôlées. Etude in vitro de leurs potentialités sur cultures dérivées de vertébrés. DES Université de Montpellier II. 165 hal.
- FABREGAS J., C. HERRERO., B. CABEZAS dan J. ABALDE. 1987. Growth and biochemical variability of the marine microalga *Chlorella stigmatophora* in batch cultures with different salinities and nutrient gradient concentration. *Br. Phycol. J.* 22: 269-276.
- FALKOWSKI P.G., Z. DUBINSKY dan K. WYMAN. 1985. growth irradiance relationships in phytoplankton. *Limnol Oceanogr.* 30: 311-321.



- FAO/WHO. 1973. Energy and protein requirement. Report of FAO/WHO Expert Commity 52, FAO Geneve.
- FATTORUSO E dan M. PIATELLI. 1980. Amino acids from marine algae. In Marine natural product. Acad. Press. Inc. 95-140.
- FOWDEN L. 1951. Amino acid of certain alga. Nature 167: 1030-1031.
- GANTT E dan S.F CONTI. 1965. the ultrastructure of *Porphyridium cruentum*. J. Cell Biol. 16: 365-381.
- GEITLER L. 1923. *Porphyridium aerugineum* n. Sp. Osterreich Bot. Z. 72: 84.
- GENZE M.T., E. GUERIN-DUMARTRAIT, J.C LECLERC dan S. MIHARA. 1969. Synchronisation de Porphyridium: Evolution des quatites de pigments et de la capacite photosynthetique au cours du cycle biologique. Phycologia 8: 135-141.
- GERESH S., N. LUPESCU dan S.M ARAD. 1992. Fraction and partial characterization of the sulfated polysachharide of Poprhyridium. Phytochemistry 31: 4181-4186.
- GERESH S., O. DUBINSKY, D.M ARAD., D. CHRISTIAEN dan GLASER. 1990. Structure of 3-O-(γ -D-glucopyranosyluronic acid)-L-galactopyranose, an aldobiouronic acid isolated from the polysachharides of various unicellar red algae. Carbohydr. Res. 208: 301-305.
- GOLDMAN J.C. 1977. Temperature effects on phytoplankton growth in continous culture. Limnol. Oceanogr. 22: 932-936.
- GRIFFITH J.B dan S.J PIRT. 1967. The uptake of amino acids by mouse cells (strain LS) during growth in bacth culture and chemostat culture: the influence of cell growth rate. Proc. Roy. Soc., 168: 421-438.
- GUDIN C dan D. CHAUMONT. 1991. Les microalgues, de nouvelles sources de metabolites. Biofutur, 106: 27-30.
- GUDIN C dan P.F DOS SANTOS. 1990. Mass production of microalgae in photobioreactors for chemical. Biotec-90: 1-6.
- GUDIN C. 1987. Why bother with microalgae. In Algal biotechnology. T. Stadler, J. Mollion, M-c Verdus, Y. Karamanos, H. Morvan and D. Christiaen Eds. 33-40.
- GUDIN C., C. THEPENIER, D. CHAUMONT dan X. BERSON. 1988. Bioreactors. In Polysaccharides from microalgae: a new agroindustry. J. Ramus and M.C Jones Rev. North Carolina USA: 1-7.



