INVESTICE
DO ROZVOJE
VZDĚLÁVÁNÍ

„Propojení výuky oborů Molekulární a buněčné biologie a Ochrany a tvorby životního prostředí “

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INVESTICE
DO ROZVOJE
VZDĚLÁVÁNÍ

Řasy v biotechnologiích

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Využití sinic a řas dnes

- Prakticky ve všech zemích s mořským pobřežím nebo s jezery, rybníky, prameništi nebo řekami
- Dnešní využití v kuchyni na řadu způsobů – v salátech, nakládaných nebo fermentovaných produktech
- Jako přísady do polévek, dušeného masa, omáček, jako pražené do čaje, do desertů nebo želatin

Table II.C.1.2. *Algae eaten by humans now and in the past*

Celkem 214 druhů sinic a řas

19 druhů

Species name	Country	Local name	Use
Cyanophyta			
Aphanothece sacrum	Japan	–	Food
Brachytrichia quoyi	China	–	Food
	Japan	–	Food
Chroococcus turgidus	Mexico	*Cocol de agua*	Food
Nostoc coeruleum	China	–	Food
Nostoc commune	Peru	*cushuro*	Food
	Japan	*kamagawa-nori*	Food
	Java	*djamurbatu*	Food
	Mongolia	–	Food
	Mexico	*amoxtle*	Food
	Bolivia	–	Food
	Ecuador	–	Food
Nostoc commune var. *flagelliforme*	China	*fa-ts'ai*	Food
Nostoc edule = *pruniforme*	China, Mongolia, Soviet Union	–	Soup
	Peru	*cushuro*	Food
Nostoc ellipsosporum	Ecuador	–	Food
Nostoc parmeloides	Peru	–	Food
Nostoc sphaericum	Peru	*cushuro*	Food
Nostoc verrucosum	Peru	*cushuro*	Food
	Thailand	–	Food
	Japan	–	Food
Nostoc sp.	Fiji	–	Food
Nostochopsis lobatus	China	–	Food
Nostochopsis sp.	Thailand	–	Soup, dessert
Oscillatoria spp.	Java	*keklap*	Food
Phormidium tenue	Mexco	*cocol de agua*	Food
Phylloderma sacrum	Japan	*suizenji-nori*, *kotobuki-nori*	Food
Spirulina maxima	Mexico	*tecuitlatl*	Food
Spirulina platensis	Chad	*die*	Sauce

Table II.C.1.2. *(Continued)*

Species name	Country	Local name	Use
Charophyta			
Chara spp.	Peru	–	Food
Chlorophyta			
Caulerpa sp.	New Caledonia		Baked, raw
	New Hebrides	–	Salad
	Polynesia	*Itum, Itmu*	Salad
Caulerpa peltata	Malaysia	*lata*	Salad
	Java	*lata*	Salad
	Phillippines	–	Salad
	Indonesia	–	Salad, sweetmeat
Caulerpa racemosa	Malaysia	*letato*	Dessert
	Philippines	*araructp lal-lat*	Salad
	Indonesia	–	Raw, sweetmeat
	Guam	*Itmu fuafua*	Relish
	Melahesia	–	–
Caulerpa serrulata	Malaysia	–	Food
	Celebes	–	Food
	Singapore	–	Salad
	Philippines	*gal galacgac*	Food
Chaetomorpha sp.	Malaysia	*lumut laut*	Food
Chaetomorpha antennina	Hawaii	*limu hututto, limu lile, limumami*	Food
	Malaysia	*lumut-laut*	Raw
Chaetomorpha crassa	Philippines	*kauat-kauat*	Sweetmeat
Chaetomorpha javanica	Indonesia	*lumut laut*	Food
Chaetomorpha tomentosum	Malaysia	*susu-lopek, laur-laur*	Raw
Cladophora sp.	Peru	–	Food
Codium sp.	Philippines	*pocpoclo*	Salad
	Samoa	–	Raw, baked
Codium fragile	Japan	*miru*	Soup, sauce
	China	*sbuisong*	Food
Codium intricatum	Philippines	*pocpoclo*	Salad, cooked vegetable
Codium muellert	Hawaii	*limu aalaula*	Salad
	Philippines	*pocpoclo*	Salad
Codium papillatum	Philippines	*pocpoclo*	Salad, cooked vegetable
Codium tomentosum	Malaysia	*susu-lopek, laur-laur*	Raw
Enteromorpha sp.	China	*bu-t'at*	Condiment
	Hawaii	*limu eleele*	Salad
	New Caledonia	–	Raw, baked
	Philippines	*lumot*	Salad
	Northwest North America	–	Food
Enteromorpha clatbrata	China	taitiao	Food
Enteromorpha compressa	Malaysia	–	Food
	Philippines	*lumot*	Salad
Enteromorpha flexuosa	Hawaii	*limu eleele*	Salad
Enteromorpha intestinalis	Canada	–	Food
	Malaysia	–	Food
	Philippines	*lumot*	Salad
Enteromorpha plumosa	Philippines	*lumot*	Salad
Enteromorpha prolifera	Hawaii, Malaysia, China	*limu eleele*	Salad
Enteromorpha tubulosa	China	*bu-t'at*	Food
Monostroma sp.	Peru	–	Soup
	China	*chiao-mo*	Condiment
Monostroma nitidum	China	–	Condiment
Monostroma quaternaria	Peru	–	Food
Oedogonium sp.	India	–	Food
Prasiola japonica	Japan	*kawa-nori, datyagawa-nori, nikko-nori*	Food
Prasiola yunnanica	China	–	Food
Spirogyra sp.	Burma	–	Food
	Canada	–	Food
	Indochina	–	Food
	Thailand	–	Soup, salad

1 druh

37 druhů

C. peltata

C. racemosa

Table II.C.1.2. *(Continued)*

Species name	Country	Local name	Use
Chlorophyta			
Ulothrix flacca	China	–	Vegetable
Ulva sp.	China	–	Food
	Japan	*awosa, aosa*	Garnish
Ulva conlobata	China	–	Tea
Ulva fasciata	Hawaii	*limu pahapaha*	Food
	Peru	*cochayuyo*	Food
	China	–	Tea
Ulva lactuca	Canada (Bella Coola, Haida, Lillooet Indians)	–	Food
	Chile	*lucbe*	Food
	China	*Hai ts'ai*	Soup, salad, vegetable
	New Zealand (Maori)		Soup, stew, vegetable
	Peru	*cochayuyo*	Food
	Philippines	*gamgamet*	Salad, cooked vegetable
Ulva lactuca	United States, California (Pomo and Kashoya Indians)	*sihtono*	Flavoring
	Hawaii	*limu pakcaea*	Soup, salad, garnish
	Washington (Makah)	*kalkatsup*	Food
Phaeophyta			
Alaria crassifolia	Japan	*chigatso*	Food
Alaria esculenta	Alaska (Indian)	–	Food
	Siberia (Nivkhi)	–	Food
	Iceland, Ireland, Orkney Islands, Norway, Scotland	–	Food
Alaria pylaii	Greenland (Inuit)	*kipilasat*	Food
	Greenland (Angmagsalik)	*suvdlutisit*	Food
	Siberia	*me'cgomei*	Food
Arthrothamnus bifidus	Japan	*mekoashi-kombu chigatso*	Food
Arthrothamnus kurilensis	Japan	*chishimanekoashi*	Food
Ascophyllum nodosum	Greenland	*miserarnat*	Food
Chnoospora pacifica	Indochina	*rau ngoai*	Salad, relish
Chorda filum	China	–	Food
	Japan	–	Salad
Dictyopteris plagiogramma	Hawaii	*limu lipoa*	Food
Dictyopteris repens	Easter Island	*auke*	Food
Dictyota sp.	Indonesia	–	Food
Dictyota acutiloba	Hawaii	–	Food
Dictyota apiculata	Hawaii	–	Food
Durvillea antarctica	Chile	*cochayuyo*	Stew
	Peru	*cochayuyo*	Food
	New Zealand (Maori)	*rimurapi*	Roasted
Eckloni kurome	China	*kunbu, miangichai*	Food
Eckloni stolonifera	Japan	*kizame arame*	Soup, sauce, stew
Elsenia bicyclis	Japan	*arame*	Soup, stew
Endoraebne binghamiae	China	–	Food
Fucus sp.	Alaska (Chugach)	–	Food
	Greenland (Inuit)	*mikarkat*	Food
Heterochordaria abietina	Japan	*matsumo*	Sauce
Hizikia fusiforme	Japan	*hijiki*	Soup, stew, salad
Hydroclathrus clathratus	Philippines	*balbalulang*	Salad
Ishige okamurai	China	*tieding cai*	Food
Ishige sinicole	China	*hai dai*	Food
Kjellmaniella gyrata	Japan	–	Soup
Laminaria sp.	New Zealand	*rimu roa*	Roasted
Laminaria angustata	Japan	*kizami-kombu*	Soup Vegetable
Laminaria cichorioides	Japan	*chitmi-kombu*	Food
Laminaria diabolica	Japan	*kuro-tororo kombu*	Food
Laminaria digitata	Scotland	–	Food

60 druhů

U. conlobata

U. fascinata

U. lactuca

Table II.C.1.2. *(Continued)*

Species name	Country	Local name	Use
Phaeophyta			
Laminaria japonica	Japan	*ma-kombu*	Sweetmeat
	Japan	*ori-kombu*	Food
	China	*hai'tai*	Food
Laminaria digitata	Japan	–	Food
Laminaria ochotensis	Japan	*rishiri-kombu*	Food
Laminaria religiosa	Japan	*hosome-kombu, saimatsu-kombu*	Food
Laminaria saccharina	France, Great Britain, Ireland	–	Fresh
Laminaria yezoensis	Japan	–	Food
Macrocystis integrifolia	British Columbia	–	Food
Mesogloia crassa	Japan	*futo-mozuku*	Food
Mesogloia decipiens	Japan	*mozuku*	Food
Nemacystus decipiens	China	*haida*	Food
	Japan	*mozuku*	Food
Padina australis	Indonesia	*agar-agar, daun-besar*	Sweetmeat
Pelvetia siliquosa	China	*liutao cai*	Food
Petalonia fascia	Japan	*hondawara*	Soup, sauce
Postelsia palmaeformis	California (Indian)	*gaye*	Food
Sargassum sp.	China	*hai ts'at*	Tea, soup
	Hawaii	*limu kala*	Food
	Malaysia	–	Food
Sargassum agulfollum	Indonesia, Malaysia	*arien wari*	Raw, cooked
Sargassum fusiformis	China	*cbu-cbiau ts'at*	Soup, vegetable
Sargassum granuliferum	Amboina	*arien-wari*	Raw, cooked
	Indonesia	–	Raw, cooked
	Malaysia	–	Raw, cooked
Sargassum hemiphyllum	China	–	Food
Sargassum henslowianum	China	–	Food
Sargassum horneri	China	–	Food
Sargassum pallidum	China	–	Food
Sargassum polycystum	Amboina	*arien barulu*	Raw
	Moluccas	*agar-agar' kupean*	
Sargassum siliquosum	Malaysia	–	Raw, cooked, pickled
	Philippines	*aragan*	Raw, cooked
Scytosiphon lomentaria	China	–	Food
Turbinaria conoides	Celebes	*labi-labi*	Salad
	Malaysia		Pickle
Turbinaria ornata	Malaysia	*agar-agar-ksong*	Pickle
	Moluccas	*arien essong*	Raw, cooked
Undaria peterseneeniana	Japan	*wakame*	–
Undaria pinnatifida	China	–	Food
	Japan	*wakame*	Food
Undaria undarioides	Japan	*wakame*	Food
Rhodophyta			
Agardhiella sp.	Philippines	*gulaman*	Sweetmeat
Acanthopeltis japonica	Japan	*yuhtiri*	Food
	Indonesia	–	Vegetable
Acanthophora spicifera	Philippines	*culot*	Salad, cooked
Ahnfeltia concinna	Hawaii	*limu akiaki*	Salad, baked
Asparagopsis sanfordiana	Hawaii	–	Food
Ahnfeltia taxiformis	China	–	Salad, stew
	Hawaii	*limu kobu*	Food
Bangia fusco-purpurea	China	*hangmaocai*	Salad
	Hawaii	–	Soup
Caloglossa adnata	Burma	–	Raw, boiled
Caloglossa leprieurii	Burma	–	Food
Campylaephora hypnaeides	Japan	*yego-nori*	Food
Carpopeltis flabellata	Japan	*kome-nori*	Garnish
Catenella impudica	Burma	–	Salad
Catenella nipae	Burma	–	Raw, cooked
Chondria tenuissima	Hawaii	*limu oolu*	Food
Chondrus elatus	China	–	Food
Chondrus ocellatus	China	–	Food
	Japan	*makuri-nori*	Food
Corallopsis salicornia	Indonesia	*bulung-buka*	Vegetable, jelly

