

1ère version : juin 2007

Spiruline : bibliographie générale

vidéos
livres
thèses, travaux de diplômes
documents divers
articles scientifiques

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Introduction

Cette Bibliographie Générale est à utiliser conjointement avec le document « Spiruline : bibliographie scientifique (1966 – 2006) ».

Le présent document consiste en une brève compilation de titres de livres, thèses, documents et autres articles de vulgarisation ou de présentations en rapport avec la spiruline ; ainsi qu'une liste d'articles qui ne figurent pas dans le deuxième document cité plus haut.

La plus grande part de notre bibliographie est consacrée aux articles scientifiques spécifiquement en rapport avec la spiruline, classés par ordre alphabétique du premier auteur. C'est en effet la source d'informations primaires sur lesquelles s'appuient presque toutes les autres publications. C'est la raison pour laquelle les notices de présentations s'efforcent de fournir une valeur ajoutée à la simple énumération des titres : indications si l'article a été répertorié par MEDLINE, les mots-clés retenus par les auteurs, et ceux qui nous ont semblés pertinents, résumés lorsqu'il y en a de disponibles ; et également l'indication de l'existence de versions téléchargeables (gratuitement ou non).

Un troisième document, une présentation de la bibliographie proprement dite, triée en diverses catégories, est en préparation.

Documents divers:

- 1) Vidéos
- 2) Livres
- 3) Thèses, travaux de diplôme
- 4) Documents scientifiques
- 5) Autres documents

Articles scientifiques recensés jusqu'en 2006:

- 6) Articles scientifiques antérieurs à 1966
- 7) Articles scientifiques 1966–2006 : titres additionnels

Articles scientifiques recensés à partir de 2007:

- 8) Au sujet des notices des Articles scientifiques
- 9) Articles scientifiques recensés après 2006

Documents divers

1) Vidéos

FAO.

L'algue bleue du désert.

Film vidéo produit par A. Proto, Division de l'Information, FAO's Inter-Departmental Working Group on Biological Diversity for Food and Agriculture, (2003).

2) Livres

Becker E.W.

Microalgae, biotechnology and microbiology.

(Cambridge University Press, Cambridge, 1995)

Borowitska (ed.)

Micro-Algal Biotechnology.

(Cambridge University Press, Cambridge, 1986).

Challem J.J.

La spiruline, apprenez à la connaître dans l'intérêt de votre santé.

(Editions Générales de Diététique, 74108-Ville-la-Grand, 1981).

Challem JJ, Passwater RA, Mindell EM.

Spirulina.

(Keats Publishing Inc New Canaan, Connecticut, 1981).

Darcas C.

La spiruline, une algue pour la santé - Livret-guide de production.

(TECHNAP/CREDESA, 2000)

<http://credesa.online.fr/>

F. Doumenge, H. Durand-Chastel, A. Toulemont (eds).

Spiruline, algue de vie / Spirulina, algae of life (Musée océanographique, Monaco, 1993) 222 pp.

PMID: pas

pdf: Doumenge F 1993.papier

mots-clés livre: \$Spiruline, \$taxonomie, \$biochimie, \$culture, \$valeur-nutritive, \$source-alimentaire.

mots-clés Antenna: £spirulina-platensis; £E£, £introduction + figures pages 211-218£.

résumé:

Reports of spirulina cultivation around the world presented at the Monaco Oceanographic Institute, 1993.

Introduction of Spirulina, the algae of life by Hubert Durand Chastel. Reports on spirulina production in Mexico, India, Spain, Myanmar, Chile and developing countries.

Dupire J.
Objectif : Malnutrition.
(Editions Similia, Paris, 1998).

Falquet Jacques.
Spiruline, Aspects nutritionnels.
Antenna Technologie, Genève.

Flamant Vert.
Produire de la spiruline en systèmes autonomes.
(Editions de la Tempresse , Eaux-Vives, Suisse, 1988).

Fox R.D.
Spiruline, Technique pratique et promesse.
(Edisud, Aix-en-Provence, 1999).

Par son initiateur, tout sur la culture de la spiruline, algue d'eau salée, pour combattre la malnutrition dans le monde. L'ouvrage est un exposé détaillé de l'ensemble des aspects biologiques, techniques et pratiques de la culture de la spiruline. Il montre à la fois l'intérêt majeur d'un tel apport de vitamines et de protéines de haute qualité ; les conditions de base (qualité de l'eau, salinité, lumière, risques...) pour mener cette culture (depuis le niveau artisanal, au village, jusqu'à la production à grande échelle dans une ferme industrielle) ; les exemples déjà opérationnels ; ainsi que le budget prévisionnel d'une ferme géante.

Fox Ripley D.
Spirulina, production & potential.
(Edisud, Aix-en-Provence, 1996).

This book gives the most complete and practical information on growing spirulina. It should be consulted by health authorities and development decisionmakers, by spirulina growers and it can be used as a teaching text in universities. Dr. Fox explains the history of the cyanobacteria, *Arthrospira platensis*, popularly known as the blue-green algae spirulina... its composition, growth requirements and methods for managing the culture (from village level artisanal production to large scale industrial farms). Health benefits are described, with emphasis on its usefulness for combatting malnutrition. Giant farms using seawater are proposed for providing spirulina as a food supplement for the millions of malnourished children living today. Dr. Fox sees spirulina as a million dollar commodity in the near future.

Fox Ripley D.
Algoculture: la spiruline, un espoir pour le monde de la faim.
(Edisud, Aix-en-Provence, 1986).

Dr. Ripley Fox pioneered village scale spirulina systems in developing world countries. He describes what conditions and nutrients needed to grow spirulina. He describes the installation and operation of his integrated village health and energy system in three experimental projects.

Frapplier Renée.
La spiruline, un aliment précieux pour la santé.
(Les Editions Asclépiades Inc., Montréal, 1992).

Henrikson Robert
Earth food Spirulina, How this remarkable blue-green algae can transform your health and our planet.
(Ronore Enterprises Inc., U.S.A., 1989, 1994 et 1997).

This book has been called the "definitive popular reference book about spirulina." Take a step-by-step adventure with this microscopic algae: how this 3.6 billion year old life form was rediscovered by scientists; its unusual phytonutrients and antioxidants; how spirulina can benefit your health through self care programs; new medical discoveries revealing spirulina's health benefits; how it ecologically grows more nutrition per acre than any other food; how spirulina is grown in the developing world countries; how it uses land and water more efficiently than other crops; what super spirulina and phytochemical extracts to expect in the near future; schemes and dreams to restore our planet with micro algae. This easy-to-read 180 page book has over 100 photographs, charts and graphs, and an 11 page scientific bibliography.

<http://www.spirulinasource.com/earthfood.html>

Henrikson R.
Spirulina, superalimento del futuro.
(Ediciones Urano, Barcelone, 1994).

Hills C.
The secrets of Spirulina, medical discoveries of Japanese Doctors.
(University of the three press, Boulder Creek, Californy, 1980)

Jourdan J.-P.
Cultivez Votre Spiruline - Manuel de Culture Artisanale de la Spirulina
Publication Antenna Technologies 1996.

(English version published by Antenna Technologies, 1999)

J.P Jourdan fait part de son expérience pratique de plus de douze années de production de la spiruline et montre aussi comment appliquer les méthodes du génie chimique pour perfectionner cette production même à petite échelle et sans moyen technique sophistiqué. Il donne une foule de détails permettant de construire l'installation de culture et de conduire sa marche dans des circonstances très variées, mais aussi d'évaluer et d'optimiser le prix de revient de cette micro-algue si demandée actuellement pour ses vertus alimentaires ou autres.

Michka.
La spiruline, une algue pour l'Homme et la Planète (Georg Editeur, Genève, 1992).

Michka.
La spiruline, une algue pour l'Homme et la Planète (Georg Editeur, Genève, 2005).

Nouvelle version écrite en collaboration avec Jacques Falquet

Saury A.
Les algues, source de vie (Editions Dangles, 45800 Saint Jean de Braye, 1982).

Sisso B.
La Spiruline : Saveurs et vertus de la spiruline (Grancher, Paris, 2003) 116 pp.

Tietze HW.
Spirulina - Micro Food - Macro Blessing (Fourth Edition)

pdf: Tietze W 2004.pdf
livre de 78 pages

Venkataraman LV, Becker E.W.
Biotechnology & Utilization of Algae: The Indian Experience (Sharada Press, Mangalore, India, 1985)

Vonshak A. (ed.)
Spirulina platensis (Arthrospira) : Physiology, Cell-biology and Biotechnology (Taylor & Francis, London, 1997)
233 pp.

Spirulina is a form of blue-green algae which is becoming commercially cultivated on an increasingly large scale. This book describes the biology, cultivation and applications of this increasingly valued microorganism. It begins by examining the morphology, physiology, photosynthesis and genetics of laboratory cultures of Spirulina and then moves on to discuss the biotechnological applications in detail. An overview of mass production is also given. Written by leading experts in the field, this book will be an invaluable reference for researchers and industrialists working with this micro-algae.

3) Thèses, travaux de diplôme

Achard M.A.

Etude et modélisation du transfert de CO₂ dans les photobioréacteurs. Application à l'étude de la limitation par la source de carbone chez *S.platensis*.

D.E.A Université Blaise Pascal, Laboratoire de Génie Chimique Biologique, 1994.

Ballot A.

Cyanobakterien in kenianischen Rift Valley Seen eine biologische und toxikologische Studie Cyanobacteria in Kenyan Rift Valley lakes.

(FU Berlin Digitale Dissertation)

(<http://www.diss.fu-berlin.de/2004/116>)

Bucaille P.

Intérêt et efficacité de l'algue spiruline dans l'alimentation des enfants présentant une malnutrition protéino-énergétique en milieu tropical. [Effectiveness of Spirulina Algae as Food for Children with Protein-Energy Malnutrition in a Tropical Environment].

Thèse de doctorat (Université Paul Sabatier Toulouse III, 10/10/1990).

Etude faite au Zaïre

Cascallo Anne.

Conception, contrôle et fonctionnement d'un photobioréacteur pour la culture en mode continu de la cyanobactérie "*Spirulina platensis*".

Thèse de doctorat dans la spécialité Génie enzymatique, bioconversion, microbiologie (Université de Technologie de Compiègne, 2000).

Cornet J.F.

Etude cinétique et énergétique d'un photobioréacteur.

Thèse de doctorat (Université de Paris-Sud Centre d'Orsay, 27/02/1992).