- GUDIN C., D. BERNARD, C. THEPENIER dan T. HARDY. 1984. Direct bioconservation of solar energy into organic chemical. Biotech 84. the World Biotech. Report online publication Ltd. UK, I: 541-559.
- GUDIN C., D. CHAUMONT dan C. THEPENIER. 1998. Technologies de culture et de recolte des microalgues a grand echelle: Valorisation. Dans Valorisation des produits de la mer. Xieme journees Europeennes de Cosmetologie, Nantes, France. 75-87.
- GUILLARD R.R dan J.H RYTHER. 1963. Studies on marine planktonic diatoms. I. *Cyclotella nana* Hustedt, and *Detonula confervacea* (Cleve) Gran. Can. J. Microbiol. 8: 229-239.
- HASCOET A. 1985. Les algues en thalassitherapie, en cosmetologie et en aquaculture. These de Doctorat en Pharmacie, Universite de Bretagne, Rennes. 127 hal.
- HAYASHI K., S. KIDA., K. KATO., dan M. YAMADA. 1974. Component fatty acids of acetate-soluble lipids of 17 species marine benthic algae. Nippon Susian Gakkaishi 40: 609-617.;
- HAYASHI K., Y. SUITANI., M. MURAKAMI., K. YAMAGUCHI., S. KONOSU dan H. NODA. 1986. Protein adn amino acid composition of five species of marine phytoplankton. Bull. Jap. Soc. Sci. Fish. 52: 337-343.
- JACOB A., G.O KIRS, C. WIENCKE dan H. LEHMANN. 1991. Physisological response of the Antartic green alga *Prosiola crispa* spp. *antarticto* salinity stress. Plant Physiol. 139: 57-62.
- JIMENES C dan F.X NIELL. 1990. Growth of *Dunaliella viridis* Teodoresco: Effect of salinity, temperature and nitrogen concentration. J. Appl. Phycol. 3: 319-327.
- JONES R.B., L. SPEER dan W. KURY. 1963. Studies on the growth of the red alga *Porphyridium cruentum*. Physiol. Plant 16: 636-643.
- JONES R.T. 1962. Extracellular mucilage of red alga *Porphyridium cruentum*. J. Cell. Comp. Physiol. 60: 636-643.
- JONES R.T., L. SPEER dan W. KURRY. 1963. Studies on the growth of the red alga *Porphyridium cruentum*. Physiol. Plant. 16: 636-643.
- KANAZAWA T. 1964. Changes of amino acid composition of Chlorella cells during their life cycle. Plant and Cell Physiol. 5: 333-354.
- KANENIWA M., Y. ITABASHI dan T. TAKAGI. 1987. Usual 5-olefinic acids in lipids of algae from japanese waters. Nippon Sisan Gakkaishi 53: 861-866.

- KAUSS H. 1968. á-Galactosylglyzeride un osmoregulation in rotalgen. Z. PflPhysiol. 58: 428-433.
- KHOTIMCHENKO S.V., V.E VASKOUSKI dan PRZHEMEWTSKAYA. 1991. Distribution of eicosanpenenoic and arachidonic acids in dfferent species of Gracilaria. Phytochemistry 30: 207-209.
- KIRST G.O. 1980. low molecular wight carbohydrates and ions in rhodophyceae: quatitative measurement of floridoside and digeneadise. Phytochemistry 19: 1107-1110.
- KUEBLER J.E., I. R DAVISON dan C. YARISH. 1991. Photosynthetic adaptation to temperature in the red algae *Lomentaria baileyana* nad *Lomentaria orcadensis*. Br. Phycol. J. 26; 9-19.
- KUFFERATH H. 1912. notes sur la physiologie et la morphologie de *Porphyridium cruentum* Naeg. Bull. Soc. Roy. Bot. Belgium 52: 286-290.
- LAUTIER J., A. MALEVILLE, H. COUSSE., G. MOUZIN dan J. LAGARRIGUE. 1993. Variation in amino acid composition of phytoplanktonic production in sewage teratment pond at Meze. Effect on the valorization of microalgal biomass. Comp. Biochem. Physiol. 104: 775-779.
- LECLERC J.C. 1967. Sur la croissance et la photosynthese de *Porphyridium* en fonction de la salinite du mileu de culture. Photosynthetica 1: 179-191.
- LEE T.Y dan M.J BAZIN. 1991. Environmental factors influencing photosynthesis efficiency of the micro red alga *Porphyridium cruentum* (Agarth) Naeg. In light-limited culture. New Phytol. 118: 513-519.
- LEE Y.K dan H.M TAN. 1988. Effect of temperature, light intensity and dilution rate on the cellular composition of red alha *Porphyridium cruentum* in liht-limited chemostat culture. Mircen. J. 4: 231-237.
- LEE Y.K., H.M TAN dan C.S LOW. 1989. Effect of salinity of medium on cellular fatty acid composition of marine alga *Porphyridium cruentum* (Rhodophyceae). J. Appl. Phycol. 1; 19-23.
- LEVEILLE G.A., J.W SAUBERLICH dan J.W SOCHLEY. 1962. Protein value and the aminoacid deficiencies of various algae for growth of rats and chiks. J. Nutr. 76: 423-428.
- LEWIS I.F dan C. ZIRKEL. 1920. Cytologiy and systematic position of *Porphyridium cruentum* Naeg. Am. J. Bot. 7: 330-346.
- LIGNELL A dan M. PEDERSEN. 1989. Agar composition as a function of morphology and growth rate. Studies on some morphological starins of