L. Japonica *L. digitata* *L. ochotensis*

L. religiosa *L. saccharina* *L. yezoe*

97 druhů

Table II.C.1.2. *(Continued)*

Species name	Country	Local name	Use
Rhodophyta			
Dermonema frappieri	China	–	Food
Dermonema ouivinata	China	–	Food
Digenea simplex	Japan	*makuri-nori*	Food
Eucheuma edule	China	*bai-ts'ai mu*	Food
	Indonesia	*agar-agar-besar*	Jelly
Eucheuma gelatinae	China	–	Food
Eucheuma horridum	Malaysia	–	Jelly
Eucheuma muricatum	Indonesia	–	Jelly
	Malaysia	–	Agar
	Philippines	*canot-canot*	Salad, cooked vegetable
Eucheuma serra	Bali	*bulung djukut lelipan*	Agar, vegetable
Eucheuma speciosa	Tasmania	–	Jelly
Gelidiella acerosa	Philippines	*culot*	Salad, cooked vegetable
Gelidium sp.	China	*shih-hua-tsh*	Agar
	Hawaii	*limu loloa*	Food
Gelidium amansii	Indonesia	–	Jelly
Gelidium latifolium	Hawaii	–	Agar
	Indonesia	*limu loloa*	Jelly
	Java	–	Agar
Gelidium rigidum	Indonesia	–	Jelly
	Malaysia	–	Agar
Gigartina sp.	Malaysia	–	Food
	New Zealand	*rebia*	Food
Gigartina chamissoi	Peru	*cochayuyo*	Soup, stew
Gigartina glomerata	Peru	*cochayuyo*	Soup, stew
Gigartina intermedia	China	–	Food
Gigartina teedii	Japan	*cata-nori,shikin-nori*	Food
Glotopelitis sp.	China	–	Soup
Glotopelitis coliformis	China	–	Food
Glotopelitis furcata	China	–	Food
	Japan	*funori*	Food
Glotopelitis tenax	Taiwan	*funori*	Raw, fried
Gracilaria sp.	New Zealand	*karengo*	Food
Gracilaria conferoides	China	*bai-mein-san*	Food
	Philippines	*gulaman*	Salad, cooked vegetable
Gracilaria coronopifolia	Hawaii	*limu mahauea*	Food
	Philippines	*caocooyan*	Dessert
Gracilaria crassa	Philippines	*susueldot-baybay*	–
Gracilaria eucheumoides	Philippines	*cavot-cavot*	Raw, cooked
Gracilaria lichenoides	Amboina	*atjar*	Pickled
	Ceylon	*chan, chow-parsi*	Pudding
	Hawaii	*limu manauea*	Soup, jelly
	India	*conji-parsi*	Food
	Malaysia	–	Pickled
Gracilaria salicornia	Philippines	*susueldot-baybay*	Food
Gracilaria taenioides	Malaysia	–	Food
Gracilaria verrucosa	Philippines	*susueldot-baybay*	Food
Grateloupia affinis	Japan	*kome-nori*	Food
Grateloupia doryphora	Peru	*cochayuyo*	Food
Grateloupia filicina	China	–	Soup
	Japan	*mukade-nori*	Food
	Philippines	–	Jelly
Grateloupia ligulata	China	*bai-ts'ai*	Food
Griffithsia sp.	Hawaii	*limu moopuna-kana lipoa*	Food
Gymnogongrus disciplinalis	Hawaii	*limu wawaloli*	Food
Gymnogongrus flabelliformis	Japan	*okitsu-nori*	Food
Gymnogongrus vermicularis	Hawaii	*limu wawaloli*	Food
Halymenia durvillae	Hawaii	*limu lepeahina*	Food
	Philippines	*gayong-gayong*	Salad, cooked vegetable
Hypnea	Indonesia	–	Dessert
Hypnea armata	Hawaii	*limu huna*	Food

Gelidium amansii

Gelidium latifolium

Table II.C.1.2. *(Continued)*

Species name	Country	Local name	Use
Rhodophyta			
Hypnea cenomyce	Indonesia	–	Food
Hypnea cernicornis	China	*sa ts'ai*	Food
Hypnea charoides	Philippines	*culot tipusa*	Salad
Hypnea divaricata	Amboina	*arten*	Agar, food
Hypnea nidifica	Hawaii	*limu huna*	Food
Hypnea musciformis	China	*su-wei-tung*	Stew, jelly
Iridea edulis	Iceland	–	Food
	Scotland	*dulse*	Food
Laurencia sp.	Hawaii	*limu lipeepee*	Salad
	Polynesia	*lum, (limu, rimu)*	Cooked
Laurencia botryoides	Hawaii	*tartartptp*	Raw, cooked
Laurencia okamurai	Philippines	*culot*	Salad, cooked vegetable
Laurencia papillosa	Hawaii	*limu lipeepee*	Cooked salad,
	Philippines	*culot*	cooked vegetable
Laurencia pinnatifida	Scotland, Western Europe, United States	*pepper dulse*	Seasoning
Lemanea mamillosa	India	*nungbam*	Food
Liagora decussata	Hawaii	*limu puak*	Food
Liagora farinosa	Philippines	*barts-barts*	Food
Macrocystis integrifolia	British Columbia	giant kelp	Food
Nemalion helminthoides	Italy, Japan	sea noodles	Food
Nemalion multifidum	Japan	*tsukomo-nori*	Food
Nemalion vermiculare	Japan	*umu-somen*	Food
Porphyra sp.	British Columbia	–	Food
	New Zealand	*karengo*	Food
Porphyra atropurpurea	Hawaii	*limu luau*	Condiment
	Philippines	*gamet*	Soup
Porphyra columbina	Chile	*luche*	Stew
	Peru	*cochayuyo*	Stew
Porphyra crispata	China	*tsu ts'ai*	Condiment, vegetable
Porphyra dentata	China	–	Food
Porphyra laciniata	California	–	Baked, raw
	Hebrides	–	Food
Porphyra leucosticta	Hawaii	*limu luau*	Food
	Peru	*cochayuyo*	Stew
Porphyra marginata	China	–	Food
Porphyra perforata	British Columbia	–	Food
Porphyra suborbiculata	China	*tzu-ts'ai*	Vegetable
Porphyra tenera	Japan	*awanori*	Food
Porphyra vulgaris	California	–	Baked, raw
Rhodymenia palmata	Canada	*sol*	Nibbled with beer
	Iceland	*sol*	Cooked, baked
	Ireland	–	Food
Rhodoglossum denticulatum	Peru	–	Food
Sarcodia sp.	Japan	*bosaka-nori, atsuba-nori*	Food
Sarcodia montagneana	Molluccas	–	Food
Subria vittata	South Africa	–	Jelly

Vlastnosti a další využití sinic a řas

- Chaluhy jako hnojivo a krmivo pro zvířata – již celá staletí na farmách v Evropě (římské knihy ze 2 století n.l.), Středomoří, Severní Americe, Asii, biomasa chaluh byla zaoraná nebo usušena a spálená, popel použit jako hnojivo (doplňuje půdu o minerální látky), zvápenatělé řasy slouží k obohacování půdy Ca^{2+}
- Menstruační tampony – zejména chaluhy
- Mytí rukou – *Ulva* (Skotsko)
- Výplně spár mezi trámy srubů – *Ulva* (Skotsko)

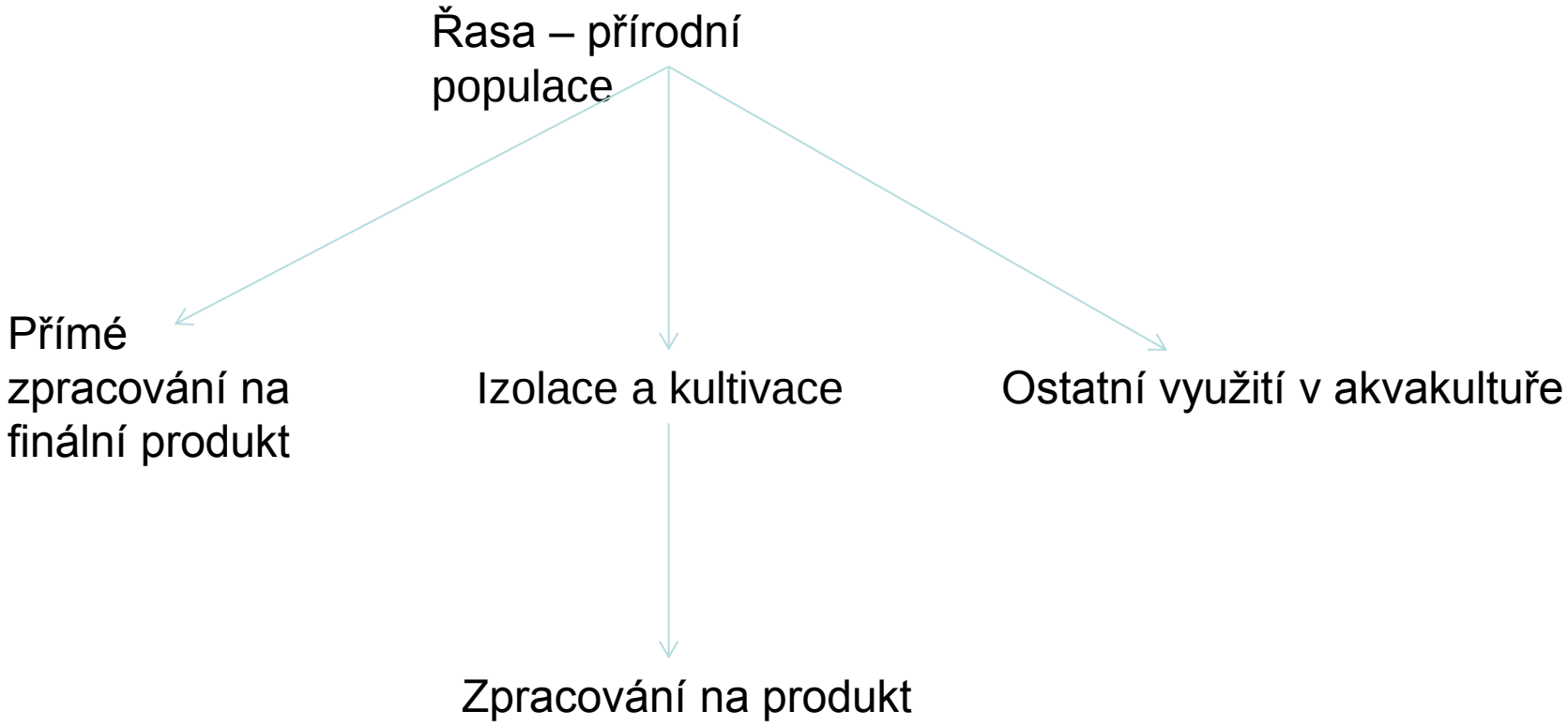
Živiny v řasách

Table II.C.1.3. *The gross chemical composition of edible algae (percentage of dry weight)*