Gonçalves de Oliveira E. (2006)

Sacagem de *Spirulina platensis* : análise das técnicas de leito de jorro e camada delgada

Thèse de doctorat (Dpt de Chimie, Université de Rio Grande, Brésil, 2006)

Ittis A.

Le phytoplancton des eaux natronées du Kanem (Tchad), influence de la teneur en sels dissouts sur le peuplement algal.

Thèse de doctorat (Université de Paris VI, 1974).

Lebrun S.

Les protéines d'organismes unicellulaires : étude des principaux substrats, cas particulier de la production de protéines alimentaires par les spirulines.

Doct pharm (Montpellier, 1988)

Maurel D.

Protéines végétales et alimentation : étude particulière des algues Spirulines et de quelques protéines foliaires.

Thèse d'exerc fac pharmacie, (Montpellier, 1983)

Remondetto Gabriel Edgardo.

Propriétés de rétention et de libération de micronutriments par des réseaux protéiques: étude du système gélifié beta-lactoglobuline/fer.

Thèse de 175 pages

Ne mentionne qu'une seule référence spirulinienne...

Zarrouk Claude.

Contribution à l'étude d'une cyanophycée: influence de divers facteurs physiques et chimiques sur la croissance et la photosynthèse de *Spirulina maxima* (Setch et Gardner) Geitler.

Thèse de doctorat, Faculté des Sciences de l'Université de Paris, 06/12/1966.

4) Documents scientifiques

AFAA (Association française pour l'algologie appliquée)
Actes du premier symposium sur la spiruline *Spirulina Platensis* (Gom.) Geitler de l'AFAA (1982)

Biorigin
documentation Biorigin pour "Azina" et "Ferrina", spiruline enrichie en zinc ou en fer (2006)
<http://www.biospirulina.ch/content.php?id=54>

Busson F.
"Spirulina platensis (Gom.) Geitler et Spirulina geitleri J. de Toni, cyanophycées alimentaire" (Service de Santé, Parc du Pharo, Marseille, 1971).

Chamorro-Cevallos G.(1980)
Toxicologic Research on the Alga Spirulina (United Nations Organisation for Industrial Development, 24 Oct. 1980).

Desikachary TV.
Cyanophyta (Indian Coucil of Agricultural Research, New Delhi, Inde, 1959) 686 pp.

Evets L, et al.
Means to normalize the levels of immunoglobulin E, using the food supplement Spirulina (Grodenski State Medical Univ. Russian Federation Committee of Patents and Trade. Patent (19)RU (11)2005486. Jan. 15, 1994. Russia).

Funteu F.
Effet des facteurs de l'environnement sur le métabolisme lipidique et activités biologiques des substances lipophiles chez une cyanobactérie filamenteuse, *Spirulina platensis*.
I.N.R.A. Paris-Grignon, 18/09/1996.

Manoharan R.
"Improvement of bioavailable iron in *Spirulina fusiformis*", Spirulina ETTA National Symposium, MCRC, Madras (1992), p. 98.

MELISSA(1996)
"Final report for 1995 activity", Agence Spatiale Européenne, Noordwijk, Hollande.

MELISSA(1997)
"Final report for 1996 activity", Agence Spatiale Européenne, Noordwijk, Hollande.

104 Miao Jian Ren (1987)
Spirulina in Jiangxi China
Academy of Agricultural Science.

Presenté à la Soc. Appl. Algology (Lille, France, Sep. 1987).

Montenegro Ferraz CA, Aquarone E, Florenzano G, Balloni W, Tredici M.
"Utilização de sub-produtos da industria alcooleira na obtenção de biomassa de spirulina maxima, Parte I -
emprego do anidrido carbonico".

Paoletti C, Vincenzini M, Bocci F, Materassi R.
Composizione biochemica generale delle biomasse di Spirulina.
Rome (Consiglio Nazionale delle Ricerche, Rome, 1980).

Picard ME. (1993)
Utilisation de la spiruline au Centre Nutritionnel (Nutrition Santé Bangui, 49-50 Bd Van Iseghem, Nantes, 1993).

Proteus Inc. (1975)
Clinical Experimentation With Spirulina (National Institut of Nutrition, Mexico City, 1975)

transl. by Proteus, Inc. 1975.

Seshadri C.V.
Large scale nutritional supplementation with spirulina alga. (All India Coordinated Project on Spirulina. Shri Amm
Murugappa Chettiar Research Center (MCRC) Madras, India, 1993).

Tomaselli L., Giovanetti L., Pushparaj B. et Torzillo G. (1987)
"Biotecnologie per la produzione di spirulina", IPRA, Monografia 17 (page 21).

Trzebiatowska J, Lipok J, Zastawniak K, Mlynarz P, Kafarski P.
Glyphosate degradation by Spirulina sp.
www.rhodia.com/icpc2004/Abstracts/Thursday/PS%202-031.pdf (2004)

Ramos Galvan R.
Clinical experimentation with spirulina.
In : Colloque sur la valeur nutritionelle des algues spirulines, Rueill, May 1973.(National Institute of Nutrition,
Mexico City, Mexico, 1973)
en espagnol

5) Autres documents

Becker E.W. et Venkataraman L.V. (1982)
"Biotechnologie and exploitation of algae, the Indian approach".

Consiglio Nazionale delle Ricerche, Atti del convegno
"Prospettive della coltura di spirulina in Italia", Firenze, 20-21/11/1980.

Consiglio Nazionale delle Ricerche (1987)
IPRA Monografia N° 17 "Biotechnologie per la produzione di spirulina.

Jasby A.
Spirulina: a model for microalgae as human food
In: C.A. Lembi (ed.) Algae and Human Affairs (Cambridge University Press, 1989)

MCRC.
"Large scale nutritional supplementation with spirulina alga", Final project report, Department of Biotechnology,
Ministry of Science and Technology, New Delhi, Inde, 1993.

Seshadri CV, Jeeji Bai N.
"Spirulina ETTA national symposium", MCRC, Madras, Inde, 1992.

Shambu Prasad C.
The innovation trajectory of Spirulina algal technology.
In : <http://www.crispindia.org/docs/InnovationsInInnovation.pdf> pp 51-80.

Shambu Prasad C.
Science and technology in civil society: Innovation trajectory of Spirulina algal.
Technology Economic and Political Weekly (October 1, 2005) 4363-4372 .

Venkataraman LV.
"Spirulina in India", Proc. National Seminary Cyanobacterial Research-Indian Scene, NFMC, BARD,
Tiruchirapalli, Inde, 1993.

www.cema-sa.org/files/mcsd/fr/biotech_fr.pdf
Applications de la Biotechnologie dans l'industrie.
Centre d'Activités Régionales pour la Production Propre (CAR/PP) / Plan d'Action pour la Méditerranée.

Articles scientifiques recensés jusqu'en 2006:

6) Articles scientifiques antérieurs à 1966

Crow WB.
The generic characters of Arthrospira and Spirulina.
Transactions Amer Microscopical Soc 46, No 2 (1927) 139-148.

Dangeard P.
Sur une algue bleue alimentaire pour l'homme : Arthrospira platensis (Nordst.) Gomont.
Actes Soc Linn Bordeaux 91 (1940) 39-41.

Rich F.
Notes on Arthrospira platensis.
Rev Algol 6 (1931) 75-79.

7) Articles scientifiques 1966–2006: titres additionnels

Le document « Bibliographie spirulinienne (1966-2006)-articles scientifiques » est disponible à l'adresse <http://www.antenna.ch/documents>. Il comprend une compilation de 937 titres d'articles scientifiques, chacun accompagné d'une notice descriptive aussi complète que possible selon le modèle décrit à la section (11) : auteurs, titre, journal, mots-clés, résumés, etc.

Une compilation des mots-clés fournis par les auteurs de quelques 600 de ces articles se trouve ci-après dans la section (9). On trouve à la section (10) une compilation similaire de mots-clés associés par Antenna Technologies à ces mêmes articles en vue de rendre disponible prochainement une répartition des articles spiruliniens en catégories classées par thèmes.

La liste qui suit décrit des articles qui n'ont pas été inclus dans le document mentionné. Les notices de ces titres additionnels sont réduites au minimum: auteurs, titre, journal.

Annapurna V, et al.
Bioavailability of spirulina carotenes in preschool children
J. Clin. Biochem. Nutrition 10 (1991) 145-151.

Anusuya DM, Venkataraman LV.
Supplementary value of the proteins of the blue green algae Spirulina platensis to rice and wheat proteins.
Nutr. Rep. Internat. 28 (1983) 1029-1035.

Ayehunie S, et al.
Inhibition of HIV-1 replication by an aqueous extract of *Spirulina platensis* (*Arthrospira platensis*).
In : International Association of Applied Algology, 7th International Conference. 16 april 1996, Knysna, South Africa.

Baojiang G, et al.
Study on effect and mechanism of polysaccharides of spirulina on body immune function improvement.
Proc. of Second Asia Pacific Conf. on Algal Biotech. Univ. of Malaysia. (1994) 33-38.

Becker EW, Jakober B, Luft D, et al.
Clinical and biochemical evaluations of the alga *Spirulina* with regard to its application in the treatment of obesity.
A double-blind crossover study.
Nutr Rep Intl 1986;33:565-73.

Belay A.
Mass culture of *Spirulina platensis* - The Earthrise farms experience.
In: A. Vonshak (ed.), *Spirulina platensis* (*Arthrospira*) (Taylor & Francis, London, 1997) 131-158.

Boudène C, Collas E, Jenkins C.
Recherche et dosage de divers toxiques minéraux dans les algues spirulines de différentes origines, et évaluation de la toxicité a long terme chez le rat d'un lot d'algues spirulines de provenance mexicaine
Ann Nutr Aliment 29 (1975) 577-587.

Bujard E, Braco U, Mauron J, Mottu F, Nabholz A, Wuhrmann JJ, Clément G.
Composition and nutritive value of blue green algae (*Spirulina*) and their possible use in food formulations.
In : 3rd.international Congress of Food Science and Technology, Washington, 1970.

Cohen Z.
Chemicals from spirulina.
In: A. Vonshak (ed.), *Spirulina platensis : Physiology, cell-biology and biotechnology*" (Taylor & Francis, London, 1997) 175-204.

Contreras A, Herbert DC, Grubbs BG, Cameron IL.
Blue-green alga, *Spirulina*, as the sole dietary source of protein in sexually maturing rats.
Nutr. Rep. Int. 19 (1979) 749-763.