- Garcilaria secundata* and *Gracilaria verrucosa* (Rhodophyta). Bot. Mar. 32: 219-227.
- LUPESCU N., S.M ARAD, S. GERESH., M.A BERSTEIN dan R. GLASER. 1991. Structure of some sulfated sugars isolated after acid hydrolysis of the extracellular polysaccharide of *Porphyridium* sp., a unicellular red alga. Carbohydr. Res. 210: 349-352.
- MACLER B.A. 1988. Salinity effect on photosynthesis, carbon allocation and nitrogen assimilation in the red alga, *Gelidium coulteri*. Plant Physiol. 88: 690-694.
- Mc LACHLAN J dan C.J BIRD. 1986. Gracilaria (Gigartinales, Rhodophyta) and productivity. Aquat. Bot. 26; 27-49.
- MIRALLES J., M. AKNIN., L. MICOUIN., E.M GAYDOU dan J.M KORNPROBST. 1990. Cyclopentyl and ω -5 monounsaturated fatty acids from red algae of the solieriaceae. Phytochemistry 29: 2161-2163.
- MOREL F.M.F., J.G REUTER, D.M ANDERSEON dan R.R.L GUILLARD. 1979. Aquil: a chemically defined phytoplankton culture medium for trace metal studies. J.Phycol. 15: 135-141.
- MORIMURA Y dan N TAMIYA. 1994. Preliminary experiments in the use of Chlorella as human food. Food Technol. 8: 179-182
- MORRIS I. 1981. Photosynthetic products, physiological state and phytoplankton growth. In Physiological bases of phytoplankton ecology. Edited by T.Platt. Can. Bull. Fish. Aquat. Sci. 210: 83-102.
- MORRISSON W.R dan L.M SMITH. 1964. Preparation of fatty acids methyl esters and dimethyl acetals from lipids with boron fluoride-methanol. J. Lipid Res. 5: 600-608.
- MOSS B. 1973. The influence of environmental factors on the distribution of fresh water algae: an experimental study. Effects of temperature, vitamin requirements and inorganic nitrogen compounds on growth. J. Ecol. 61: 179-192.
- MOYSE A dan A. YVON. 1956. Etude de la croissance d'algues monocellulaires (Chlorella et especes voisines) en culture accelerees. J. Res. CNRS 35: 169-175.
- MUNOZ-BLANCO J., J. HIDALGO-MARTINEZ dan J. CARDENAS. 1990. Extracellular deamination of L-aminoacids by *Chlamydomonas reinhardtii* cells. Planta. 194-198.
- NEAL P.J dan A. MELIS. 1989. Salinity stress enhances photoinhibition of photosynthesis in *Chlamydomonas reinhardtii*. Plant Physiol 134: 619-622.