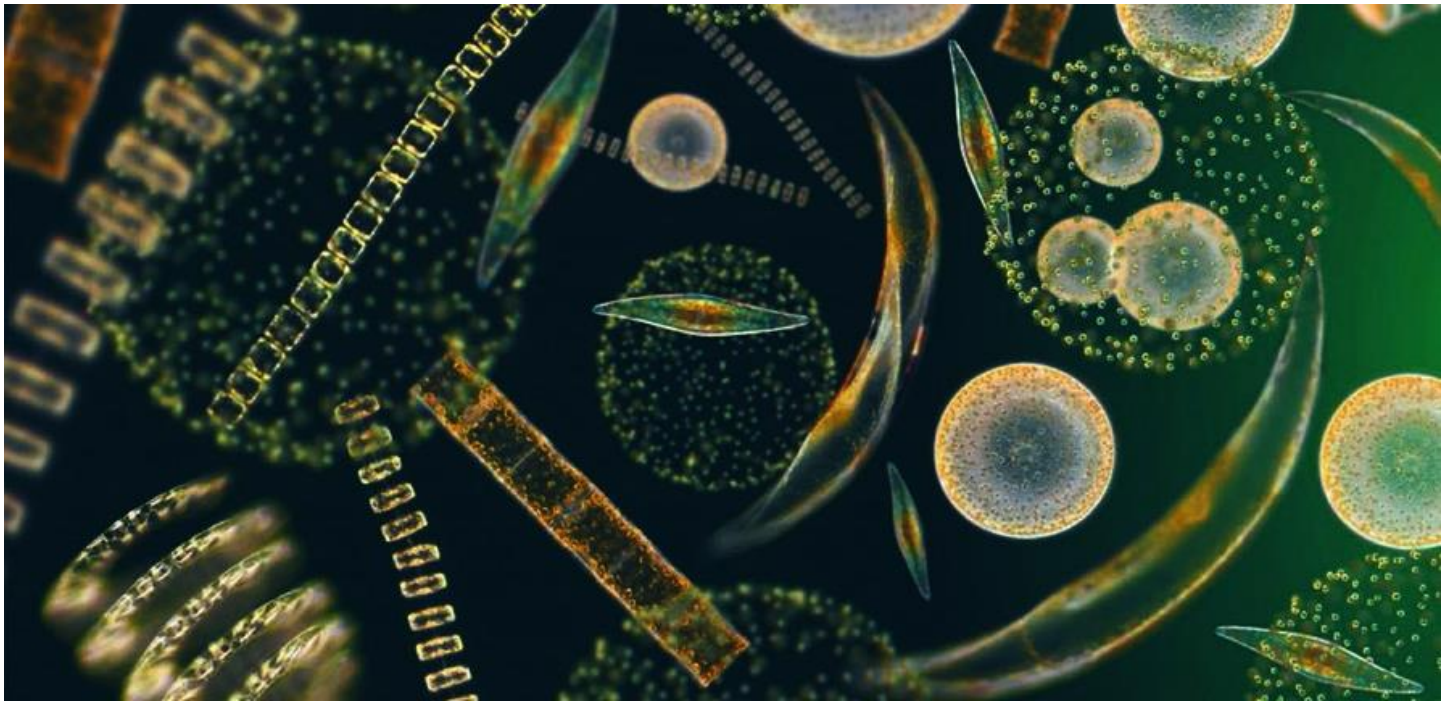
Species	Protein	Total carbohydrate plus fiber	Lipids	Total nucleic acids	Ash	HO
Cyanophyta						
Agmenellum guadruplicatum	36	32	13	–	11	–
Nostoc commune	21	60	1	–	8	11
Nostoc phylloderma	25	59	1	–	12	–
Phormidium tenue	11	52	1	–	46	9
Spirulina sp.	64–70	–	5–7	4	–	–
Spirulina maxima	56–62	16–18	2–3	–	–	–
Spirulina maxima	60–71	13–17	6–7	3–5	6–9	–
Spirulina platensis	46–50	8–14	4–9	2–5	–	–
Spirulina platensis	63	9	3	4	10	9
Synechococcus sp.	63	15	11	5	–	–
Chlorophyta						
Chlorella vulgaria	52	25	6	–	14	5
Chlorella vulgaris	57	32	6	–	8	–
Coelastrum proboscideum	49	24	9	–	13	6
Enteromorpha sp.	20	58	0.3	–	15	–
Enteromorpha compressa	12	–	–	–	10	14
Enteromorpha linza	19	–	–	–	19	14
Monostroma sp.	20	5	1	–	15	–
Ulva sp.	26	46	1	–	23	–
Ulva sp.	15	51	–	–	16	19
Phaeophyta						
Arthrothamnus bifidus	6	52	0.7	–	17	24
Ascophyllum nodosum	5–10	42–59	2–4	–	17–20	12–15
Hizikia fusiformis	6	102	1.7	–	19	12
Hizikia fusiformis	10	57	0.5	–	–	16
Kjellmaniella crassifolia	9	62	0.6	–	28	–
Laminaria sp.	2	11	0.6	–	7	–
Laminaria sp.	6	49	1	–	21	24
Laminaria angustata	9	65	1.7	–	24	–
Laminaria angustata	9	66	2.2	–	19	–
Laminaria japonica	9	68	1.3	–	22	–
Laminaria japonica	9	66	2.2	–	23	–
Laminaria japonica	4	88	3	–	18	10
Laminaria religiosa	8	67	0.5	–	25	–
Sargassum sp.	5	35	1.3	–	25	33
Undaria sp.	3	10	0.6	–	7	–
Undaria pinnatifida	12	38	0.3	–	31	19
Undaria pinnatifida	21	8	1.7	–	31	19
Rhodophyta						
Gelidium sp.	13	68	–	–	4	–
Gracilaria sp.	4	28	–	–	4	–
Gracilaria coronopifolia	8	61	0.1	–	18	13
Laurencia sp.	9	62	1	–	19	9
Palmaria sp.	20	60	1	–	13	7
Porphyra sp.	44	46	2	–	8	–
Porphyra laciniata	29	41	2	–	19	9
Porphyra tenera	29–36	39–41	0.6	–	–	11–13
Porphyra tenera	46	64	0.5	–	12	9
Porphyra tenera	28	40	0.8	–	10	17
Rhodymenia palmata	8–35	38–74	0.2–4	–	12–37	–

Biotechnologie sinic a řas

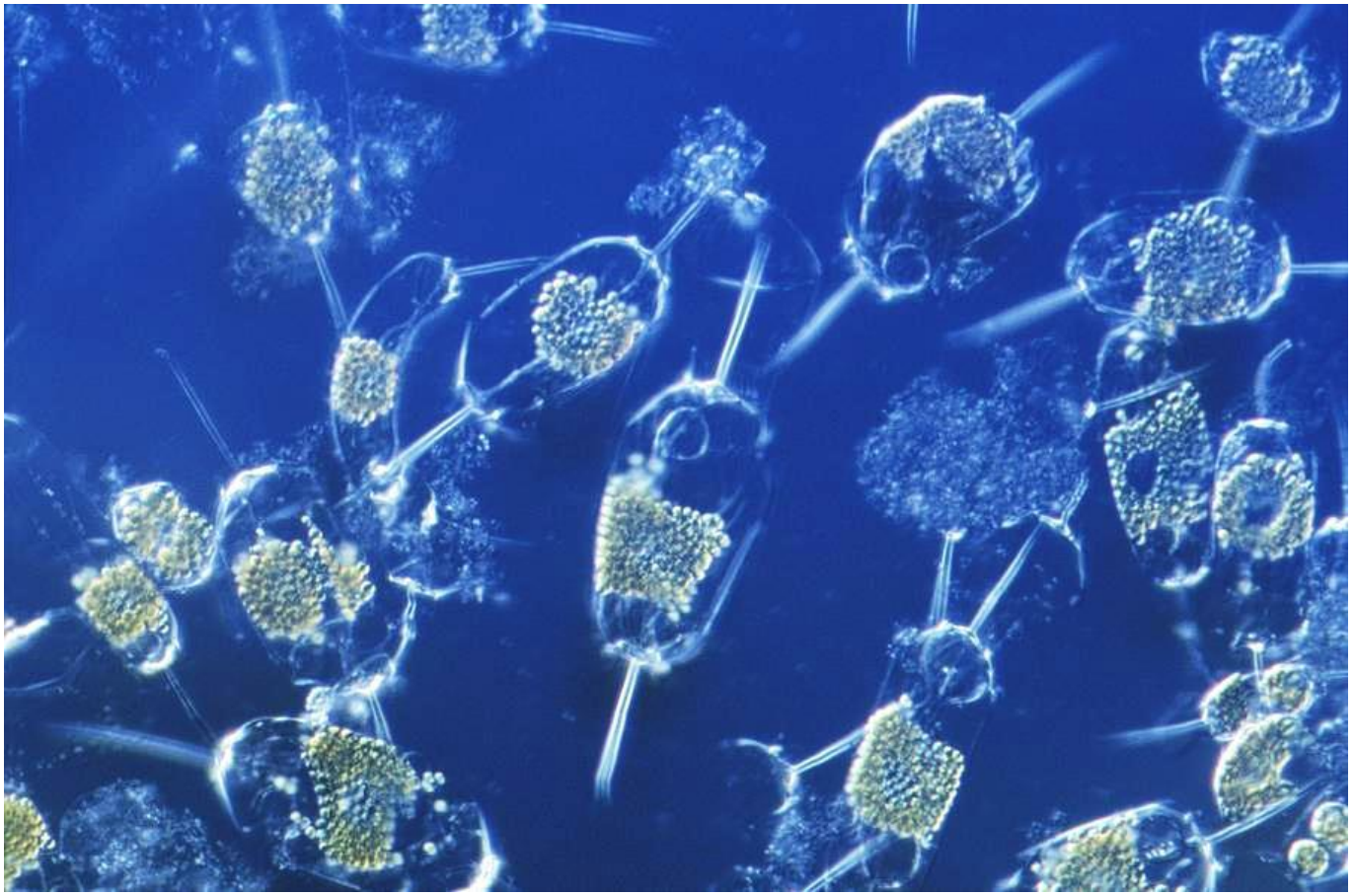
od přírodních populací ke kulturám a produktům


Řasa – přírodní populace
Přímé zpracování na finální produkt
Izolace a kultivace
Ostatní využití v akvakultuře
Zpracování na produkt

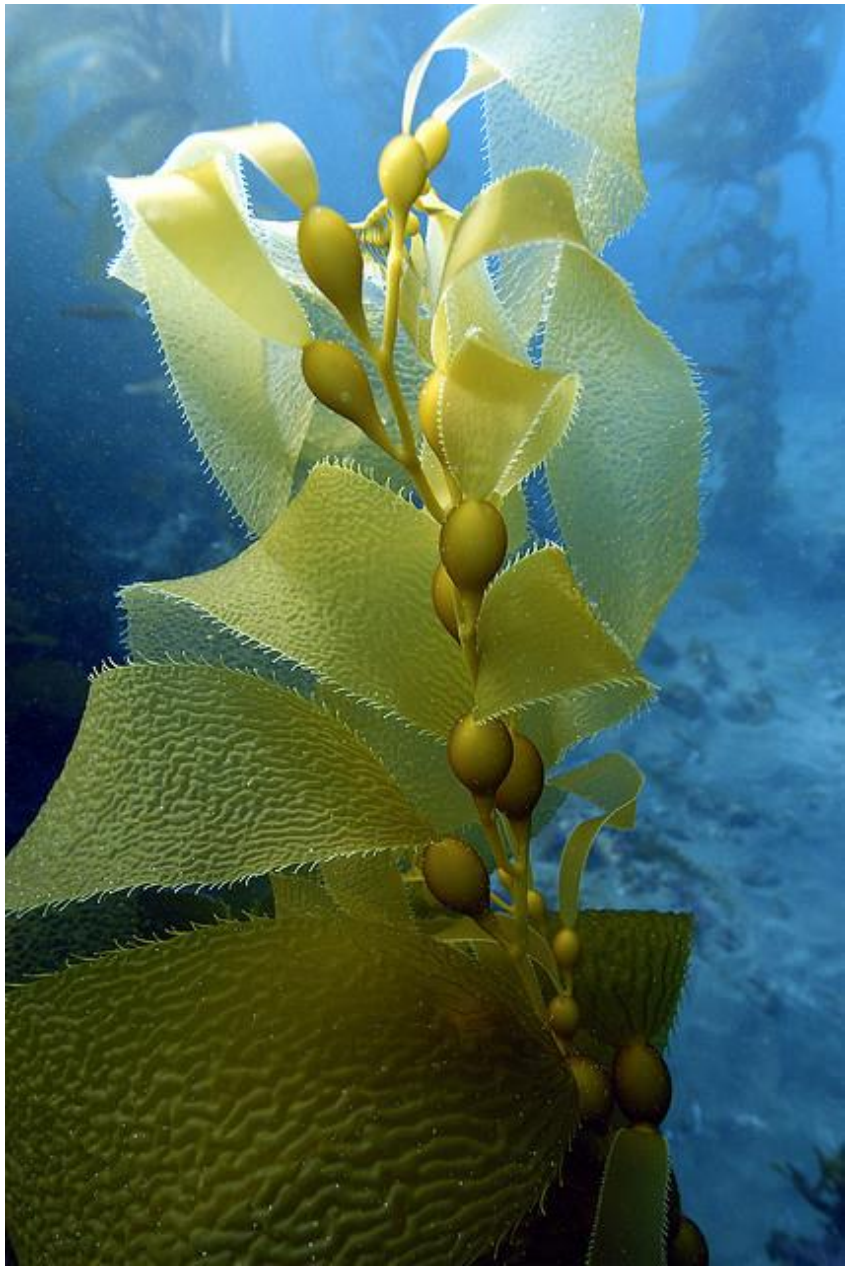
Přírodní populace jako zdroj materiálu řas pro biotechnologie