Durand-Chastel H.
Production of *Spirulina* biomass rich in gamma-linolenic acid and sulfolipids.
In: Charpy L, Larkuma AWD (eds.), *Marine Cyanobacteria* ; Bull. Inst. Océanogr. Monaco Numéro spécial 19 (1999) 541-549.

Durand-Chastel H. et Clément G.
Spirulina algae: food for tomorrow.
In: Proc. 9th int. Congr. Nutrition, Mexico (Karger, Basel, 1972) Vol 3, pp 85-90.

Elder GH, Hunter PR, Codd GA. Hazardous freshwater cyanobacteria (blue-green algae). Lancet 1993;341:1519–20 [letter].

Filali Mouhim R, Cornet J-F, Fontaine B, Dubertret G.
Production, isolation and preliminary characterization of the exopolysaccharide of the cyanobacterium *Spirulina platensis*.
Biotechnology Letters 15 (1993) 567–572.

Fox R. (2004b)
Nouvelles utilisations de la spiruline.
In : Compte-rendu du Colloque international : CSSD « Les Cyanobactéries pour la Santé, la Science et le Développement » Les Embiez, 2004.

Fukino H, Takagi Y, Yamane Y.
Effect of spirulina (*S. platensis*) on the renal toxicity induced by inorganic mercury and cisplatin.
Eisei Kagaku 36 (1990) 5.

Furst PT.
Spirulina.
Human Nature 1, No 3 (1978) 60-65.

Gendel SM, Nohr RS.
Growth and nitrogen fixation by immobilized cyanobacteria
Appl Microbiol Biotechnol 31(2):138 (1989)

Gireesh T, Jayadeep A, Rajasekharan KN, Menon VP, Vairamany M, Tang G, Nair PP, Sudhakaran PR.
Production of deuterated beta-carotene by metabolic labelling of *Spirulina platensis*.
Biotechnol Lett 23 (2001) 447-449.

Gustafson KR, Cardellina JH, Fuller RW, Weislow OS, Kiser RF, Snader KM, Patterson GML, Boyd MR.
AIDS- Antiviral sulfolipids from cyanobacteria (blue-green algae).
J Natl Cancer Inst 81 (1989) 1254-1258.

Hau R.
Vitamin B12 in der Mikroalge *Spirulina platensis*.
FIT fürs LEBEN 1 (1995) 29

Hudson BJJ, Karis IG.
The Lipids of the Alga *Spirulina*.
J Sci Fd Agric 25 (1974) 759-763.

Jacquet J.
Microflore des préparations de spirulines.
Ann Nutr Aliment 29 (1975) 589-601.

Johnson PE and Shubert LE.
Accumulation of mercury and other elements by spirulina (cyanophyceae).
Nutr Rep Intl 1986;34(6):1063-71.

Jourdan JP.
Survival type production of spirulina.
In: 6th International conference on applied algology, Ceske Budejovice, 1993.

Jourdan JP.
Sugar as a source of carbon for spirulina (*Arthrospira platensis*) culture.
In: International symposium on Cyanobacterial biotechnology", Bharathidasan University, Tiruchirapalli, Inde, 1996.

Kapoor R, Mehta U. (1992)
Development and sensory evaluation of Spirulina supplemented recipes.
In : CV Seshadri, N Jeeji Bai (eds.), Spirulina National Symposium, Madras, 1992, pp 134-139.

Kotut K, Ballot A, Krienitz L.
Toxic cyanobacteria and their toxins in standing waters of Kenya: implications for water resource use.
J Water Health. 4 (2006) 233-245.

Léonard J, Compère P.
Spirulina platensis (Gom.) Geitler, algue bleue de grande valeur alimentaire par sa richesse en protéines.
Bull. Jard. Bot. Belg. 37, No 1 (1967) 23 pp.

Loseva LP, Dardynskaya IV.
Spirulina- natural sorbent of radionucleides.
In: 6th International Congress of Applied Algology, Czech Republic, 1993.

Lanfalconi L, Grifantini R, Petris A, Gualerzi CO.
Production and regeneration of spheroplasts from the cyanobacterium Spirulina platensis.
FEMS Microbiology Letters 59(1-2):141 (1989)

Markarova EN, Kirikova NN, Tambiev AKh.
The effect of EHF radiation on the kinetics of sodium transport in Spirulina platensis.
Vestn Mosk Univ Ser. 16, No 2 (1995) 16-23.

Nakaya N, Homma Y, Goto Y.
Cholesterol lowering effect of Spirulina.
Nutrition Reports Internat. 37 (1988) 1329-1337.

Paniagua-Michel J., Dujardin E. et Sironval C. (1993)
"Le Tecuitlal, concentré de spirulines source de protéines comestibles chez les Aztèques", Cahiers de
l'Agriculture 1993; 2, 283-287.

Qiang Hu.
Productivity and photosynthetic efficiency of *Spirulina platensis* as affected by light intensity, algal density and
rate of mixing in a flat plate photobioreactor.
Journal of Applied Phycology 8, No 2 (1996)

Regunathan C.
Pigment deficiency correction in shrimp broodstock using *Spirulina* as a carotenoid source.
Aquaculture Nutrition 12, No 6 (2006)

Simpore J, Zongo F, Kabore F, Nikiema JB, Sia Dabogo J, Bere A, Musumeci S.
Essai de récupération des enfants malnutris VIH positifs et négatifs avec la spiruline et le misola à Ouagadougou
(Burkina Faso).
In: XIIth International Conference on AIDS and STDs in Africa, December 9-13, 2001, Ouagadougou, Abstract
book, p. 264, No. 12PT2-124.

Gurbaksh Singh, Vikas S. Chauhan, V. Ramamurthy
Kraft black liquor for improving the productivity of *Spirulina* biomass.
Biotechnology Letters 17(7):771 (1995)

Slotton DG, Goldman CR, Franke A.
Commercially grown spirulina found to contain low levels of mercury and lead.
Nutr Rep Intl 1989;40:1165.

Takeuchi T.
Effect on the growth and body composition of juvenile tilapia *Oreochromis niloticus* fed raw *Spirulina*.
Fisheries Science 68, No 1 (2002)....

Tomaselli L, Torzillo G, Giovannetti L, Pushparaj B, Bocci F, Tredici M, Papuzzo T, Balloni W, Materassi R.
Recent research on *Spirulina* in Italy.
Hydrobiologia 151-152, No 1 (1987) 79-82.

Tredici MR, Papuzzo T, Tomaselli L.
Outdoor mass culture of *Spirulina maxima* in sea-water.
Appl Microbiol Biotech 24 (1986) 47-50.

Warr SRC, Reed RH, Chudek JA, Foster R, Stewart WDP.
Osmotic adjustment in *Spirulina platensis*.
Planta 163 (1985) 424-429.

Wu B, Tseng CK, Xiang W.

Large-scale cultivation of *Spirulina* in seawater based culture medium.
Bot Mar 36 (1993) 99-102.

Articles scientifiques recensés à partir de 2007:

8) Au sujet des notices associées aux articles scientifiques

Les notices des articles scientifiques recensés ci-après contiennent si possible :

Un numéro d'identification PMID qui est celui mentionné par la rubrique Pub Med lorsque l'article a été recensé par la base de donnée MEDLINE. Dans le cas contraire, on indique alors un « pas » à la place du nombre attendu.

Comme nous gardons toujours l'espoir d'acquérir tôt ou tard sous un format PDF les documents retenus comme scientifiquement intéressants mais qui ne sont pas encore en notre possession, nous leurs réservons déjà, sous la rubrique « pdf : », un nom de fichier fait du nom du premier auteur complété de la première initiale de son prénom suivie de l'année de parution du document. Si le nom de fichier qui résulte de cette procédure est déjà attribué, on ajoute un « a » directement après l'année, puis un « b » si nécessaire, etc. Tant que nous ne disposons pas du document en question, on ajoute un PAS à la suite du nom de fichier réservé.

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Les mots-clés de la rubrique « mots-clés article : » sont ceux fournis par les auteurs mêmes du document, lorsqu'il y en a. Le symbole \$ signale le début du mot-clé, ou le début de la chaîne de mots que les auteurs ont retenu comme définissant « un » mot-clé plus spécifique.

Les mots-clés de la rubrique « mots-clés Antenna : » sont choisis par les collaborateurs d'Antenna Technologies. Les symboles £ ou ** jouent ici le rôle que \$ joue dans le paragraphe précédent.

Sous la rubrique « résumé : », on y trouve en général un résumé, qu'il soit fourni par MEDLINE, ou alors du résumé extrait du document lui-même lorsqu'il y en a un. La place disponible sous « résumé » sert également à faire figurer toute indication pertinente comme la langue originale de l'article ou toute autre considération qui a paru opportune.

Au final, une notice se présente typiquement sous l'aspect suivant :

428: Korsunskii OF, Smolygina LD, Laurinavichene TV, Gogotov IN.

[Low potential c-type cytochrome of *Thiocapsa roseopersicina*].

Biokhimiia. 1982 Mar;47(3):355-60.

PMID: 6280782

pdf: Korsunskii O 1982.pdf PAS

mots-clés article:

mots-clés Antenna: £spirulina-platensis, £spirulina-maxima.

résumé: article en russe

The low potential c-type cytochrome from the phototrophic purple sulphur bacterium *Thiocapsa roseopersicina*, strain BBS was isolated in electrophoretically homogeneous state. The bulk of the cytochrome (approximately 90%) after disruption of the cells remained in the membrane fraction. The absorption spectrum of the cytochrome was characterized by the maxima at 420, 523 and 552 nm in the reduced state and at 408 nm in the oxidized one. The cytochrome interacted with CO in the reduced state. The molecular weight of the cytochrome is 50 000. The cytochrome contains great amounts of phenylalanine, leucine, valine, aspartic and glutamic acids and can be reduced by dithionite but not by cysteine, sulfide or ascorbate. Besides, the cytochrome can also be reduced by NAD(P)H in the presence of NAD(P)-reductases of *T. roseopersicina*, when ferredoxin of *Spirulina platensis* or benzyl viologen are added to the reaction mixture. The cytochrome can act as an electron donor (acceptor) for *T. roseopersicina* hydrogenase.

9) Articles scientifiques recensés après 2006

Il s'agit bien ici d'articles dont nous avons pris connaissance après 2006. Certains de ces articles ont pu être publiés de nombreuses années avant, mais nous semblent mériter des notices plus complètes que celles de la section 7 ("additionnelle").