- OTT F.D. 1972. A review of synonyms and the taxonomic position of the red algal genus *Porphyridium* Naeg. 1849. *Nova Hedwigia* 23: 237-239.
- OTT F.D. 1987. A brief review of the species of *Porphyridium* with additional records for the rarely collected alga *Porphyridium sordidum* GEITLET 132 (Rhodophyta, Porphyridiales). *Arch. Protistenkd.* 134: 35-41.
- PARSONS T.R., R. STEPHENS dan J.D.H STRICKLAND. 1961. On the chemical composition of eleven species of marine phytoplankter. *J. Fish. Res. Bd. Can.* 18: 1001-1016.
- PEKARKOVA B. 1989. Physiological properties of photosynthetic pigments in some *Porphyridium* and *Rhodella* sp (Rhodophyceae). *Arch. Hydrobiol.* 82: 197-206.
- PEKARKOVA B., J. SMARDA dan F. HINDAK. 1989. Cell morphology and growth characteristics of *Porphyridium aerugineum*. *Plant Sys. Evol.* 164: 263-272.
- PERCIVAL E dan R.A.J POYLE. 1979. The extracellular polysaccharides of *Porphyridium cruentum* and *Porphyridium aerugineum*. *Carbohydr. Res.* 72: 165-176.
- PRIESTLEY G. 1976. Algal protein. In *Food from Waste*. Birch. Parker et Worgan Eds.: 114-138.
- PRINGSHEIM E.G dan O. PRINGSHEIM. 1949. The growth requirement of *Porphyridium cruentum* with remarks on the ecology of brackishwater algae. *J. Ecol.* 37: 57-64.
- RAMUS J. 1972. The production of extracellular polysacchire by unicellular red alga *Porphyridium aerugineum*. *J. Phycol.* 8: 97-111.
- REED R.H. 1985. Osmoacclimatation in *Bangia atropurpurea* (Rhodophyta, Bangiales): the osmotic role of floridoside. *Br. Phycol. J.* 20: 211-218.
- REED R.H., J.C COLLINS dan G. RUSSEL. 1980. the effect of salinity upon galactosyl-glycerol content and concentration of marine red alga *Poprhya purpurea* (Roth) C. Ag. *J. Exp. Bot.* 31: 1539-1554.
- ROBERT E. 1975. γ -aminobutyric acid and nervous system function. A prespective. *Biochem. Pharmacol.* 23: 2637-2649.
- ROTEM A., N. ROTH-BEJERANO dan S.M ARAD. 1986. Effect of controlled enviromental conditions on starch and agar content of *Gracilaria* sp (Rhodophyceae). *J. Phycol.* 22: 117-121.
- SALLAL A.K., R.H AL-HASAN dan N.A NIMER. 1990. Effect of salinity on photosynthesisi and glycollate dehydrogenase of *Spirulina subsalsa* and



Synechocystis sp. Br. Phycol. J. 25: 201-203.

- SANDKUHLER J dan T. HERDEGEN. 1995. Distinct patterns of actibated neurons through out the rat midbrain periaqueductal gray induced by chemical stimulation within its subdivision. J. Comp. Neurol. 357: 546-553.
- 4SCHIELER L., L.E McCLURE dan M.S DUNN. 1953. the aminoacid composition of Chlorella . Plant Physiol. 1: 377-380.
- SCHRONSTEIN K.H dan J. SCOTT. 1982. Fatty acids of geochemical significance of microscopies algae. Phytochemistry, 9: 613-617.
- SERVEL M.O., C. CLAIRE., A. COIFFARD dan Y. ROECK-HOLTZHAUER. 1994. fatty acid composition of some marine microalgae. Phytochemistry 36: 691-693.
- SHEAT R.G., J.A HELLEBUST dan T. SAWA. 1979. Floridean starch metabolism of *Porphyridium purpureum* (Rhodophyta). Changes during the ageing of batch cultur. Phycologia, 18: 149-163.
- SMAYDA T.J. 1973. The growth of *Skeletonema contatum* during a winter spring bloom in Narragansett bay, Rhode Island. Norv. J. Bot. 20: 219-247.
- SMITH D.C., J.A BASSHAM dan M. KIRK. 1961. Dynamic of the photosynthesis of carbon compounds. II. Amino acid synthesis. Biochem. Biophys. Acta. 48: 299-313.
- SOEDER C.J dan E. STENGEL. 1974. Phsico-chemical factors affecting metabolism and growth rate. In *Alga Physiology and Biochemistry*. W.D.P Steward Eds. Univ. California Press: 715-740.
- SOMMERFELD M.R dan H.W NICHOLS. 1970. Comparative studies in the genus Poprphyridium Naeg. J. Phycol. 6; 67-78.
- SPOEHR H.A dan H.N MILNER. 1949. The chemical composition of Chlorella: Effect of environmental conditions. Plant Physiol. 24: 120-149.
- STARR R.C. 1960. The culture collection of algae at Indiana University. Am. J. Bot. 47: 67-80.
- STEVANOV K., M. KONAKLIEVA., E.Y BRECHANY dan W.W CHRISTIE. 1988. Fatty acid composition of some algae from the Black Sea. Phytochemistry 27: 3495-3497.
- STRYER L dan A.M GLAZER. 1985. Fluorescent immunoassay employing a phycobiliproteine labeled ligand or receptor. US patent 4, 520, 110.