Fytoplankton – aktivně či pasivně se vznášející sinice a řasy ve vodním sloupci



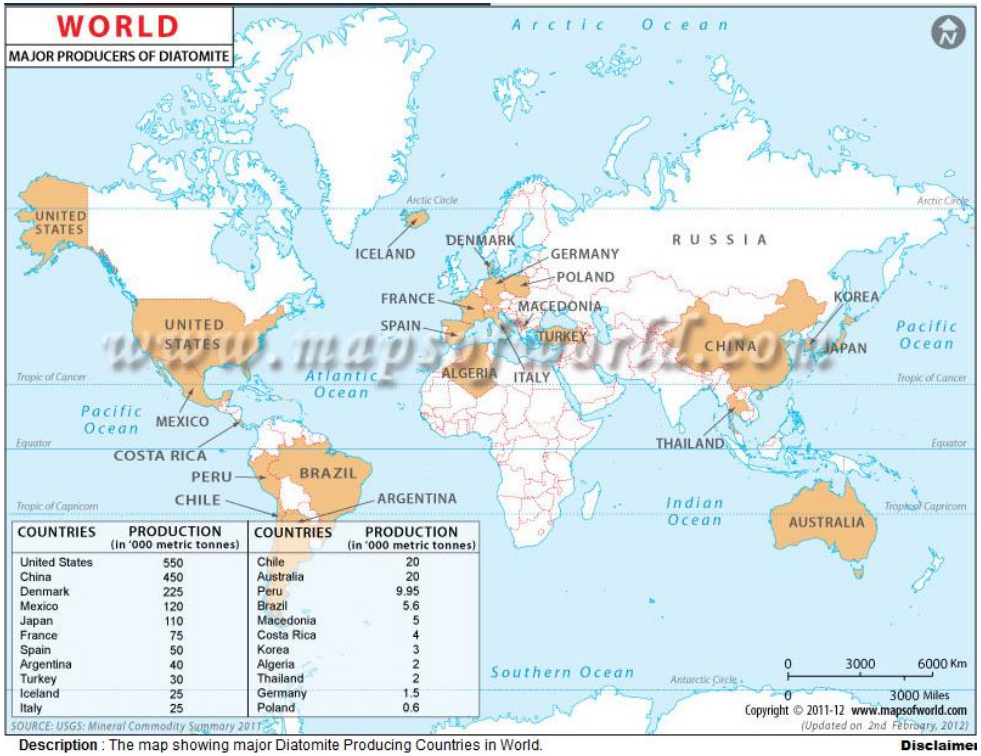
Mořský fytoplankton – významný primární producent na Zemi, vysoký biotechnologický potenciál



Chaluhy –
Makroskopické hnědé řasy v litorálních zónách moří a ocánů

Přímé zpracování řas nebo jejich částí na produkt

A. Diatomit – přírodní produkt, sedimentární hornina



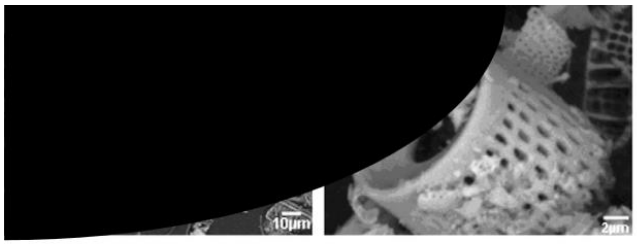
COUNTRIES	PRODUCTION (in '000 metric tonnes)
United States	550
China	450
Denmark	225
Mexico	120
Japan	110
France	75
Spain	50
Argentina	40
Turkey	30
Iceland	25
Italy	25

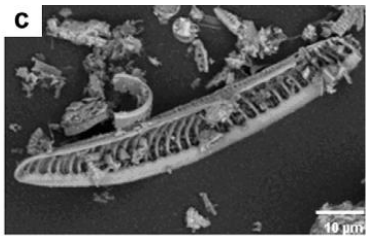
COUNTRIES	PRODUCTION (in '000 metric tonnes)
Chile	20
Australia	20
Peru	9.95
Brazil	5.6
Macedonia	5
Costa Rica	4
Korea	3
Algeria	2
Thailand	2
Germany	1.5
Poland	0.6

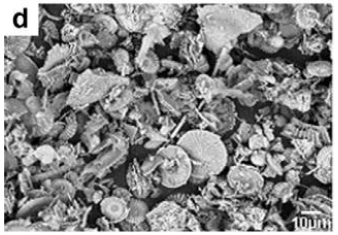
Description : The map showing major Diatomite Producing Countries in World.

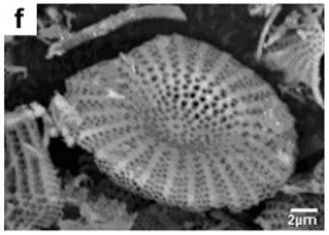
Disclaimer

Vrstvy diatomitu

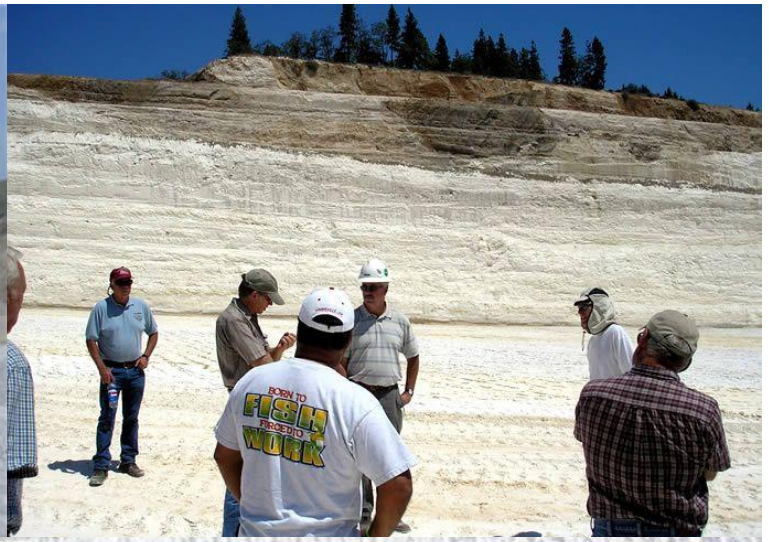




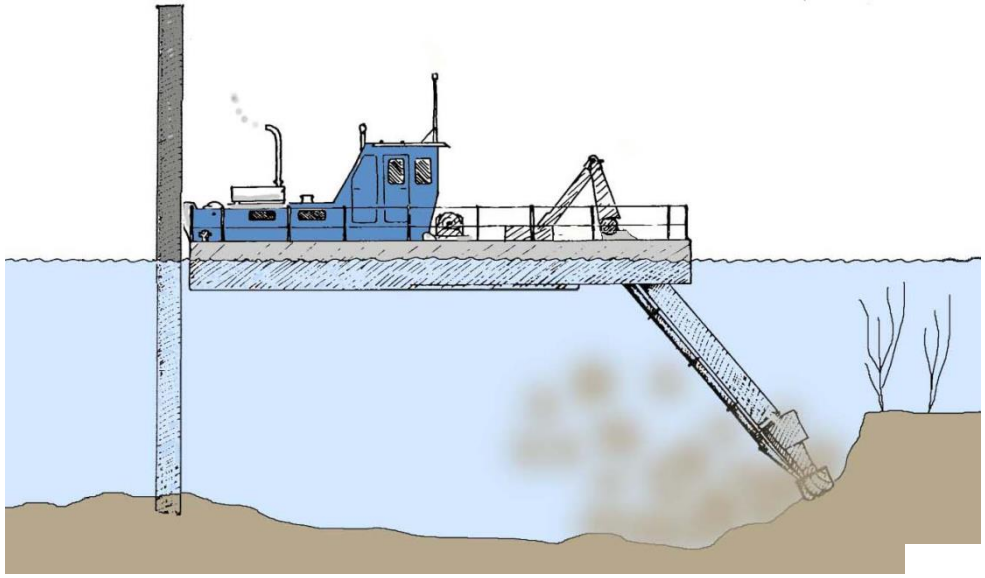




Těžba diatomitu

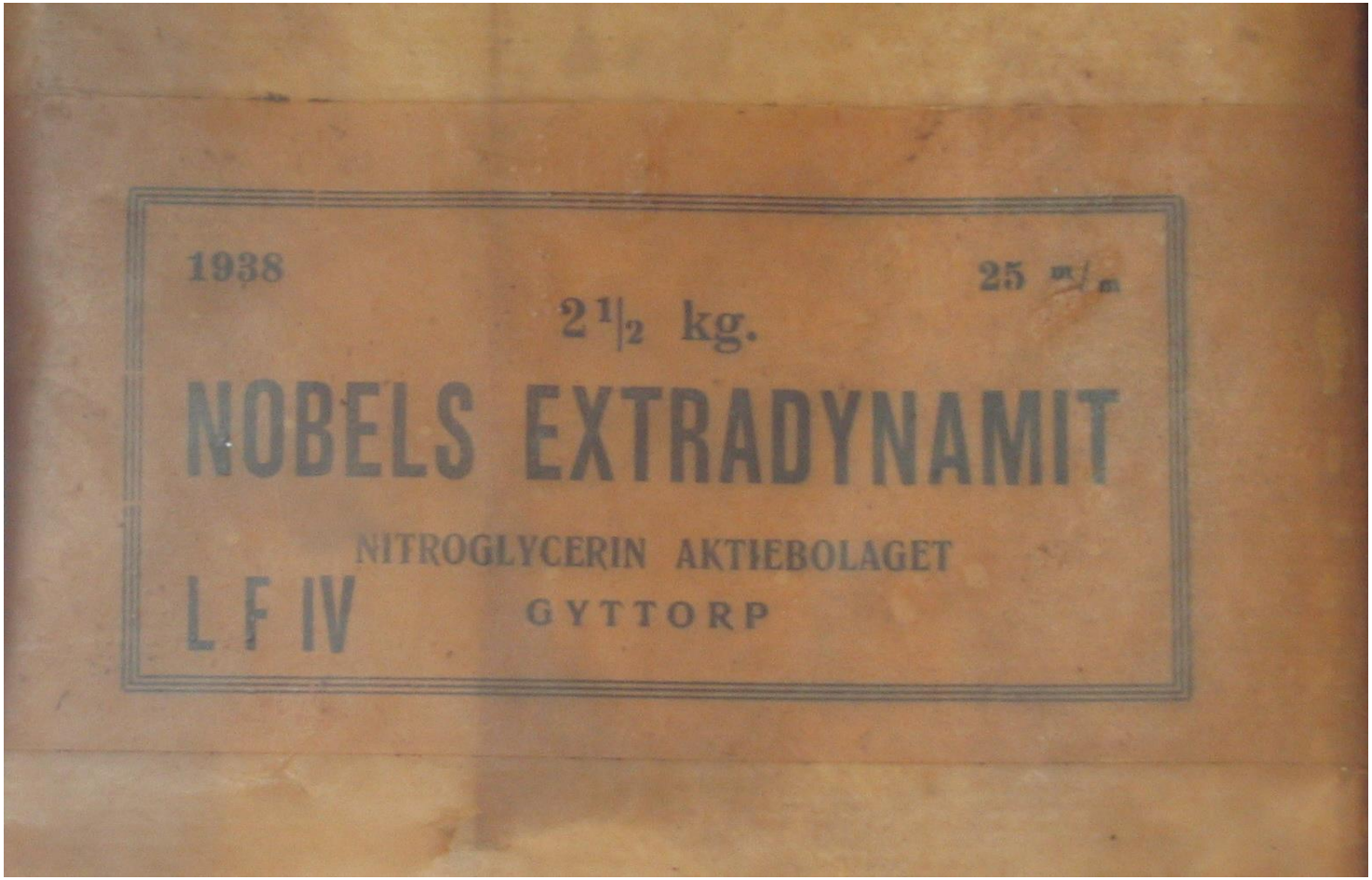


Těžba diatomitu



Zpracování diatomitu

Dynamit


1938
25 m/m
2 1/2 kg.
NOBELS EXTRADYNAMIT
NITROGLYCERIN AKTIEBOLAGET
L F IV
GYTTORP

Nobelova cena

Nobelova cena je ocenění každoročně udělované za zásadní vědecký výzkum, technické objevy či za přínos lidské společnosti. Uděluje se v následujících oborech: **fyzika**, **chemie**, **fyziologie nebo lékařství**, **literatura**, **mír**; dále se také uděluje Cena Švédské národní banky za rozvoj ekonomické vědy na památku Alfreda Nobela, běžně označovaná jako „Nobelova cena za ekonomii", která však není skutečnou Nobelovou cenou (viz níže).

Nobelova cena je udělována každoročně od roku 1901 na základě poslední vůle švédského vědce a průmyslníka Alfreda Nobela, vynálezce dynamitu. Ve všech oblastech, v nichž je udělována, je považována za nejprestižnější ocenění.