En raison de l'explosion du nombre de publications consacrées à la spiruline, ou utilisant l'*Arthrospira platensis* comme organisme modèle, les listes d'articles scientifiques que nous élaborons n'ont pas de prétention à l'exhaustivité.

Abed RM, Zein B, Al-Thukair A, de Beer D.

Phylogenetic diversity and activity of aerobic heterotrophic bacteria from a hypersaline oil-polluted microbial mat.

Syst Appl Microbiol 30, No 4 (2007) 319-330.

PMID: 17056222

Abed R 2007.pdf

mots-clés article: \$Cyanobacterial-mats; \$Aerobic-heterotrophic-bacteria; \$Arabian-Gulf; \$Carbon-cycle; \$Oil-biodegradation; \$16S-rDNA-cloning; \$Cultivation; \$Bacterial-diversity.

mots-clés Antenna: £££, £££.

résumé:

The diversity and function of aerobic heterotrophic bacteria (AHB) in cyanobacterial mats have been largely overlooked. We used culture-dependent and molecular techniques to explore the species diversity, degradative capacities and functional guilds of AHB in the photic layer (2mm) of an oil-polluted microbial mat from Saudi Arabia. Enrichment isolation was carried out at different salinities (5% and 12%) and temperatures (28 and 45 degrees C) and on various substrates (acetate, glycolate, Spirulina extract and crude oils). Counts of most probable number showed a numerical abundance of AHB in the range of $1.15-8.13 \times 10^6$ cells g^{-1} and suggested the presence of halotolerant and thermotolerant populations. Most of the 16S rRNA sequences of the obtained clones and isolates were phylogenetically affiliated to the groups Gammaproteobacteria, Bacteroidetes and Alphaproteobacteria. Groups like Deltaproteobacteria, Verrucomicrobia, Planctomycetes, Spirochaetes, Acidobacteria and Deinococcus-Thermus were only detected by cloning. The strains isolated on acetate and glycolate belonged to the genera Marinobacter, Halomonas, Roseobacter and Rhodobacter whereas the strains enriched on crude oil belonged to Marinobacter and Alcanivorax. Members of the Bacteroidetes group were only enriched on Spirulina extract indicating their specialization in the degradation of cyanobacterial dead cells. The substrate spectra of representative strains showed the ability of all AHB to metabolize cyanobacterial photosynthetic and fermentation products. However, the unique in situ conditions of the mat apparently favored the enrichment of versatile strains that grew on both the cyanobacterial exudates and the hydrocarbons. We conclude that AHB in cyanobacterial mats represent a diverse community that plays an important role in carbon-cycling within microbial mats.

Kuhad A, Tirkey N, Pikhwal S, Chopra K.

Renoprotective effect of *Spirulina fusiformis* on cisplatin-Induced oxidative stress and renal dysfunction in rats.

Renal Failure 28, No 3 (2006) 247-254.

PMID: 16703798

mots-clés article: \$Cisplatin; \$Spirulina-fusiformis; \$oxidative-stress; \$nitrosative-stress; \$acute-renal-failure.

mots-clés Antenna: £spirulina-fusiformis.

résumé:

Cisplatin is an effective chemotherapeutic agent used in the treatment of a wide array of both pediatric and adult malignancies. Dose-dependent and cumulative nephrotoxicity is the major toxicity of this compound, sometimes requiring a reduction in dose or discontinuation of treatment. Recent evidences have implicated oxidative and nitrosative stress in cisplatin-induced nephrotoxicity. *Spirulina fusiformis*, blue-green algae, is claimed to be a potential antioxidant. The present study was designed

to explore the renoprotective potential of *Spirulina fusiformis* against cisplatin-induced oxidative stress and renal dysfunction. *Spirulina fusiformis* (500,1000,1500 mg/kg-1 p.o.) was administered 2 days before and until 3 days after cisplatin challenge (5 mg/kg-1 i.p.). Renal injury was assessed by measuring serum creatinine, blood urea nitrogen, creatinine and urea clearance, and serum nitrite levels. Renal oxidative stress was determined by renal TBARS levels, reduced glutathione levels, and by enzymatic activity of superoxide dismutase and catalase. A single dose of cisplatin produced marked renal oxidative and nitrosative stress and significantly deranged renal functions. Chronic *Spirulina fusiformis* treatment significantly and dose-dependently restored renal functions, reduced lipid peroxidation, and enhanced reduced glutathione levels, superoxide dismutase, and catalase activities. The results of the present study clearly demonstrate the pivotal role of reactive oxygen species and their relation to renal dysfunction and point to the therapeutic potential of *Spirulina fusiformis* in cisplatin-induced nephrotoxicity.

Baicus C, Baicus A.

Spirulina did not ameliorate idiopathic chronic fatigue in four N-of-1 randomized controlled trials.

Phytother Res 21, No 6 (2007) 570-573.

PMID: 17335116

pdf: Baicus C 2007.pdf

mots-clés article: \$*Spirulina*; \$N-of-1 trial; \$single-case research; \$randomization; \$double-blind.

mots-clés Antenna: £*Spirulina-platensis*, £f£.

résumé:

Idiopathic chronic fatigue is an exclusion diagnosis established when no chronic disease is found. *Spirulina platensis* is an alga with a rich content of proteins, vitamins, minerals and amino acids and is considered as a bioactive additive with multiple effects, among them being effects against fatigue. However, despite the worldwide utilization of *Spirulina*, there are only a few quality studies with it and none concerning fatigue. The N-of-1 randomized trials are made on one patient, and by this kind of study the efficacy of a treatment on that particular patient can be assessed. A series of four N-of-1 double-blind, randomized trials were performed on four physicians who complained of chronic fatigue. Each patient was his own control and received three pairs of treatments comprising 4 weeks of spirulina and 4 weeks of placebo. *Spirulina platensis* was administered in a dose of 3 g/day. For each pair, the order of treatments was randomized. Outcome measures were severity of fatigue measured on a 10-point scale. The scores of fatigue were not significantly different between spirulina and placebo. *Spirulina* administered in a dose of 3 g/day did not ameliorate fatigue more than the placebo in any of the four subjects, and possibly it has no effect on chronic fatigue.

Beccera G, Desmorieux H, Briançon S, Khenniche S, Albiol J.

Culture et séchage de la spiruline par atomisation.

In: Récents Progrès en Génie des Procédés, Volume 92 (2005).

PMID: pas

pdf: Beccera G 2005.pdf

mots-clés article: \$Séchage, \$atomisation, \$spiruline, \$photobioréacteur.

mots-clés Antenna: £££.

résumé:

La spiruline est un microorganisme très riche en éléments nutritionnels et particulièrement en acides aminés essentiels, ce qui lui confère de nombreuses possibilités d'application, notamment nutritionnelles et diététiques. La plus grande partie de la spiruline commercialisée est séchée par atomisation. Une première approche de ce procédé, mal connu dans le cas de la spiruline, a été réalisée dans ce travail. La culture de la spiruline a été menée dans un photobioréacteur batch cylindrique vertical, à air lift avec une énergie lumineuse croissante de 30 à 100W/m², avec régulation du pH et de la température. Ce travail présente la conception du réacteur ainsi que le suivi de la culture. Le séchage a été étudié par l'influence des paramètres opératoires par la méthode des plans d'expérience. Les résultats montrent que la température d'entrée de l'air de séchage est un paramètre prépondérant pour garantir les caractéristiques de la spiruline. Il est préférable d'abaisser cette température et d'augmenter les débits d'alimentation et d'air séchant. La granulométrie des poudres

sèches obtenues montre des agglomérats constitués de filaments en grande partie fragmentés, avec une taille moyenne mesurée par le demi périmètre des filaments variant de 20 à 50 microns.

Briend A, Ferguson E, Darmon N.

Local food price analysis by linear programming: A new approach to assess the economic value of fortified food supplements.

Food and Nutrition Bulletin 22, No 2 (2001) 184-189.

PMID: pas

pdf: Briend A 2001.pdf

mots-clés article:

mots-clés Antenna: £spirulina.

résumé:

Linear programming can be applied to identify a nutritionally adequate diet of the lowest cost, since price and nutrient contents are linearly related to food weight. Most computer spreadsheets now include an easy-to-use solver function that is suitable for this purpose. This approach can also be used to estimate the effect of introducing a food supplement on the minimal cost required to provide a nutritionally adequate diet. It can also provide an estimate of the expenses saved by families in relation to the sums spent by the donor after the distribution of a food supplement. This method is illustrated by comparing the economic value of two food supplements, a traditional blended flour and a nutrient-dense spread (a "foodlet") in rural Chad. The limitations of this approach and the need to interpret its findings carefully in relation to field observations are discussed.

Chamorro G, Perez-Albiter M, Serrano-Garcia N, Mares-Samano JJ, Rojas P.

Spirulina maxima pretreatment partially protects against 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine neurotoxicity.

Nutr Neurosci. 2006 Oct-Dec;9(5-6):207-12.

PMID: 17263087

pdf: Chamorro G 2007.pdf PAS

mots-clés article:

mots-clés Antenna: £££, £f£.

résumé:

Spirulina is an alga that has a high nutritional value and some of its biological activities are attributed to the presence of antioxidants. Oxidative stress is involved in Parkinson's disease. This study aims at evaluating the neuroprotective role of *Spirulina maxima* (Sp.) against 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) neurotoxicity, used as a model of Parkinson's disease. Ninety-six male C-57 black mice were pretreated with *Spirulina* for 14 days (25, 50, 100, 150 or 200 mg/kg, oral), followed by three MPTP administrations (30 mg/kg, intraperitoneal, i.p.). Animals were given Sp. for 8 additional days. After the treatment, the striatal dopamine (DA) content was analysed by high performance liquid chromatography, and lipid peroxidation was studied as an index of oxidative stress. Sp. pretreatment at 150 mg/kg partially prevented (51%) the DA-depleting effect of MPTP and blocked oxidative stress. *Spirulina* partially prevents MPTP neurotoxicity and oxidative stress, suggesting it could be a possible alternative in experimental therapy.

de Morais MG, Costa JA.

Biofixation of carbon dioxide by *Spirulina* sp. and *Scenedesmus obliquus* cultivated in a three-stage serial tubular photobioreactor.

J Biotechnol. 2007 May 1;129(3):439-45.