- SUKENIK A., O. ZMORA dan Y. CARMELI. 1993. Biochemical quality of marine unicellular algae with special emphasis on lipid composition. II. *Nannochloropsis* sp. *Aquaculture* 117: 313-326.
- SWITZER L. 1980. *Spirulina*, the whole food revolution. Protein Corporation, Bantam Books, Toronto. 169 hal.
- THEPENIER C. 1984. Ecophysiologie de *Porphyridium cruentum* immobilise dans des mousses de polyurethane. Etude de la production de polysaccharides. These de docteur-ingenieur. Universite Technologique de Compiègne, France. 215 hal.
- TINDALL D.E., J.H YOPP, W.E SCHMID dan D.M MILLER. 1977. Protein and amino acid composition of the obligate halophile *Aphanothece halophytica* (Cyanophyta). *J. Phycol.* 13: 127-133.
- TREMBLIN J., A. COUDRET dan A. BAGHDADLI. 1986. Photosynthese apparente et installation chez deux cystoseires mediterraneennes: *Cystoseira stricta* et *Cystoseira crinita* (Pheophycees, Fucales): effets de la lumiere, de la temperature et de la salinite. *Cryptogamie Algol.* 7: 291-300.
- TREZZY-PLANTEVIN C. 1991. Recherche de l'axenie et selection phenotypique sur deux algues unicellaires eucaryotes: *Porphyridium cruentum* et *Haematococcus pluvialis*. DEA d'Océanologie. Universite de Marseille Luminy. 35 hal.
- VAULOT D dan S.W CHISHOLM. 1987. A simple method of the growth of phytoplankton population in light/dark cycle. *J. Plank. Res.* 9; 345-366.
- WEBB K.L dan F.L CHU. 1983. Phytoplankton as a food source for bivalve larvae. *World Maricult. Soc. Special Pub.* 2: 272-291.
- VEGLIA P. 1991. Ecophysiologie du phycobilisome chez deux especes de *Porphyridium*. DEA de Chimie de l'Environnement et Sante. Universite de Marseille Saint Charles, Marseille. 34 hal.
- WEPIERRE J., A.PAPIN dan M. CORMIER. 1987. Effet des insaponifiables d'avocat et de soja sur la proliferation et la survie des fibroblast en cultures normal et perturbee. Symposium Franco-Italien. Les extraits naturels en cosmetologie organise par la Societe Francaise de Cosmetologie a Chamonix France, 123-132.
- WIENCKE C dan A. LAUCHLI. 1981. Inorganic ions and floridoside as osmotic solute in *Porphyra umbilicalis*. *ZfPhysiol.* 103: 247-256.
- VISHER W. 1925. Zur morphologie, physiologie und systematik der Blutalge *Porphyridium cruentum* Naeg. *Verhand. Der Naturf.* 8-12.



- VISO A.C dan J.C MARTY. 1993. Fatty acids from 28 marine microalgae. *Phytopchemistry* 34: 1521-1533.
- VOLKMAN J.K., M.R BROWN., G.A DUNSTAN dan P.S JEFFREY. 1993. The biochemical composition of marine microalgae from the class eustigmatophyte. *J. Phycol.* 29; 69-74.
- VOLKMAN J.K., R.B JOHS., F.T GILLAN dan G.J PERRY. 1980. Fatty acid and lipid composition of 10 species microalgae used in mariculture. *J. Exp. Mar. Biol. Ecol.* 128: 219-240.
- VONSAK A. 1988. Porphyridium. In *Microalgal Biotechnology*. M.A Borowitzka and L.J Borowitzka Eds. Cambridge University Press, Cambridge: 122-134.
- VONSHAK A., Z. COHEN dan A. RICHMOND. 1985. the feasibility of mass cultivation of Porphyridium. *Biomass* 8: 13-25.
- YONGMANITCHAI W dan O.P WARD. 1991. Screening of algal for potential alternative source of eicosapentanoic acid. *Phytochemistry* 30: 2963-2967.
- YU S dan M. PEDERSEN. 1990. The effect of salinity changes on the activity of α -galactoside of the red algae *Gracilaria sordida* and *Gracilaria tenuistipitata*. *Bot. Mar.* 33: 385-391.