Fotografie profilu Alfreda Nobela – předloha aversu medaile, 1896 či dříve

Obsah [skrýt]

Oceňované oblasti [editovat | editovat zdroj]

Alfred Nobel ve své závěti napsal, že z jeho pozůstalosti mají být každoročně udělovány ceny za vynikající činy v pěti oblastech lidské činnosti:

- Nobelova cena za fyziku – udělována švédskou Královskou akademií věd
- Nobelova cena za chemii – udělována švédskou Královskou akademií věd
- Nobelova cena za fyziologii nebo lékařství – udělována institutem Karolinska
- Nobelova cena za literaturu – udělována Švédskou akademií
- Nobelova cena za mír – udělována komisí norského parlamentu

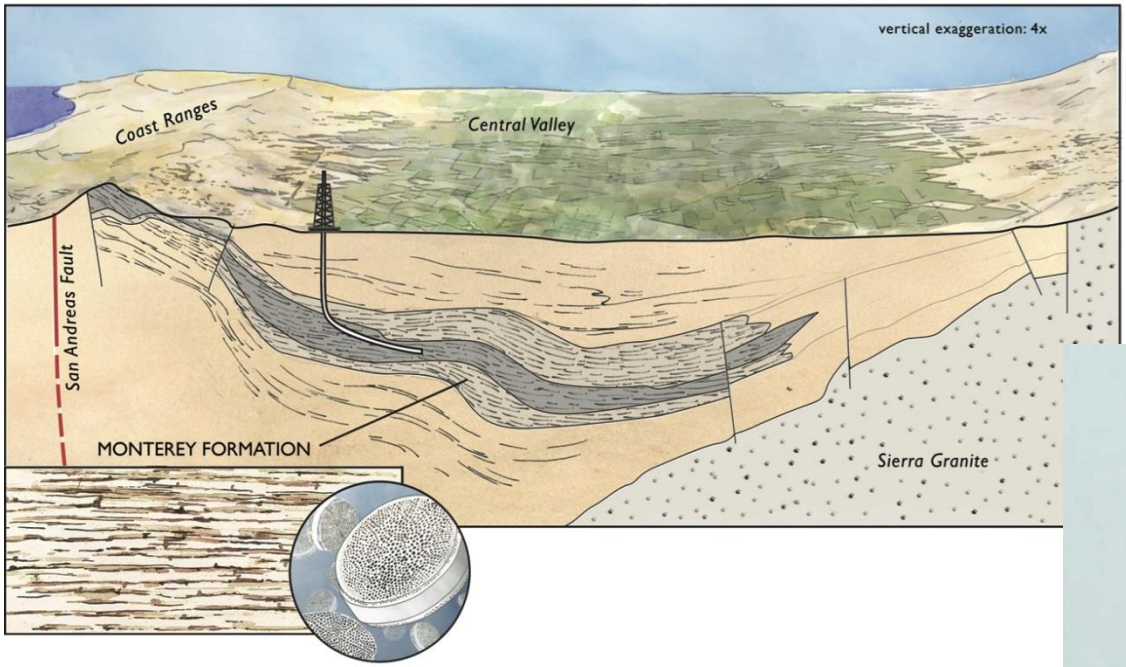
Roku 1968 se Švédská národní banka rozhodla založit Nobelovu cenu za ekonomii, pod názvem *„Cena Švédské národní banky za rozvoj ekonomické vědy na památku Alfreda Nobela"*. Tuto cenu uděluje švédská Královská akademie věd, ale jelikož není zmíněna v Nobelově závěti, peněžní odměna se nevyplácí z Nobelova fondu, a nejedná se tedy o „Nobelovu cenu".[1] Přesto se uděluje společně s ostatními cenami. V roce 1968 však bylo rozhodnuto, že žádné další ceny „na památku Alfreda Nobela" již zaváděny nebudou.

Filtr na výrobu piva

Další filtrační zařízení

Zachytávače kouře a prachu

Vrstvy diatomitu a ropa



Přímé zpracování řas nebo jejich částí na produkt

B. Agar – jméno pochází z malajštiny agar-agar, označení ruduchy *Eucheuma muricatum*

Historie agaru

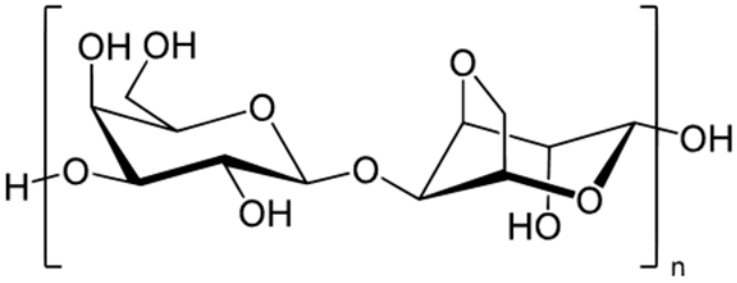
- Objev agaru 1658 Minoya Tarozaemon (Japonsko, Kanten – studené počasí)
- 1859 Anselme Payen – extrakce agru z ruduchy *Gelidium corneum*
- 1882 použití agaru v mikrobilogii – laboratoř prof. Kocha; reálný objev Angelina Fannie Eilshemius Hesse, manželka dr. Walthera Hesse, který pracoval v laboratoři Kocha

Základní data

- Bot tání 85 °C
- Bod tuhnutí 32-40 °C
- Podle amerického lékopisu – suchá hydrofilní koloidní látka izolovaná z *Gelidium cartilageneum*, *Gracilaria confervoides* a příbuzných ruduch.
- Surový agar - jehlicovitý, složený z jemných membranosních proužků, vločkovitých nebo granulosních struktur
- Barva žlutavá, oranžová, našedlá nebo bezbarvá
- Práškový – bílý až žlutavý, nerozpustný ve studené vodě

Existuje pouze jeden agar?

- Chemická struktura agaru závisí na zdroji a způsobu přípravy
- Meer (1980) rozlišuje dva typy agarů, *Gelidium* a *Gracilaria* agary, *Gelidium cartilagineum* – pobřeží Mexika, standartní bakteriologický agar v USA.
- Agar se skládá ze dvou složek – agarosa a agaropektin



Vlastnosti agaru, typ *Gelidium*

- Připravený má podobu gelu, elastickému koloidu, který zaujímá tvar, ve kterém byl vyrobený.
- Gel může obsahovat až 99,9% vody, při této koncentraci může agar vodu uvolňovat v podobě kapek. Vodu lze odstranit opakovaným zmrazením a rozpuštěním.
- Tuhost agaru je dána strukturou – v gelu vznikají dvojité šroubovice agaros, které vytváří síť a na jeden díl agarosy může obsahovat až 100 dílů vody

Schéma agarosové sítě

Gelidium corneum

Gelidium corneum

Vlastnosti agaru, typ *Gracilaria*

- Z produkce 30 tis tun *Gracilaria* cca 5 tis tun agaru
- Agar není zcela stejný a mezi druhy mohou být jeho vlastnosti mírně odlišné, např. druhy Gracilaria z mírného pásu poskutují agar s vyšší pevností než druhy z tropů, důvod? – delší doba růstu a delší čas na tvorbu biomolekul = větší biomolekuly

Gracilaria chilensis

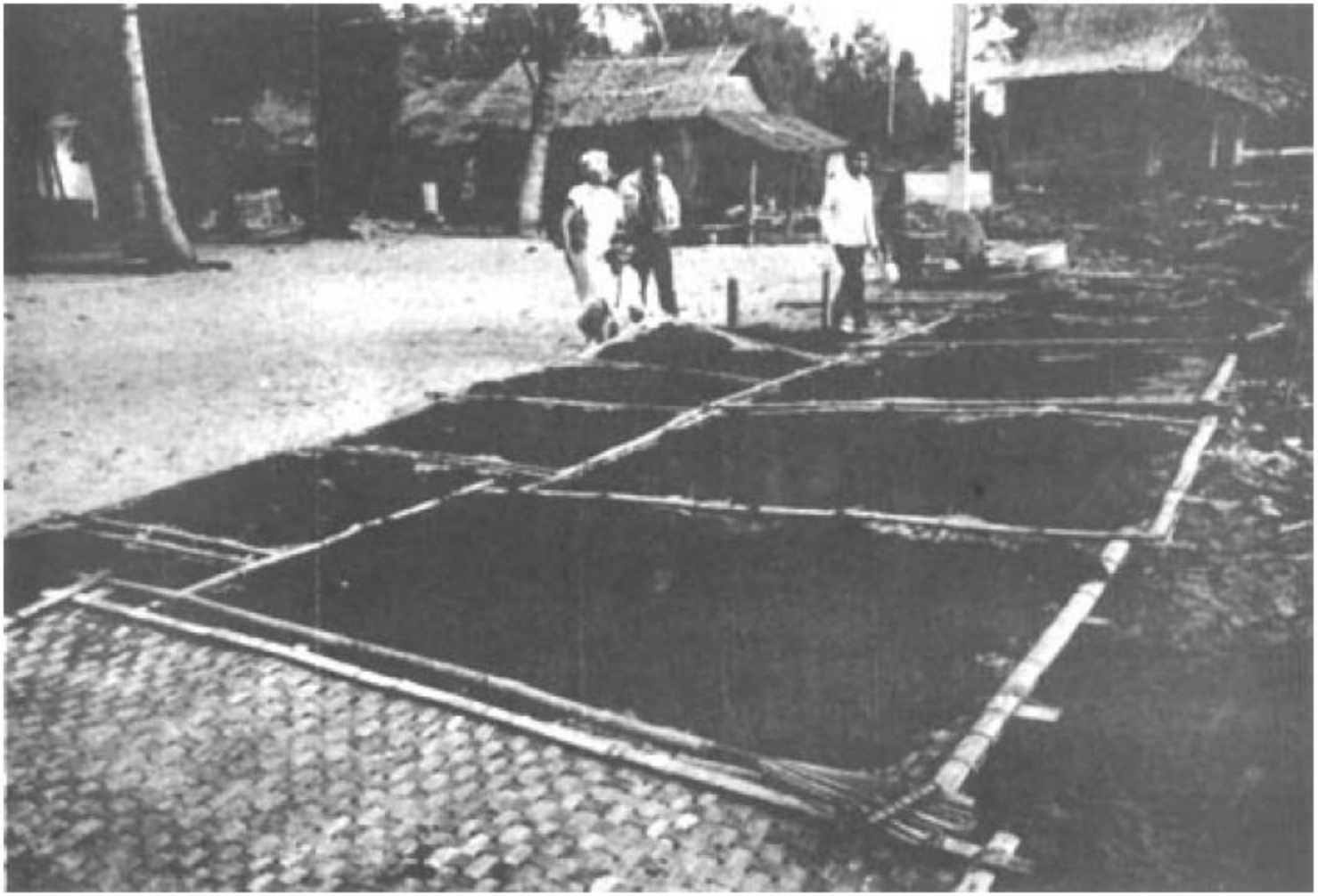
Zjednodušený postup extrakce agaru z rodu *Gracilaria*

- Čištění a separace čerstvé hmoty od příměsí
- Vysušení sběru
- Sběr sušené hmoty do pytlů a převoz ke zpracování
- Kontrola čistoty, udává se v % nečistot a % vlhkosti
- Ošetření před extrakcí:
  - ✓ bělení – opakované namáčení a sušení na slunci
  - ✓ Bělení pomocí vápence – zvýšení pevnosti agaru
  - ✓ Ošetření hydroxidem (NaOH) – zvýšení pevnosti a snížení viskozity agaru, 3-5% NaOH, 95 °C, 60-90 min