PMID: 17320994

pdf: de Morais M 2007.pdf

mots-clés article: \$Carbon-dioxide-fixation; \$Chlorophyta; \$Cyanobacteria; \$Global-warming;

\$Greenhouse-gases; \$Microalgae.

mots-clés Antenna: £££, £spirulina-platensis, £f£.

résumé:

The increase in the concentration of atmospheric carbon dioxide is considered to be one of the main causes of global warming. As estimated by the Intergovernmental Panel on Climate Change (IPCC) criteria, about 10-15% of the gases emitted from the combustion coal being in the form of carbon dioxide. Microalgae and cyanobacteria can contribute to the reduction of atmospheric carbon dioxide by using this gas as carbon source. We cultivated the *Scenedesmus obliquus* and *Spirulina* sp. at 30 degrees C in a temperature-controlled three-stage serial tubular photobioreactor and determined the resistance of these organisms to limitation and excess of carbon dioxide and the capacity of the system to fix this greenhouse gas. After 5 days of cultivation under conditions of carbon limitation both organisms showed cell death. *Spirulina* sp. presenting better results for all parameters than *S. obliquus*. For *Spirulina* sp. the maximum specific growth rate and maximum productivity was 0.44d⁻¹, 0.22gL⁻¹d⁻¹, both with 6% (v/v) carbon dioxide and maximum cellular concentration was 3.50gL⁻¹ with 12% (v/v) carbon dioxide. Maximum daily carbon dioxide biofixation was 53.29% for 6% (v/v) carbon dioxide and 45.61% for 12% carbon dioxide to *Spirulina* sp. corresponding values for *S. obliquus* being 28.08% for 6% (v/v) carbon dioxide and 13.56% for 12% (v/v) carbon dioxide. The highest mean carbon dioxide fixation rates value was 37.9% to *Spirulina* sp. in the 6% carbon dioxide runs.

Doke J, Raman K, Ghole VS.

Treatment of anaerobically digested wastewater using *Spirulina* sp.
International Journal on Algae 6, No 4 (2004).

PMID: pas

pdf: Doke J 2004.pdf PAS

mots-clés article: \$

mots-clés Antenna: £££.

résumé:

Spirulina can be cultivated in wastewater to improve water quality. Batch studies were conducted for the treatment of anaerobically digested wastewater (ADW) by using *Spirulina* sp. This study examines the possibility of using *Spirulina* sp. to remove COD, BOD, heavy metals, and bacteria from wastewater. The results showed that the growth of *Spirulina* in ADW was poor, but can be enhanced by the addition of NaHCO₃ - up to 4% to 5% as a carbon source, which gives maximum productivity at 1.4 mg/L. It also showed the removal of COD up to 80%, BOD up to 95%, and cations such as potassium 98%, calcium 96%, magnesium 95%, and sodium 90%. Anions such as chloride 51%, nitrate 52%, phosphate 76% and sulphate up to 60% were removed from effluent heavy metals, e.g., Ni was removed up to 57% and Pb up to 97% the total bacterial count was reduced up to 75% in the growth period of eight days.

Doshi H, Ray A, Kothari IL.
Biosorption of cadmium by live and dead *Spirulina*: IR spectroscopic, kinetics, and SEM studies.
Curr Microbiol 54, No 3 (2007) 213-218.
PMID: 17294329
pdf: Doshi H 2007.pdf
mots-clés article:
mots-clés Antenna: £££, £££.
résumé:

Cadmium is an important environmental pollutant and a potent toxicant to bacteria, algae, and fungi. Mechanisms of Cd(+2) toxicity and resistance are variable, depending on the organism. The present work reports the use of live and dead *Spirulina* sp. for sorption of Cd(+2). This investigation shows that this biomass takes up substantial amount of Cd(+2) ions. IR spectroscopic study, kinetics models, Langmuir & Freundlich adsorption isotherms, scanning electron microscopic analysis of *Spirulina* sp., and the *Spirulina* sp. treated with different metal ions have been employed to understand the sorption mechanism. Infrared spectra of live *Spirulina* treated with Cd(+2) ions for different lengths of time have been taken to understand the time dependency of metal interaction.

Edwards P.
Food potential of aquatic macrophytes.
ICLARM studies and Reviews 5 (1980) 54 pp.
PMID: pas
pdf: Edwards P 1980.pdf PAS
mots-clés article:
mots-clés Antenna:
résumé:

The present paper is an attempt to review critically the various aspects in which aquatic macrophytes may be used in food production. The term "weed", to refer to aquatic macrophytes, has been purposefully avoided as far as possible, since, as pointed out by certain authors, involving them in the food production process may be a far more effective control method than their mere destruction. Furthermore, several species have considerable potential in their own right and warrant detailed study. Indeed, considerable benefit would accrue to the field of aquaculture in general, if botanical aspects of the subject were given due attention.

The initial version of this paper resulted from a request to submit a manuscript to the ICLARM-SEARCA Conference on Integrated Agriculture-Aquaculture Farming Systems, held in Manila, Philippines, 6-9 August 1979.

I was requested to prepare a review paper on nutrient reclamation from manure-loaded ponds, with an emphasis on the production of crops of aquatic macrophytes for animal feed and/or human consumption. I soon found the initial title too restrictive, mainly because of sparse data in the literature on this topic, but also because of difficulty in delimiting the original topic.

It soon became apparent that aquatic macrophytes may be involved in a plethora of complex interactions in food production and difficulty was experienced in organizing the available data in a readily digestible form.

The intention has been to indicate the role of aquatic macrophytes in food production, and I hope that the research recommendations made in the summary of the text may be of use in focusing future studies on these underexploited plants.

Gitelson AA, Laorawat S, Keydan GP, Vonshak A.
Optical properties of dense algal cultures outdoors and its application to remote estimation of biomass and pigment concentration in *Spirulina platensis* (cyanobacteria).
J Phycol 31 (1995) 828-834.
PMID: pas
pdf: Gitelson A 1995.pdf
mots-clés article: \$attenuation-coefficient, \$biomass, \$chlorophyll, \$Cyanobacteria, \$dense-algal-cultures, \$phycocyanin, \$remote-sensing, \$Spirulina-platensis.

mots-clés Antenna: *Spirulina-platensis*, *£B£*.
résumé:

Reflectance and vertical attenuation coefficient spectra from 400 to 1100 nm were investigated in detail on dense algal cultures of *Spirulina* in order to create algorithms for remote estimation of pigment and biomass concentration. Reflectance and the vertical attenuation coefficients were compared with biomass and pigment concentration in outdoor algal cultures. For assessing biomass concentration, the sum of reflectance above the base line from 670 to 950 nm was used. This allows the estimation of biomass with an error of less than 0.06 g L⁻¹. For chlorophyll a and phycocyanin estimation, vertical attenuation coefficients at the wavelengths 440 nm (or 676 nm) and 624 nm, respectively, were employed. The developed algorithms were tested by using independent data sets in the range of chlorophyll a from 0.2 to 20 mg L⁻¹ and biomass from 0.15 to 1.1 g L⁻¹. An error of pigment estimation of less than 0.80 mg·L⁻¹ was achieved. The potential use of the algorithms in algal biotechnology is further discussed.

Guo N, Zhang X, Lu Y, Song X.

Analysis on the factors affecting start-up intensity in the upstream sequence of phycocyanin beta subunit gene from *Arthrospira platensis* by site-directed mutagenesis.

Biotechnol Lett 29, No 3 (2007) 459-464.

PMID: 17242853

pdf: Guo N 2007.pdf

mots-clés article: *Arthrospira-platensis*, *ScpcB*, *Green-fluorescent-protein*, *Site-directed-mutagenesis*.

mots-clés Antenna: *£££*, *£f£*.

résumé:

Six promoters in the 419 bp upstream sequence of the phycocyanin beta subunit gene of *Arthrospira platensis* FACHB341 have been previously cloned. Site-directed mutagenesis has now been used to introduce mutations in the -10 and -35 boxes of promoter 3, -10 box of promoter 4, and -35 box of promoter 6. The expression level of green fluorescent protein gene was measured by flow cytometry. Results showed that the effects of site-directed mutagenesis in different promoters were dissimilar: some increased and some declined.

Hao G, Chen S, Zhu S, Yin H, Dai J, Cao Y.

[Analysis of monosaccharides and uronic acids in polysaccharides by pre-column derivatization with p-aminobenzoic acid and high performance liquid chromatography].

Se Pu. 2007 Jan;25(1):75-9.

PMID: 17432580

pdf: Hao G 2007.pdf PAS

mots-clés article:

mots-clés Antenna: *£££*, *£f£*.

résumé: en chinois

An ion-pair reversed-phase high performance liquid chromatographic (RP-HPLC) method for the simultaneous determination of carbohydrate and uronic acids was developed. p-Aminobenzoic acid (p-AMBA) was used for pre-column derivatization of the analytes, enabling fluorescence ($\lambda_{ex} = 313$ nm, $\lambda_{em} = 358$ nm) or ultraviolet (UV at 303 nm) detection. Reaction conditions such as reaction temperature and reaction time were optimized. Atlantis dC18 column with hydrophilic end capping was selected for the separation of derivatives. Effects of mobile phase compositions such as ion pairs and their concentrations and pH on the retention behaviors and separation results of 9 monosaccharides and 2 uronic acids were investigated. Derivatives of fructose, galactose, glucose, mannose, xylose, arabinose, ribose, galacturonic acid, fucose, glucuronic acid and rhamnose were separated within 42 min, applying tetrabutyl ammonium hydrogen bisulfate (TBAHSO₄) as the ion pair reagent. The detection limits were between 3.38×10^{-8} mol/L and 176×10^{-8} mol/L for fluorescence detection and between 2.55×10^{-7} mol/L and 13.4×10^{-7} mol/L for UV detection. Good linearities were obtained with correlation coefficients (r^2) above 0.99. The relative standard

deviations (RSDs) of the peak area of the derivatives in 12 - 51 h after derivatization were from 2.5% to 3.9%. This method has been applied for the determination of mono-/disaccharides and uronic acids in spirulina polysaccharide after dissolved in trifluoroacetic acid solution (2 mol/L). The results showed this method is suitable for the analysis of monosaccharide compositions in polysaccharides.

Hayashi K, Hayashi T, Morita N, Kojima I.

An extract from *Spirulina platensis* is a selective inhibitor of herpes simplex virus type 1 penetration into HeLa cells.

Phytotherapy Research 7 (1993) 76-80.

PMID: pas

pdf: Hayashi K 1993.pdf PAS ou papier

mots-clés article: \$Spirulina-platensis, \$herpes-simplex-virus-type-1, \$antiviral-activity, \$virus-penetration, \$animal-experiment.

mots-clés Antenna: £spirulina-platensis.

résumé:

The water-soluble extract of *Spirulina platensis* achieved a dose-dependent inhibition of the replication of herpes simplex virus type 1 (HSV-1) in HeLa cells within the concentration range of 0.08-50 mg/mL. This extract proved to have no virucidal activity and did not interfere with adsorption to host cells. However, the extract affected viral penetration in a dose-dependent manner. At 1 mg/mL the extract was found to inhibit virus-specific protein synthesis without suppressing host cell protein synthesis if added to the cells 3 h before infection. In an in vivo experiment food containing the extract effectively prolonged the survival time of infected hamsters at doses of 100 and 500 mg/kg per day.

He HL, Chen XL, Wu H, Sun CY, Zhang YZ, Zhou BC.
High throughput and rapid screening of marine protein hydrolysates enriched in peptides with angiotensin-I-converting enzyme inhibitory activity by capillary electrophoresis.
Bioresour Technol. 2007 Feb 19; [Epub ahead of print].
PMID: 17317156
pdf: He H 2007.pdf
mots-clés article:
mots-clés Antenna: £££, £££.
résumé:

Twelve kinds of marine protein materials, including fish, shrimp, seashell, algae and seafood wastes were selected for the hydrolysis using four different proteases. The IC(50) values for angiotensin-converting enzyme (ACE) inhibitory activity of 48 hydrolysates were rapidly determined by capillary electrophoresis (CE). The values ranged from 0.17 to 501.7mg/ml, and were affected by both the marine protein resources and the selected proteases. Hydrolysates of the lowest IC(50) values were from shrimp (*Acetes chinensis*), shark meat, mackerel bone, *Polysiphonia urceolata* and *Spirulina platensis*, indicating these five kinds of marine food proteins contained beneficial materials for the production of ACE inhibitory peptides by proteolysis. The hydrolysates obtained using proteases Protamex and SM98011 had lower IC(50) values, showing these two proteases were superior to others. The CE method achieved the same sensitivity as the high performance liquid chromatography (HPLC) method. However, the CE method was faster and, as a result, more economical. Therefore, CE had potential for rapid screening of marine protein hydrolysates enriched in ACE inhibitory peptides.

Herrero M, Vicente MJ, Cifuentes A, Ibanez E.
Characterization by high-performance liquid chromatography/electrospray ionization quadrupole time-of-flight mass spectrometry of the lipid fraction of *Spirulina platensis* pressurized ethanol extract.
Rapid Commun Mass Spectrom. 2007;21(11):1729-38.
PMID: 17487827
pdf: Herrero M 2007.pdf
mots-clés article:
mots-clés Antenna: £spirulina-platensis.
résumé:

Microalgae have been suggested as a potential source for new functional ingredients, making possible the development of new functional foods from natural origin. Among the natural ingredients, polyunsaturated fatty acids (PUFAs) have generally been identified as an interesting group of compounds with biological activity, mainly related to their anti-inflammatory properties. In this regard, the use of environmentally friendly extraction procedures (e.g. pressurized liquid extraction, PLE) to obtain such natural ingredients is also becoming necessary. In this work, an exhaustive characterization of the lipid fraction of a pressurized ethanolic extract of the microalga *Spirulina platensis* is carried out. To achieve this objective high-performance liquid chromatography (HPLC) coupled to quadrupole time-of-flight mass spectrometry (QTOF-MS) is employed. The use of the QTOF analyzer allows the selection and isolation of precursor ions as well as providing the high efficiency, sensitivity and mass accuracy required. By means of this powerful hyphenated technique, it was possible to identify several polar lipids in an extract of *S. platensis* (some of them, to our knowledge, described for the first time in this work), including four free fatty acids, four monogalactosyl monoacylglycerols, three phosphatidylglycerols and two sulfoquinovosyl diacylglycerols.

Huang Z, Zheng W.
[Antagonistic effects of Se-rich *Spirulina platensis* on rat liver fibrosis].
Wei Sheng Yan Jiu. 2007 Jan;36(1):34-6.
PMID: 17424844

pdf: Huang Z 2007.pdf PAS
mots-clés article:
mots-clés Antenna: £££, £f£.
résumé: en chinois

OBJECTIVE: Antagonistic effects of supplement of Se-rich *Spirulina platensis* (Se-SP) on hepatocirrhosis were investigated with the rat model of liver fibrosis induced by intraperitoneal injection 3% thioacetamide (TAA).

METHODS: Parameters of routine liver function, content of malondialdehyde (MDA) and activities of glutathione peroxidase (GPx) and superoxide dismutase (SOD) in rat serum were determined by colorimetry. Content of selenium (Se) was measured by DAN fluorometry method and hyaluronic acid (HA) was detected by radio-immunoassay. Liver fibrosis was diagnosed by HE staining and relative contents of collagen (RCC) were estimated by Masson's trichrome staining.

RESULTS: Parameters of liver function in Se-SP group were most recovered in all protective groups. Compared with the model groups, contents of MDA and HA were lower, whereas activities of GPx and SOD were higher ($P < 0.05$) in rats serum of Se-SP group. The RCC in rats liver of Se-SP group were lower than those of the model groups, where the liver fibrosis were identified dominantly to degree I according to pathological diagnosis. Moreover, Se content in rats serum had positive correlation ($r = 0.645$) with activity of GPx while a negative correlation ($r = 0.675$) with MDA level.

CONCLUSION: The results indicated that Se-SP have detectable antagonistic effects to liver fibrosis, and suggested that enhancement of antioxidation level and liver reserve function might be associated with these effects.

Karkos PD, Leong SC, Arya AK, Papouliakos SM, Apostolidou MT, Issing WJ.
'Complementary ENT': a systematic review of commonly used supplements.
J Laryngol Otol. 2006 Nov 24;:1-4 [Epub ahead of print].

PMID: 17125579
pdf: Karkos P 2007.pdf PAS
mots-clés article:
mots-clés Antenna: £££, £f£.
résumé:

Objective: To assess the evidence surrounding the use of certain complementary supplements in otolaryngology. We specifically focussed on four commonly used supplements: spirulina, Ginkgo biloba, Vertigoheel(R) and nutritional supplements (cod liver oil, multivitamins and pineapple enzyme).

Materials and methods: A systematic review of the English and foreign language literature. Inclusion criteria: in vivo human studies. Exclusion criteria: animal trials, in vitro studies and case reports. We also excluded other forms of 'alternative medicine' such as reflexology, acupuncture and other homeopathic remedies.

Results: Lack of common outcome measures prevented a formal meta-analysis. Three studies on the effects of spirulina in allergy, rhinitis and immunomodulation were found. One was a double-blind, placebo, randomised, controlled trial (RCT) of patients with allergic rhinitis, demonstrating positive effects in patients fed spirulina for 12 weeks. The other two studies, although non-randomised, also reported a positive role for spirulina in mucosal immunity. Regarding the use of Ginkgo biloba in tinnitus, a Cochrane review published in 2004 showed no evidence for this. The one double-blind, placebo-controlled trial that followed confirmed this finding. Regarding the use of Vertigoheel in vertigo, two double-blind RCTs and a meta-analysis were identified. The first RCT suggested that Vertigoheel was equally effective in reducing the severity, duration and frequency of vertigo compared with betahistine. The second RCT suggested that Vertigoheel was a suitable alternative to G biloba in the treatment of atherosclerosis-related vertigo. A meta-analysis of only four clinical trials confirms that Vertigoheel was equally effective compared with betahistine, G biloba and dimenhydrinate. Regarding multivitamins and sinusitis, two small paediatric pilot studies reported a positive response for chronic sinusitis and otitis media following a course of multivitamins and cod liver oil. Regarding bromelain (pineapple enzyme) and sinusitis, one randomised, multicentre trial including 116 children compared bromelain monotherapy to bromelain with standard therapy and standard therapy alone, for the

treatment of acute sinusitis. The bromelain monotherapy group showed a faster recovery compared with the other groups.

Conclusion: The positive effects of spirulina in allergic rhinitis and of Vertigoheel in vertigo are based on good levels of evidence, but larger trials are required. There is overwhelming evidence that *G biloba* may play no role in tinnitus. There is limited evidence for the use of multivitamins in sinus symptoms, and larger randomised trials are required.

Kim CJ, Jung YH, Oh HM.

Factors indicating culture status during cultivation of *Spirulina* (*Arthrospira*) *platensis*.

J Microbiol 2007 Apr;45(2):122-7.

PMID: 17483796

pdf: Kim C 2007.pdf

mots-clés article: \$coil-number, \$culture-status, \$cyanobacteria, \$floating-activity, \$Spirulina-platensis.

mots-clés Antenna: £Spirulina-platensis.

résumé:

Factors indicating culture status of two *Spirulina platensis* strains were monitored in a batch mode cultivation for 36 days. Changing mode in all factors showed a common turning point, indicating shift of cell or culture status. Mean biomass productivity was highly sustained until day 22, chlorophyll a concentration peaked on day 22, pH value was >12 on day 22, coil number was abruptly shortened on day 22, and floating activity was sustained at greater than 79% after day 22, indicating that day 22 is a criterion reflecting phase-transfer in cell physiology in a batch culture system. Many of these changes may have been caused by increased pH, suggesting that pH control is essential for mass production of *S. platensis*. Fluctuations in floating activity were likely induced by the number of cellular gas vacuoles. Consequently, coil number per trichome and floating activity of *S. platensis* could readily act as simple indicators for determination of culture status or harvesting time of cells.

Lee JB, Hayashi T, Hayashi K, Sankawa U.

Structural analysis of calcium spirulan (Ca-SP)-derived oligosaccharides using electrospray ionization mass spectrometry.

J Nat Prod 63 (2000) 136-138.

PMID: 10650096

pdf: Lee J 2000b.pdf

mots-clés article: \$

mots-clés Antenna: £££.

résumé:

Detailed structural analyses of calcium spirulan (CaSP)-derived oligosaccharides were performed by ESI-MS and collision-induced dissociation tandem mass spectrometry. This study indicates that Ca-SP

is composed of two types of disaccharide repeating units, O-rhamnosyl-acofriose and O-hexuronosyl-rhamnose (aldobiuronic acid).

Ma C, Ni X, Chi Z, Ma L, Gao L.

Purification and characterization of an alkaline protease from the marine yeast *Aureobasidium pullulans* for bioactive peptide production from different sources.

Mar Biotechnol 9, No 3 (2007) 343-351.