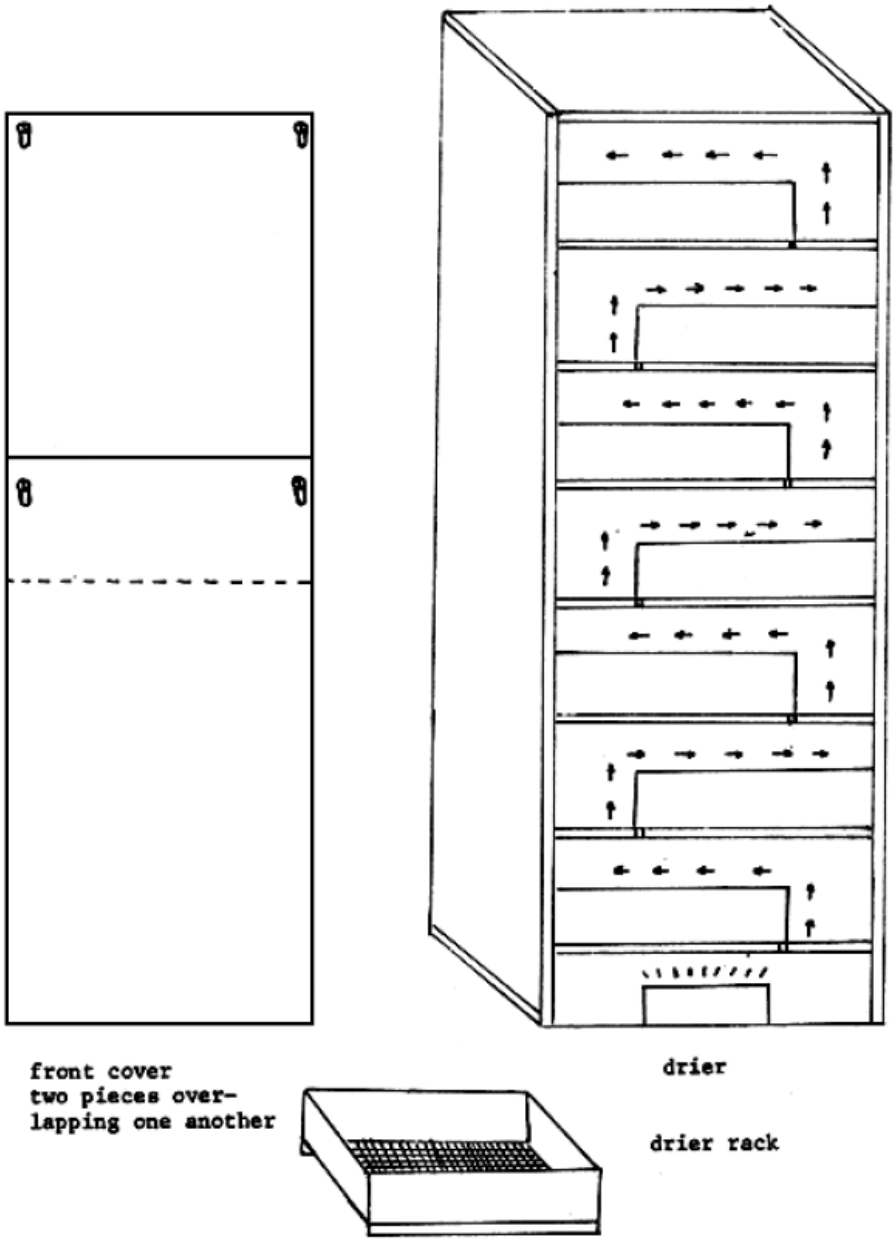
Vlastní extrakce agaru

- Namočit vzorek na 30 min do kys.octové, pH 5,6-6
- Promýt vzorek a zahřát v drtiči na 1h, 95 °C
- Přemístit vzorek do míchačky, zahřívat 3h
- Přelít vzorek do tlakového filtru 50-80 psi
- Přefiltrovanou hmotu napustit na hliníkové pláty a nechat vychladnout v pokojové teplotě
- Tuhý agar na polyesterové síto a pak promývání vodou do bezbarvé formy, poté destilovanou vodou, nakonec isopropanol
- Odstředit isopropanol a roztrhaný vločkovitý agar se přemístí na hliníkovou pánev a zahřívá se na 55-60 °C
- Suchý agar se rozemele na jemný prášek

Sušení agaru v přístavu



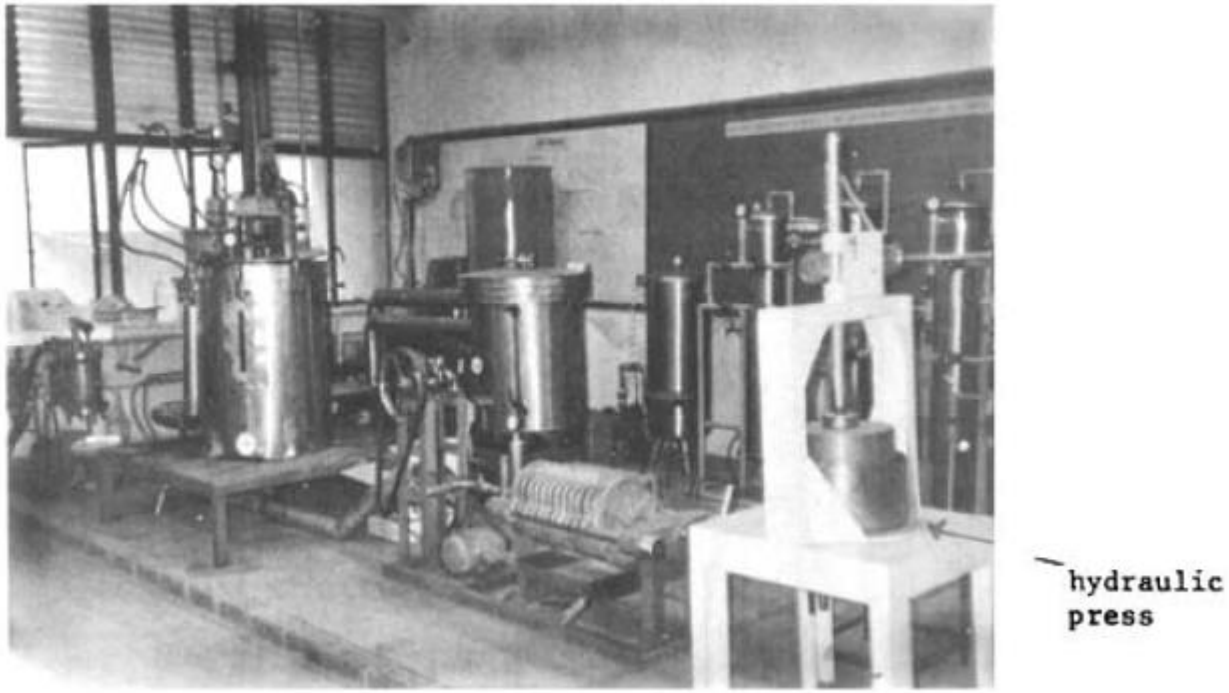
Sušení v rybářské osadě



Improvizovaná sušárna

Transport v pytlích

Skladiště ruduch ve výrobně agaru



Tlakový filtr

Využití agaru

- V roce 1989 pouze 5% světové produkce v mikrobiologii

Příklady použití v potravinářství

- Zmrzlina 0,2-0,5%, stabilizace a zabraňuje přilnutí k obalu
- 0,5-1% zabraňuje lámavosti polevy na koblize, zvyšuje přilnavost a snižuje roztékání
- Přísada do nízkokalorického pečiva, 0,1-1 %, zvětšení objemu
- Do želatinových bonbonů, 0,3-1,8%,
- 0,5-2% pomáhá zlepšovat barvu masných produktů, kuřata, ryby
- Do 1,5% zabraňuje vysychání omáček
- Zlepšuje vlastnosti polevy u sušenek

Yokan

- Agar 1%
- Voda 26,5%
- Cukr 54,3%
- Sůl 0,2%
- Rozmačkané fazole 5,6%
- Další pevné látky 12,4%

Oblate – jedlý papír

- Směs škrobu a agaru
- 100 dílů 5% škrobu
- 200 dílů 2,5% agaru

Mitsuname

- Ovocná dřeň 20kg
- Voda 18 l
- Cukr 28 kg
- Agar 450 g

Vanilková zmrzlina

- Agar 2,6g
- Vanilka 0,2g
- Uhličitan sodný 0,1g
- Barvivo 0,05g
- Mléko 500ml

Další použití agaru

- Výroba hmot pro otisky zubů
- Medicína a farmacie
- Čištění piva a vína
- Výroba pevných podpalovacích kostek z alkoholu
- Barevné potahy papíru, kovů a látek
- Snižování citlivosti roznětek u výbušnin
- Kosmetika
- Výroba agarosy

Seaweeds

- Makroskopické mořské řasy ze skupiny – ruduch, chaluh a zelených řas
- V Japonsku kombu (hlavně chladné vody, *Laminaria*), wakame (*Undaria*), nori (*Porphyra*)
- Anglicky mluvící země: Wrecks (typ *Fucus*), kelp (typ *Laminaria*)
- Jednoletky/víceleté druhy, kalcifikované typy až 100 let

Laminaria digitata

Macrocystis pyrifera

Fucus vesiculosus

Saccharina japonica

Chondrus crispus

Porphyra umbilicalis

Caulerpa sertularioides

Codium fragile

Produkty z chaluh - čističe

Product Name	Company Name	Description	Seaweed Used
Sea Clean Industrial Oil Remover	Shropshire Seaweed Company	UK	*Laminaria digitata*
Sea Clean Eco Oven Cleaner	Shropshire Seaweed Company	UK	*Laminaria digitata*
Seaweed BBQ Cleaner	Shropshire Seaweed Company	UK	*Laminaria digitata*
Seaweed Patio Cleaner	Shropshire Seaweed Company	UK	*Laminaria digitata*
Eco Bike Cleaner	Shropshire Seaweed Company	UK	*Laminaria digitata*
Seaweed Oil Stain Remover	Shropshire Seaweed Company	UK	*Laminaria digitata*
Heavy Duty Tyre Mark Remover	Shropshire Seaweed Company	UK	*Laminaria digitata*
Annual Health Kit for Septic Tanks	Shropshire Seaweed Company	UK	*Laminaria digitata*

Sea Sure Annual Health Kit for Septic Tanks

Click to zoom

Septic tanks require ongoing care if expensive and unpleasant complications and breakdowns are to be avoided. After all, the bacteria population within a septic tank, which is crucial to its proper functioning, tends to diminish over time, either from irregular water flow or from the influx of anti-bacterial products, such as bleach or other detergents. When this population starts to wane, expensive and unpleasant blockages and smells become more likely. Compared to the cost of emergency pumping or plumbing work, which can often run into hundreds of pounds, a regular maintenance programme for your septic tank can be a very wise investment indeed.

Our *Sea Sure Annual Health Kit* offers unbeatable protection against septic tank problems by regularly topping up the bacteria within your system. It does this by combining fresh bacteria spores (BioBoost Tablets) with a special natural tonic (Sea Sure) made from *Ascophyllum nodosum* seaweed, which stimulates and supports the new microbes, giving them everything they need to multiply when they get in the tank.

Each *Sea Sure Annual Health Kit* comprises one litre of Sea Sure and twelve BioBoost Tablets. Once a month, measure out around 500ml of warm water in a jug or bucket and pour in approximately 80 ml of Sea Sure. Take one BioBoost Tablet out of the handy re-sealable tube and flush into your septic tank via a connected toilet.

Details

SKU	SKU4115
Quantity in stock	50 item(s) available
Weight	1.50 kg
Seaweed ingredients	*Ascophyllum nodosum*
Our price:	**$52.00**

Sea Clean Industrial Oil Remover (5 Litres)

Click to zoom

Versatile Cleaning Product: *Sea Clean Industrial Oil Remover* is ideal for cleaning floors prior to the application of coatings, seals and other finishes, or for safely dealing with oil or fuel spills before they can become a major health and safety issue. It is suitable for use on a range of surface types, including concrete, metals, plastics and ceramics.

Extremely Low Risk: *Sea Clean Industrial Oil Remover* has no caustic alkalis, silicates, phosphates, harmful solvents or aggressive biocides, which makes it extremely low-risk to handle and store on site, posing no threat to employee health. It's not flammable, can be handled without gloves and does not need to be stored in a bonded warehouse.

Environmentally Sound: *Sea Clean Industrial Oil Remover* is derived from sustainably harvested British *Laminaria digitata* seaweed stocks and reinforced with other organic plant extracts. It is therefore an environmentally responsible option for business, posing no threat to the local eco-system whatsoever.