PMID: 17345116

pdf: Ma C 2007.pdf

mots-clés article: \$alkaline-protease, \$bioactive-peptides, \$characterization, \$marine-yeast, \$purification.

mots-clés Antenna: £*Arthrospira-platensis*, £f£.

résumé:

The extracellular alkaline protease in the supernatant of cell culture of the marine yeast *Aureobasidium pullulans* 10 was purified to homogeneity with a 2.1-fold increase in specific protease activity as compared to that in the supernatant by ammonium sulfate fractionation, gel filtration chromatography (Sephadextrade mark G-75), and anion-exchange chromatography (DEAE Sepharose Fast Flow). According to the sodium dodecyl sulfate-polyacrylamide gel electrophoresis data, the molecular mass of the purified enzyme was estimated to be 32.0 kDa. The optimal pH and temperature of the purified enzyme were 9.0 and 45 degrees C, respectively. The enzyme was activated by Cu(2+) (at a concentration of 1.0 mM) and Mn(2+) and inhibited by Hg(2+), Fe(2+), Fe(3+), Zn(2+), and Co(2+). The enzyme was strongly inhibited by phenylmethylsulfonyl fluoride, but weakly inhibited by EDTA, 1-10-phenanthroline, and iodoacetic acid. The K (m) and V (max) values of the purified enzyme for casein were 0.25 mg/ml and 0.0286 mumol/min/mg of protein, respectively. After digestion of shrimp protein, spirulina (*Arthrospira platensis*) protein, proteins of marine yeast strains N3C (*Yarrowia lipolytica*) and YA03a (*Hanseniaspora uvarum*), milk protein, and casein with the purified alkaline protease, angiotensin I converting enzyme (ACE) inhibitory activities of the resulting peptides reached 85.3%, 12.1%, 29.8%, 22.8%, 14.1%, and 15.5%, respectively, while the antioxidant activities of these were 52.1%, 54.6%, 25.1%, 35%, 12.5%, and 24.2%, respectively, indicating that ACE inhibitory activity of the resulting peptides from the shrimp protein and antioxidant activity of those produced from the spirulina protein were the highest, respectively. These results suggest that the bioactive peptides produced by digestion of the shrimp protein with the purified alkaline protease have potential applications in the food and pharmaceutical industries.

Madhyastha HK, Vatsala TM.

Pigment production in *Spirulina fusciformis* in different photophysical conditions.

Biomol Eng. 2007 Apr 19; [Epub ahead of print].

PMID: 17500033

pdf: Madhyastha H 2007.pdf PAS

mots-clés article:

mots-clés Antenna: £ *Spirulina fusciformis*.

résumé:

The present investigation makes a comparative investigation of individual light source on the different commercially important pigments in *Spirulina fusciformis* in photobioreactor culture condition. Continuous culture system was carried out throughout the experimental condition. Initially, seed culture, corresponding to 0.2g/L on dry weight basis was cultivated in Zarrouks medium with different colored light source in reactor. Maximum daily biomass productivity, 0.8g/L, 0.75g/L and 0.69g/L in white light (WL), blue light (BL) and green light (GL), respectively, conditions was noticed. Pigment content during WL treatment showed the highest accumulation (5.5µg/mL) of chlorophyll whereas, other pigments roughly remained constant without much change, implying WL intensity is better for chlorophyll synthesis. On the other hand, chlorophyll and phycocyanin content gradually increased up to 7µg/mL and 2mg/mL, respectively, at BL intensity. The response to GL was negative to all pigments studied except for phycocyanin; in this case a highest production (2.5mg/mL) was seen during 18 days experimental period. Additionally, when yellow light (YL) treatment experiments were conducted, the rate of production gradually decreased from 6th day onward in all pigments demonstrating the photobleaching effect of YL. The average rate of pigments production did not show

significant accumulation in red light (RL) light treatment except phycoerythrin which showed an increasing trend of production. It is worth to mention here that higher light intensity is better for production of phycocyanin and phycoerythrin in *Spirulina*.

Malpica Sanchez A, Castro Barrera T, Sandoval Trujillo H, Castro Mejia J, De Lara Andrade R, Castro Mejia G.

[Composition of fat acids in three Mexican populations of *Artemia franciscana* from epicontinental waters].

Rev Biol Trop. 2004 Mar;52(1):297-300.

PMID: 17357427

pdf: Malpica Sanchez A 2007.pdf PAS

mots-clés article:

mots-clés Antenna: £££, £f£.

résumé: en espagnol

In this paper is presented the percentage of fatty acids composition of three *Artemia franciscana* Mexican populations of epicontinental waters; two are from natural environments (Coahuila and San Luis Potosí) and one (Texcoco) is a culture fed with *Spirulina*. Determination of fatty acids composition in each population, was performed by extraction of total lipid by the soxhlet method and the fatty acids methyl esters were determined by gas chromatography. The results show that *Artemia* of Texcoco contains the six fatty acids recommended for the culture of fish and crustaceans (16:0; 16:1; 18:1; 18:2w6; 18:3w3 and 20:5w3); *Artemia* from San Luis Potosí showed the poorest content in these acids and *Artemia* from Coahuila, although it showed a wide profile, it lacks the linolenic acid. When comparing results among the three populations with ecological data that have been published, it can be pointed out that the environment is decisive for this crustacean; *Artemia* from Texcoco fed with *Spirulina* showed the largest variety of fatty acids; the other two populations are wild, and lives in different habitats, *Artemia* of Coahuila is found in waters that are rich in sulfates and *Artemia* of San Luis Potosí lives in evaporation saltern ponds, built with stone blocks and therefore with scarce phytoplankton growth. Both *Artemia* populations showed deficiencies in essential fatty acids, mainly the last one.

Nefedova EL, Levinskikh MA, Sychev VN.

[Parametric control of the yield characteristics and species composition dynamics of algal poly-culture].

Aviakosm Ekolog Med. 2006 Sep-Oct;40(5):45-9.

PMID: 17357628

pdf: Nefedova E 2006.pdf PAS

mots-clés article:

mots-clés Antenna: £££, £f£.

résumé: en russe

There are several experimental models of biological life support systems (BLSS) designed to incorporate a *Chlorella* pool. These BLSS can be optimized if populated by algal associations that could take up more functions within the closed cycling system than a single alga species. Introduction of a *Spirulina* and *Chlamydomonas* poly-culture with differing in gas exchange and biochemical composition resulted in a tighter closure of linkages within the system. The factors determining the size of a species population in intensive continuous poly-cultures are, first and foremost, pH and suspension flow rate. Experimental testing of this supposition brought us to the conclusion that parametric control of alga productivity and species composition dynamics makes it possible to create a steady intensive poly-culture as part of the LSS for humans. Flow rate and pH can be the parameters for control of the *Spirulina* and *Chlamydomonas* populations during continuous cultivation of this poly-culture.

Pandi M, Shashirekha V, Swamy M.

Bioabsorption of chromium from retan chrome liquor by cyanobacteria.
Microbiol Res. 2007 May 11; [Epub ahead of print].

PMID: 17499983

pdf : Pandi M 2007.pdf PAS

mots-clés article: \$Bioabsorption; \$Retan-liquor; \$Chromium-uptake; \$Spirulina.

mots-clés Antenna: £Spirulina-fusifformis.

résumé:

The bioaccumulation of chromium from retan chrome liquor by *Spirulina fusiformis* was investigated under laboratory as well as field conditions. At the optimal conditions, metal ion uptake increased with initial metal ion concentration up to 300mg/l. The effect on various physico-chemical parameters like total solids (TS), total dissolved solids (TDS), total suspended solids (TSS), chlorides, sulphates, phenols, biochemical oxygen demand (BOD) and chemical oxygen demand (COD) and biochemical studies related to biomass, chlorophyll-a and protein were also carried out. The present study indicates that *S. fusiformis* is very effective in removal of chromium (93-99%) besides removing other toxicants from retan chrome liquor. The sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) and FTIR studies indicate the interaction/complexation between Cr and alga. The mechanism involved in bioaccumulation of chromium is also discussed. The process when upgraded can be applied for detoxification of tannery effluents.

Popa K, Cecal A, Kucureanu DI, Nemtsoi G, Simon D, Rudic VF, Cepoi LE, Gulea AP.
Removal of UO_2^{2+} ions using *Spirulina platensis* (Nordst.) Geitl. as a biopurifier.
Int J on Algae 6, No 1 (2004) 74-81.

PMID: pas

pdf: Popa K 2004.pdf PAS

mots-clés article:

mots-clés Antenna: £Spirulina-platensis, £££.

résumé:

The methods of radiochemistry, cyclic voltammetry and electron scanning microscopy were employed in experiments with *Spirulina platensis* (Nordst.) Geitl. CALU-835 to determine chemical and biochemical mechanisms of biological purification of waters containing U(VI). It has been established that under the absence of ionic competition, the *S. platensis* culture is able to accumulate up to 90% of UO_2^{2+} ions, which are present in the solution of $UO_2(NO_3)_2 \cdot 10^{-1}$ M. The data obtained indicate the formation of large polymer conglomerates, which are connected with the external side of the cell membrane and uranyl, introduced into the system.

Rawn DF, Niedzwiadek B, Lau BP, Saker M.

Anatoxin-a and its metabolites in blue-green algae food supplements from Canada and Portugal.

J Food Prot. 2007 Mar;70(3):776-9.

PMID: 17388076

pdf: Rawn D 2007.pdf

mots-clés article:

mots-clés Antenna: £££, £££.

résumé:

Blue-green algae and spirulina are marketed in health food stores and over the Internet as food supplements in Canada, the United States, and Europe. The reported benefits of consuming these products include improved digestion, strengthening of the immune system, and relief from the symptoms of attention deficit disorder. Some of these products have been found to contain elevated concentrations of microcystins, which are known hepatotoxins. In addition to producing microcystins, *Anabaena* sp. and *Aphanizomenon* sp. also produce the potent neurotoxin anatoxin-a. Samples of food supplements containing blue-green algae and spirulina were collected in Portugal and from urban centers across Canada in 2005. Extracts of these supplements were analyzed to determine the presence and concentrations of anatoxin-a and its two main metabolites, dihydroanatoxin-a and epoxyanatoxin-a. Initial analyses were performed using high-performance liquid chromatography

(HPLC) with fluorescence detection, and confirmation required the use of LC with tandem mass spectrometry (LC-MS-MS). The HPLC with fluorescence detection indicated no anatoxin-a, but four samples were suspected to contain either dihydroanatoxin-a or epoxyanatoxin-a at 0.1 to 0.2 microg/g. LC-MS-MS results, however, indicated no trace of either transformation product in any sample analyzed. The detection limits for anatoxin-a, dihydroanatoxin-a, and epoxyanatoxin-a were similar for both fluorescence detection (0.2 to 0.3, 0.4 to 1.4, and 0.2 to 1.5 pg on the column, respectively) and mass spectrometry (0.3 to 1.5, 0.3 to 0.8, and 0.5 to 0.8 pg on the column, respectively). Because of the higher specificity of the LC-MS-MS analysis, all tested food supplement samples were considered free of anatoxin-a and its transformation products.

Robb-Nicholson C.

By the way, doctor. I read that spirulina is the next wonder vitamin. What can you tell me about it?

Harv Womens Health Watch. 2006 Nov;14(3):8.

PMID: 17228442

pdf: Robb-Nicholson C 2007.pdf PAS

mots-clés article:

mots-clés Antenna: £££, £f£.

résumé:

Roy KR, Arunasree KM, Dhoot A, Aparna R, Reddy GV, Vali S, Reddanna P.

C-Phycocyanin inhibits 2-acetylaminofluorene-induced expression of MDR1 in mouse macrophage cells: ROS mediated pathway determined via combination of experimental and In silico analysis.

Arch Biochem Biophys 459, No 2 (2007) 169-177.

PMID: 17303067

pdf: Roy K 2007a.pdf

mots-clés article: \$2-Acetylaminofluorene, \$MDR1, \$NF-kappa-B, \$Simulation, \$In-silico, \$C-Phycocyanin, \$RAW-264.7-cells.

mots-clés Antenna: £spirulina-platensis, £f£.

résumé:

We studied the effects of C-Phycocyanin (C-PC), a biliprotein from *Spirulina platensis* on the 2-acetylaminofluorene (2-AAF)-induced expression of MDR1, encoded by the multidrug resistance (MDR1) gene, in mouse macrophage cell line (RAW 264.7). Our experimental and In silico studies revealed a significant inhibition of 2-AAF-induced expression of MDR1 protein in C-PC treated mouse macrophage cell line. MDR1 induction by 2-AAF was dependent on ROS (reactive oxygen species)-Akt (protein kinase B)-NF-kappaB (Nuclear factor kappa B) signaling pathway. Generation of ROS, phosphorylation of Akt and corresponding nuclear translocation of NF-kappaB, the events that play a major role in the induction of MDR1 expression, were decreased significantly in C-PC treated cells. NADPH oxidase inhibitor, DPI (Diphenyl iodide), and pharmacological inhibitor of Akt, Akt inhibitor IV, also showed a reduction in MDR1 expression, although not to the same extent as C-PC mediated inhibition of MDR1 expression. To further understand the mechanism, we created a computational model of the detailed ROS-Akt-NF-kappaB pathway. C-PC was modeled purely as a ROS scavenger and this representation matched the experimental trends accurately. Also the ROS levels determined through In silico investigation showed that C-PC was more effective in reduction of MDR1 expression than inhibitors of NADPH oxidase and Akt. Our experimental and In silico studies collectively suggest that 2-AAF induces MDR1 by ROS dependent pathway and C-PC is a potential negative regulator of MDR1 expression. This down regulation of MDR1 expression, induced by xenobiotics such as 2-AAF, suggests C-PC's usefulness in overcoming the drug resistance in cellular systems.

Roy KR, Arunasree KM, Reddy NP, Dheeraj B, Reddy GV, Reddanna P.

Alteration of mitochondrial membrane potential by C-Phycocyanin induces apoptosis in doxorubicin resistant human hepatocellular carcinoma cell line-HepG2.

Biotechnol Appl Biochem. 2007 Feb 2; [Epub ahead of print].

PMID: 17274761

pdf: Roy K 2007.pdf PAS
mots-clés article:
mots-clés Antenna: £££, £f£.
résumé:

C-Phycocyanin (C-PC) is a water soluble biliprotein from *Spirulina platensis* with potent anti-oxidant, anti-inflammatory and anti-cancerous properties. In the present study the effect of C-PC was tested on the proliferation of doxorubicin sensitive and resistant hepatocellular carcinoma cell line-HepG2. These studies indicate 50% decrease in the proliferation of sensitive and resistant HepG2 cells treated with 40 microM and 50 microM C-PC for 24 h respectively. C-PC also enhanced the sensitivity of resistant HepG2 (R-HepG2) cells to doxorubicin. R-HepG2 cells treated with C-PC showed typical apoptotic features like membrane blebbing and DNA fragmentation. Flow cytometric analysis of R-HepG2 cells treated with 10 microM, 25 microM and 50 microM C-PC for 24 h showed 18.8%, 39.72% and 65.64% cells in sub G0/G1 phase respectively. Cytochrome c release, decrease in membrane potential, caspase-3 activation and poly (ADP) ribose polymerase (PARP) cleavage were observed in C-PC treated R-HepG2 cells. These studies also showed down regulation of anti-apoptotic protein Bcl-2 and up-regulation of pro-apoptotic Bax protein in the R-HepG2 cells treated with C-PC. The present study thus demonstrates that C-PC induces apoptosis in doxorubicin resistant HepG2 cells and its potential as an anti-hepatocellular carcinoma agent.

Schlodder E, Shubin VV, El-Mohsnawy E, Roegner M, Karapetyan NV.
Steady-state and transient polarized absorption spectroscopy of photosystem I complexes from the cyanobacteria *Arthrospira platensis* and *Thermosynechococcus elongatus*.
Biochim Biophys Acta. 2007 Jan 28; [Epub ahead of print].
PMID: 17321489

pdf: Schlodder E 2007.pdf PAS
mots-clés article: \$Photosystem-I; \$P700; Linear-and-circular-dichroism; \$Excitonic-coupling; \$Long-wavelength-antenna-chlorophyll; \$Arthrospira-platensis; \$Thermosynechococcus-elongatus.
mots-clés Antenna: £Arthrospira-platensis, £f£.
résumé:

Core antenna and reaction centre of photosystem I (PS I) complexes from the cyanobacteria *Arthrospira platensis* and *Thermosynechococcus elongatus* have been characterized by steady-state polarized absorption spectroscopy, including linear dichroism (LD) and circular dichroism (CD). CD spectra and the second derivatives of measured 77 K CD spectra reveal the spectral components found in the polarized absorption spectra indicating the excitonic origin of the spectral forms of chlorophyll in the PS I complexes. The CD bands at 669-670(+), 673(+), 680(-), 683-685(-), 696-697(-), and 711(-) nm are a common feature of used PSI complexes. The 77 K CD spectra of the trimeric PS I complexes exhibit also low amplitude components around 736 nm for *A. platensis* and 720 nm for *T. elongatus* attributed to red-most chlorophylls. The LD measurements indicate that the transition dipole moments of the red-most states are oriented parallel to the membrane plane. The formation of P700(+)/A(1)(-) or (3)P700 was monitored by time-resolved difference absorbance and LD spectroscopy to elucidate the spectral properties of the PS I reaction centre. The difference spectra give strong evidence for the delocalization of the excited singlet states in the reaction centre. Therefore, P700 cannot be considered as a dimer but should be regarded as a multimer of the six nearly equally coupled reaction centre chlorophylls in accordance with structure-based calculations. On the basis of the results presented in this work and earlier work in the literature it is concluded that the triplet state is localized most likely on P(A), whereas the cation is localized most likely on P(B).

Yang LY, Wang ZP, Cao XC, Chen XY, Xu BJ, Li XB, Huang H.
[CpCHID operon as a new tool for classification and identification of *Arthrospira platensis* strains].
Wei Sheng Wu Xue Bao. 2006 Dec;46(6):1003-6.
PMID: 17302170
pdf: Yang L 2007.pdf PAS
mots-clés article:
mots-clés Antenna: £££, £f£.

résumé: en chinois

Arthrospira is a photoautotrophic filamentous cyanobacterium belonging to the family Oscillatoriaceae, phylum Cyanophyta. Morphological criteria alone were inadequate for classification of Arthrospira . To develop new molecular markers, in this study, the cpchID operon, 16S rRNA and 16S-23S rRNA internally transcribed spacer (ITS) of seven Arthrospira platensis strains, Sp-10, Sp-2, Sp-9, Sp-1, Sp-11, Sp-3 and Sp-5, were cloned and sequenced. And the results of bioinformatics and molecular phylogenetics analyses with BioEdit 7.0, Clustal X 1.81 and Phylip 3.65 were as follows: (1) The sequences of cpchID operon, 16S rRNA and ITS from the seven strains were highly homologous to the each corresponding gene based on multiple pair-wise comparison. (2) The mean absolute deviation of the G + C content, the ratio of different sites and the genetic distance coefficient based on the sequences of cpchID operon in the seven strains were generally greater than that based on 16S rRNA and ITS region. (3) The phylogenetic dendrogram based on the sequences of cpchID operon was almost same with that based on the sequences of 16S rRNA and ITS region. Therefore, it revealed that cpchID operon could be applied as a new molecular marker to classification and identification of cyanobacterium, and more appropriate for species or strains determination due to its abundant information.

[No authors listed]

[The transmembranous passes of K⁺ in brain cortex under radiation and chemical influences and their modification with natural adaptogen].

Radiats Biol Radioecol. 2007 Jan-Feb;47(1):117-24.

PMID: 17388003

pdf: Noauthor 2007.pdf PAS

mots-clés article:

mots-clés Antenna: £Spirulina-platensis, £f£.

résumé: en russe

An investigation of the influence of chronic low-intensity irradiation with 0.25 Gr dose and of a mixture of heavy metal salts both apart and together, as well as when correcting with a natural adaptogen such as Spirulina platensis, on passive and active transport of potassium and the work efficiency of Na,K-pump in slices of brain cortex was the problem of this study. As a biological model for in vivo researches on molecular-cellular level the thin layers of a rat brain cortex were used. It was shown that both radiation and chemical factors cause reliable changes of passive membrane permeability and operation of Na,K-pump, whose function is the maintenance of the certain gradient of potassium ions on the plasmatic membrane, the normalization of ion homeostasis, the stabilization of membranous potential. The analysis of calculated indexes of passive and of active ion transport show that at modification of X-rays influence with a mixture of heavy metal salts exactly the last makes the main contribution to efficiency decrease of energy-dependent transport of potassium. The natural adaptogen spirulina renders a better effect in the case of toxic action of the mixture of heavy metal salts, enlarging not only active transport of potassium ions, but its efficiency as well.