Details

SKU	SKU411621
Quantity in stock	50 item(s) available
Weight	5.50 kg
Seaweed ingredients	*Laminaria digitata*

Our price: **$67.00**

Produkty z chaluh – hnojiva a zahrada

Product Name	Company Name	Country	Seaweed Used
Nature's Way Seaweed Booster Concentrate	Yates	Australia	bull kelp seaweed
Nirvana Bloom Enhancer	Advanced Nutrients	Canada	*Ascophyllum nodosum*
Lawn Food 2.5-1-5	BioFert	Canada	*Ascophyllum nodosum*
Seaweed Extract Powder	East Coast Seaweed Inc	India	*Ascophyllum nodosum*
Seaweed Compost Accelerator	Shropshire Seaweed Company	UK	*Ascophyllum nodosum*
Seaweed Growth Enhancer	Shropshire Seaweed Company	UK	*Ascophyllum nodosum*
AlgeaFert Meal	AlgeaAS	Norway	*Ascophyllum nodosum*
K-Boost	Custom Ag Formulators	U.S.	*Ascophyllum nodosum*
Eco-Nereo Kelp Liquid Auxiliary	Eco-Nutrients	U.S.	*Nereocystis luetkeana*
BioFlora Seaweed Creme	Global Organics Group	U.S.	*Ascophyllum nodosum*
Seaweed Extract	Grow More Inc.	U.S.	*Ascophyllum nodosum*
Seaweed Turf Product	UAS of America	U.S.	*Ascophyllum nodosum*
Vigaroot	Becker Underwood	U.S.	*Ascophyllum nodosum*
Organic Liquid Kelp	Peaceful Valley Farm & Garden Supply	U.S.	*Nereocystis luetkeana*
Sea-Kelp 100	Organics RX	U.S.	*Ascophyllum nodosum*
Black Gold Soil Conditioner	Sun Gro Horticulture	U.S.	*Ascophyllum nodosum*
Vital Soluble Kelp Powder 1-1-17	Vital Garden Supply	U.S.	*Ascophyllum nodosum*
Seasol	Seasol	Australia	*Durvillaea potatorum*, *Ascophyllum nodosum*
MYCO Tabs w/NPK	Tri C Enterprises	U.S.	*Ascophyllum nodosum*
Marinis Seaweed	Rubicon Organic	Canada	*Ascophyllum nodosum*
Alga600 Soluble Seaweed Extract Powder	Leili	China	*Sargassum spp.*
Organic Liquid Seaweed	Bloomfield Agritech	India	*Durvillaea potatorum*
Scuba Formula 9	Hi Field-AG Chem	India	*Ascophyllum nodosum*
AfriKelp® LG-1	AfriKelp Ltd	South Africa	*Ecklonia maxima*
Bloom SeaFuel	Agricultural Organics Pty Ltd	Australia	*Durvillaea potatorum*
MasterZyme	M.D. Biocoals	India	*Ascophyllum nodosum*
Titan Top Dress Fertiliser & Soil Conditioner	Arramara Teoranta	Ireland	*Ascophyllum nodosum*
Sea Rose Fertilizer	Saltwater Farms	U.S.	*Ascophyllum nodosum*
Liquid Seaweed Gold	Fair Dinkum Fertilizer	Australia	*Durvillaea potatorum*
Algacrop	Agrhusa Agrobiologicos	Mexico	*Ascophyllum nodosum*, *Laminaria spp.*, *Sargassum spp.*

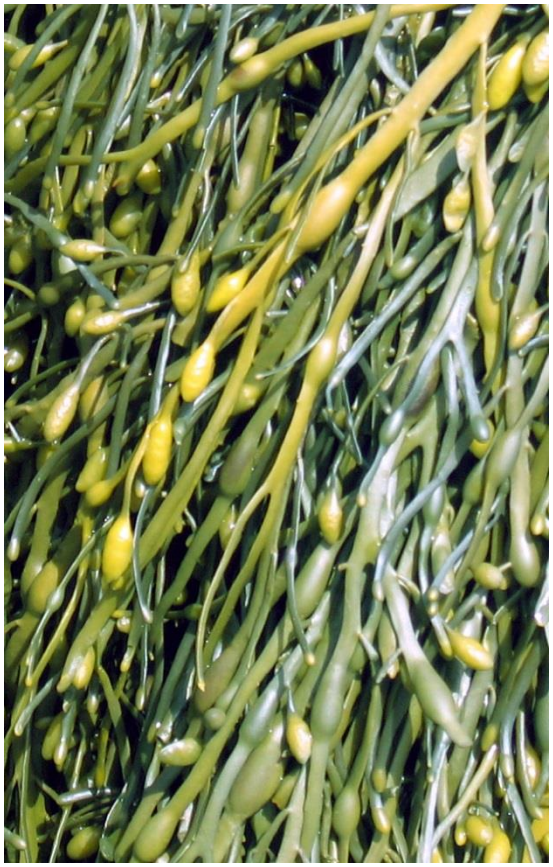
Click to enlarge

Price:	$13.50
Availability:	In Stock
Model:	UPC22632
Average Rating:	Not Rated

Available Options:

Additional Sizes:
Please Choose...

Qty: 1 Add to Cart



Description | **Additional Images (1)** | **Reviews (0)** | **Related Products (0)**

Sea Rose Fertilizer (2-1-2)

Sea Rose is a custom fertilizer for roses developed at the request of professional growers. Sea Rose begins with a base of our Seaweed/Fish fertilizer. To this we add black strap molasses and various vitamin supplements. Additionally, we add sulphur as both a nutrient source and to help control black spot and other fungal disorders. Sea Rose stimulates bud development, creates longer bloom cycles and brings out more vivid color.

Sea Rose is mixed a rate of 3 Tbsps. per gallon of water and applied as a foliar spray every 1 to 3 weeks during the growing season.

PVFS Organic Liquid Kelp (Gallon) - F1331

Plant Nutrition

$19.99 1 Add to Cart Wishlist

- Qualifies for $11.99 per package flat rate shipping in the Continental US.
- In stock. Ships from our warehouse in Northern California.

3 Reviews | Add Your Review

Buy big, save big with quantity discounts
Buy 10 for $15.99 each and **save 21%**

MEETS NOP ORGANIC

Our supplier has submitted to us a letter of compliance with the National Organic Program which means this product should be suitable for use in organic agriculture, however an organic input review board has not verified these claims. Please confirm that the product is allowed by your certifying agency.

We do our best to update our product's organic status, however the status of any product can change at anytime without notice from the manufacturer. Please confirm that the product is allowed by your certifying agency and that it's still on CDFA's organic input material list at cdfa.ca.gov

Description | Details | Reviews | Articles | Support

Cold-processed liquid kelp. Enzymatically digested, concentrated liquid extract of California Bull Kelp *(Nereocystis luetkeana)*, harvested from kelp beds in the Pacific Ocean off the Northern coast of California. Freshly harvested kelp is rapidly processed at low temperatures, using naturally occurring enzymes isolated from the kelp, to digest and liquify the chopped kelp into a dark liquid extract.

This cold water enzymatic process preserves all the very important hormones, auxins, giberillins, enzymes, proteins, vitamins and minerals found in Bull Kelp,

Produkty z chaluh – péče o tělo

Product Name	Company Name	Country	Seaweed Used
Glamour Gloss Volumizing Lip Gloss	Too Faced	U.S.	*Alaria esculenta*
EndZit Blemish Control Moisturizer	Abbe Labs	U.S.	*Ahnfeltiopsis concinna*
Rub a Dub Dub organic body care soap	Voya	Ireland	*Fucus serratus*
Daytime Wrinkle Minimizer	Adrien Arpel	U.S.	*Ahnfeltia concinna*
Super Moisturising Hand Cream	BalanceMe	UK	*Chondrus crispus*
Essential Hydration Cream	Alpha-H	Australia	*Corallina officinalis*
Pacific Seaweed Soak	Beauty through Balance	Canada	*Macrocystis integrifolia*
Gentle Foaming Facial Cleanser	Be Natural Organic	U.S.	*Ascophyllum nodosum*
Your Best Baby Bump Duo (containing Elasticity Belly Oil & All Day Moisture Body Lotion)	Belli Skincare	U.S.	*Chondrus crispus*
Detoxifying Soap Bar with Grapefruit, Lemon & Seaweed	Bentley Organic	UK	*Fucus vesiculosus*
Dulse Liquid Iodine Dietary Supplement	Bernard Jensen International	U.S.	*Palmaria palmata*
Brow Boost	Billion Dollar Brows	U.S.	*Laminaria digitata*, *Pelvetia canaliculata*
Bliss Fabulous Every Day Eye cream	Bliss World LLC	U.S.	*Laminaria digitata*
Beeswax & Royal Jelly Eye Cream	Burt's Bees	U.S.	*Chondrus crispus*
Scottish Intensive Seaweed Conditioner	Diana Drummond	UK	*Laminaria digitata*, *Chondrus crispus*, *Ascophyllum nodosum*, *Ulva lactuca*, *Rhodymenia Palmata*
Visible Brilliance Skin Cream	Elemis	UK	*Palmaria palmata*
Truly Matte Hydra-Matte Lotion	Clarins	France	*Codium tomentosum*
Seaweed Shampoo	Faith in Nature	UK	*Ascophyllum nodosum* seaweed powder
Brazen Brown Conditioner	Ted Gibson Salon	U.S.	*Macrocystis pyrifera*
Non Foaming Liquid Sea Bath	Biostase	France	*Laminaria digitata*
Nu Skin 180° Skin Mist	Nu Skin	U.S.	*Hypnea musciformis*
Eau de Oceanique Organic Sea Mineral Mist	SweetSation Therapy	U.S.	*Ascophyllum nodosum*
Aromatic Seaweed Body Wash	Astara Skin Care	U.S.	*Laminaria digitata*
Kelp Shampoo	The American Remedies	U.S.	*Saccharina angustata*
Sea Plus Renewal Night Cream	Alba Botanica	U.S.	*Chondrus crispus*, *Laminaria digitata*, *Macrocystis pyrifera*, *Ulva compressa*, *Ulva lactuca*
Smoothing Sea Kelp Shampoo	JASÖN	U.S.	*Laminaria digitata*
Tanning Creme SPF 2 Lotion	Hawaiian Tropic	U.S.	*Fucus vesiculosus*
Fresh Seawater Mist	Algologie	France	*Chondrus crispus*, *Alaria esculenta*
GLY-SEA-MAX Formula	Douglas Lab	U.S.	*Ascophyllum nodosum*, *Fucus vesiculosus*
Aerobic-Morning Burst Capsules	Oscellation	U.S.	*Palmaria palmata*
Pacific Mist	Marie Veronique Organics	U.S.	*Macrocystis pyrifera*
Full Spectrum Brown Seaweed Supplement	Swanson Health Products	U.S.	*Undaria pinnatifida*
Preg-Ease	Fairhaven Health	U.S.	*Saccharina japonica* (previously known as *Laminaria japonica*)
S.M.A.R.T. Skin Perfecting Mask	Grand Central Beauty	U.S.	*Porphyra umbilicalis*, *Fucus vesiculosus*, *Laminaria digitata*
Skin Prep	Christopher Drummond Beauty	U.S.	*Laminaria digitata*, *Porphyra* and *Chondus crispus*
YouthShield Naturals Balancing Toner with Seaweed Extract	Native Remedies	U.S.	*Chondus crispus*
Active Cleansing Milk	Algaeron Skincare	UK	*Ecklonia maxima*

Luxury De-Age Line Serum Eye	Ampleur	Japan	*Laminaria ochroleuca*
Mermaid Bath Bomb	Lush Cosmetics	U.S.	*Eisenia arborea*
Mud Masque Seaweed/French Green Clay	Amber Products	U.S.	Laminaria, *Ulva lactuca*
Seaweed Shampoo	Bumble and Bumble	U.S.	*Macrocystis pyrifera*, *Ascophyllum nodosum*
Balancing Mask Clay & Seaweed Treatment	ChellaSkinCare	U.S.	*Porphyra umbilicalis*, *Undaria pinnatifida*, *Ulva lactuca*
Mermaids Garden Soap	Casco Bay Soap Company	U.S.	*Palmaria palmata*
Blemish Wash Facial Scrub	Good for You Girls	U.S.	*Laminaria digitata*
Spa Sea Marine Triple Butter Body Cream	H2O_Plus	U.S.	*Undaria pinnatifida*, *Ulva lactuca*
Fibronol	JP Renew	U.S.	*Ecklonia cava*
Lineless Eye Cream	Dr. Brandt	U.S.	*Ahnfeltia concinna*
Bergamot Purifying Cleanser	Enessa	U.S.	*Porphyra umbilicalis*, *Fucus vesiculosus*, *Palmaria palmata*
Sea Cleanse Foaming Seaweed Cleanser	Repechage	U.S.	*Laminaria digitata*, *Ascophyllum nodosum*
Seaweed Cleansing Soap	Mario Badescu	U.S.	*Fucus vesiculosus*
Aloe Vera & Seaweed Hydrating Gel	Base Formula	U.K.	*Chondus crispus*
Nutra-Lift® Close Comfort After Shave & Moisturizer	Nutra Lift	U.S.	*Chondus crispus*
Age-Defying Therapy Moisturizer	Aubrey Organics	U.S.	*Laminaria ochroleuca*
Undaria Algae Oil	Osea Malibu	U.S.	*Undaria pinnatifida*
Curly Shampoo	Paul Labrecque	U.S.	*Macrocystis pyrifera*
Seaweed Soap	Pure Life Soap Co	U.S.	*Macrocystis pyrifera*, *porphyra umbilicalis*
Seaweed and Sage Body Wash	REN Skincare	UK	*Fucus vesiculosus*
Velvet Body Nourishing Seaweed Oil	Spa Glo	U.S.	*Laminaria digitata*
Diet Power	Sprayology	U.S.	Fucus
Advanced Anti-Aging Repairing Oil	Algenist	U.S.	*Alaria esculenta*
Color Correction Makeup	LORAC Cosmetics	U.S.	*Saccharina japonica* (previously known as *Laminaria japonica*)
North Atlantic Kelp Tablets	Solgar Vitamins	U.S.	*Ascophyllum nodosum*
Kelslim Kelp Capsules	Kelslim	South Africa	*Ecklonia maxima*
Skin Clearing Face & Body Wash	Clark's Botanicals	U.S.	*Fucus vesiculosus*
Dewy Skin Mist	Tatcha	U.S.	*Betaphycus gelatinum*
Wildly Natural Seaweed Detox Cellulite Soap	Seaweed Bath Co	U.S.	*Fucus vesiculosus*
Facial Cleansing Mask for Men	Menscience Androceuticals	U.S.	*Laminaria digitata*
Liquid Lip Gloss	Mineral Fusion	U.S.	*Macrocystis pyrifera*
Apple Cider Vinegar Shampoo	Morrocco Method International	U.S.	*Macrocystis pyrifera*
Gentle Face Wash	Obiqo Skincare	New Zealand	*Ecklonia radiata*
Chamomile Cleansing Milk	Naturopathica Holistic Health	U.S.	*Chondus crispus*
Rapid Exfoliating Serum	NIA24	U.S.	*Palmaria palmata*
Organic Citrus Blemish Lotion	Novena Maternity	U.S.	*Ascophyllum nodosum*
Organic Fragrance Free Moisturizing Shampoo	Nurture My Body	U.S.	*Chondus crispus*
Bioactive Berry White Peat Exfoliant	Red Flower	U.S.	*Chondus crispus*
Hydra Calming Moisturising Creme	Nvey Eco	U.S.	*Chondus crispus*
After-Shave Gel	Art of Shaving	U.S.	*Laminaria digitata*
PMD Neuro Neutralizing Toner	Personal Microderm	U.S.	*Corallina officinalis*
Instant Firmx™ Temporary Face Tightener	Peter Thomas Roth Labs	U.S.	*Chondus crispus*
The Great Mystery One-Minute Facial	Philosophy.com	U.S.	*Macrocystis pyrifera*, *Fucus vesiculosus*
Papaya and Coconut Color Retention Conditioner	Freeman Beauty	U.S.	*Macrocystis pyrifera*

Papaya and Coconut Color Retention Conditioner	Freeman Beauty	U.S.	*Macrocystis pyrifera*
Youth-Boosting Foundation & Brush	Physicians Formula	U.S.	*Laminaria digitata*
Sea Algae Serum	evanhealy	U.S.	*Fucus vesiculosus, Ascophyllum nodosum*
Botanical Eye Contour Cream	Pomega, Inc.	U.S.	*Laminaria digitata*
Fresh Fig Bar Soap	Pure & Basic	U.S.	*Macrocystis pyrifera*
Quadra Benefit Eye Serum	pur~lisse beauty LLC	U.S.	*Macrocystis pyrifera*
Mickey and Minnie Mouse KidSport SPF30 Lotion	All Terrain	U.S.	*Fucus vesiculosus*
Rooibos Red Tea, Red Seaweed and Australian Pink Clay Facial Clay	Manuela Valenti, LLC	U.S.	*Palmaria palmata*
Skin Resurfacer	Revision Skincare	U.S.	*Laminaria digitata*
Night Recovery	Salon Naturals	U.S.	*Porphyra umbilicalis*
Heart Body Lotion	Garden Botanika	U.S.	*Chondus crispus*

bar soap

- FRESH FIG
- GREEN TEA
- HONEY SHEA BUTTER
- MINI BAR SOAP SET
- WHITE TEA
- WILD BANANA VANILLA

Contains: Green Tea, Fig and Sea Kelp

This highly aromatic bar soap, contains sea kelp to help exfoliate and give an invigorating glow to the skin, while drenching the body in the anti-oxidant benefits of green tea, all beautifully wrapped in a gorgeously scented bar of fresh fig and pomegranate

Directions: Use daily. Work up lather. Rinse well.

Suggested U.S. Retail Price:
6.4 oz / 180 g - **$4.99 each**

Ingredients: Sodium Palmate, Sodium Cocoate, Water, Glycerin, Botanical Fragrance, Macrocystis Pyrifera (Sea Kelp) Extract, Ficus Carica (Fig) Extract, Lotus Corniculatus (Lotus Seed) Extract, Camellia Sinensis (Green Tea) Leaf Extract, Titanium Dioxide, and Sodium Chloride

Apple Cider Vinegar Shampoo 12.0 oz

Apple Cider Vinegar Shampoo is formulated to increase the blood flow to the scalp while helping to balance the pH of the hair and scalp. Perfect for ALL hair types.

Ask a question about this product

Price:

$29.00

Size

12.0 oz

1 + −

Add to Cart

Description | Ingredients | Multi Use | Pet Use | Reviews | Product Video

- Water (Aqua)
- Raw Apple Cider Vinegar (Acetic Acid)
- Aloe Vera (Aloe Barbadensis)
- Soapbark Extract (Quillaya Saponaria)
- Green Tea (Thea Sinesis Saponin)
- Naturally Foaming Cactus (Opuntia Erinacea)
- Blood of the Dragon Rare Proteins (Jatropha Dioica)
- Brown & Red Algae (Algae Macrocystis Purifera)
- Kelp
- Essential Oils of Almond (Amygdalus Communis), Ginger (Zingiber Afficinale), Sesame (Sesamum Indicum), and Tangerine (Citrus Reticulata)
- Trace Minerals and Rare Plant/Marine/Fruit Proteins as Natural Preservatives

Produkty z chaluh – domácí zvířata

Product Name	Company Name	Country	Seaweed Used
Acadain Kelp Meal	Organic Crop Protectants	Australia	*Ascophyllum nodosum*
Seaweed Calcium supplemental	Animal Essentials	U.S.	*Lithothamnium calcareum*
Equimins Herba-Clean Herbs	Equimins	UK	*Ascophyllum nodosum*
FORZA10 Every Day with Fish and Algae	Forza10	Italy	*Ascophyllum nodosum*
Organic Ocean Kelp	Animal Essentials	U.S.	*Laminaria digitata*
Malted Kelp Tablet	Dorwest	U.K.	*Fucus vesiculosus*

ANIMAL essentials®

Organic Ocean Kelp

This **PREMIUM QUALITY, USDA CERTIFIED ORGANIC KELP** is harvested from the icy waters of Northwestern Iceland where it naturally grows in a clean environment rich in alluvial minerals. It is harvested with the strictest international standards for sustainability, separation of raw material, traceability of products and contamination control at all stages of the production process.

Animal Essentials ORGANIC OCEAN KELP is dried at a uniform low temperature by hot geothermal water fed through heat exchangers. This procedure ensures all the minerals and organic substances are preserved, prevents surface oxidation and browning of the meal as often seen in oil, coal-dried or sun-dried product. The use of the geothermal water also means the production process is very environmentally friendly.

Our kelp is distinguished from most other brands as it is one of the only kelp products currently available that is sustainably harvested, dried, milled and bagged following the organic standards of QAI (Quality Assurance International) in the U.S., and TUN, the local Icelandic certification authority.

Our OCEAN KELP contains Laminaria digitata, an expensive kelp generally not included in pet kelp supplements.

The U.S.D.A. National Organic Program seal is printed on each package.

Available in 8oz and 1.5 lb sizes.

Kelp is a rich source of natural vitamins and minerals including essential trace elements for balanced growth, health and reproduction, and animals LOVE the taste!

Feeding Directions - Add to each meal:

Dogs under 25 lbs. - 1/4 teaspoon

Dogs 25-50 lbs. - 1/2 teaspoon;

Dogs 50+ lbs. - 1 teaspoon

Size	Qty	SKU	Price	Total	
8oz./237g. bag	1	WMkelp8oz.	$14.95 ea.	$14.95	Add to Cart

Produkty z chaluh – potraviny

Product Name	Company Name	Country	Seaweed Used
Dulse Flakes	Eden Foods	U.S.	*Palmaria palmata*
Dulse Flakes	FestAlgue	France	*Palmaria palmata*
SeaSnax	SeaSnax	U.S.	*Porphyra umbilicalis*
KiwiWakame Seaweed Seasoning	KiwiWakame	New Zealand	*Undaria pinnatifada*
Karengo & Tamarillo Chutney	Pacific Harvest	New Zealand	*Pyropia columbina*
Julienne Soup with Sea Vegetables	Algamar	Spain	*Undaria pinnatifida*
Dulse Butter	Pembrokeshire Beach Food Company	UK	*Palmaria palmata*
Pepper Dulse Butter	Pembrokeshire Beach Food Company	UK	*Osmundea pinnatifida*
Kombu Flakes	Just Seaweed	UK	Laminaria digitata

Pepper Dulse Butter

A lovely treat made from organic Welsh Butter, Pepper Dulse and Spices.

Pepper Dulse is a seaweed found along our coasts which has an exquisite peppery / Truffle like flavour. Try a little with your oven baked fish or pan fried shellfish, or mixed with hot pasta!
Pepper dulse butter is pepper dulse which has been cooked in welsh organic butter and then very lightly spiced. Fresh pepper dulse packs a huge amount a flavour which we capture in this product. This is only used on special occasions in the beach shack as the seaweed is difficult to harvest growing in small strands at low tide but it is very lovely and worth the effort!
Ingredients: pepper dulse, welsh organic butter, salt, smoked paprika, white pepper
No artificial ingredients or preservatives
Allergens: contains seaweed, Milk

Jar Details
100ml – Bio-plastic

This product is supplied chilled
Store in a refrigerator for up to 10 days
Once opened we recommend that you eat within 4 days

Please note that this product is only suitable for postage in the UK and Europe.

£3.90

Qty: 1 add

Osmundea pinnatifida

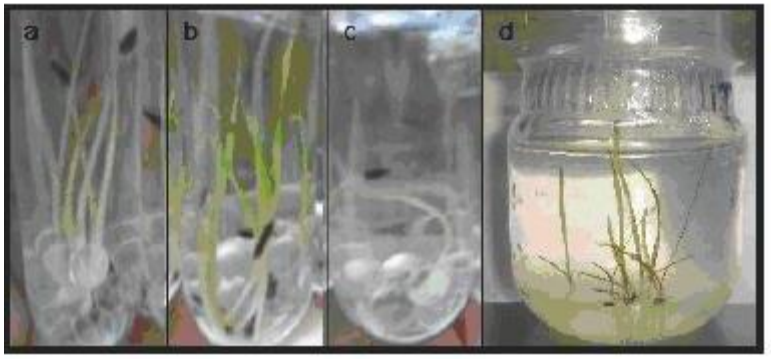
Video ukázky z technologie seaweeds

- Ukázka pěstování mořských řas a jejich zpracování v Indii: https://www.youtube.com/watch?v=qHo5db8kQO
- Technologie z Filipín: https://www.youtube.com/watch?v=NZFNNVmQ
- Těžba chaluh – problémy masivní těžby a ochrany přírody: https://www.youtube.com/watch?v=hEIAlBFjdC

Izolace a kultivace

Kultivační media

- Tekutá – nejčastěji používané typy medií: Z, BG_{11} – sinice, BBM – zelené řasy, WC – rozsivky, OGM – krásivky
- Pevná – obvykle 1,5% agar
- Bifázová – kombinace tekutého media s pevným podkladem (agar, kouky



Složení media Z

$MgSO_4 \cdot 7H_2O$	0.25 g
$NaNO_3$	0.467 g
$Ca(NO_3)_2 \cdot 4H_2O$	59 mg
NH_4Cl	31 mg
Na_2CO_3	0.02 g
FeEDTA solution	10 ml
Gaffron micronutrients	1.0 ml
Deionized water to	1.0 L

FeEDTA solution:
Made in two solutions:
Solution A - 2.8 g $FeCl_3$ in 100 ml 0.1 N HCl
Solution B - 3.9 g $EDTANa_2$ in 100 ml 0.1 N NaOH
Add 10 ml solution A and 9.5 ml solution B plus water to 1 L.

Gaffron micronutrients

H_3BO_3	3.1 g
$MnSO_4 \cdot 4H_2O$	2.23 g
$ZnSO_4 \cdot 7H_2O$	0.22 g
$(NH_4)_6Mo_7O_{24} \cdot 4H_2O$	0.088 g
$Co(NO_3)_2 \cdot 6H_2O$	0.146 g
$VOSO_4 \cdot 6H_2O$	0.054 g
$Al_2(SO_4)_3K_2SO_4 \cdot 2H_2O$	0.474 g
$NiSO_4(NH_4)_2SO_4 \cdot 6H_2O$	0.198 g
$Cd(NO_3)_2 \cdot 4H_2O$	0.154 g
$Cr(NO_3)_3 \cdot 7H_2O$	0.037 g
$Na_2WO_4 \cdot 2H_2O$	0.033 g
KBr	0.119 g
KI	0.083 g

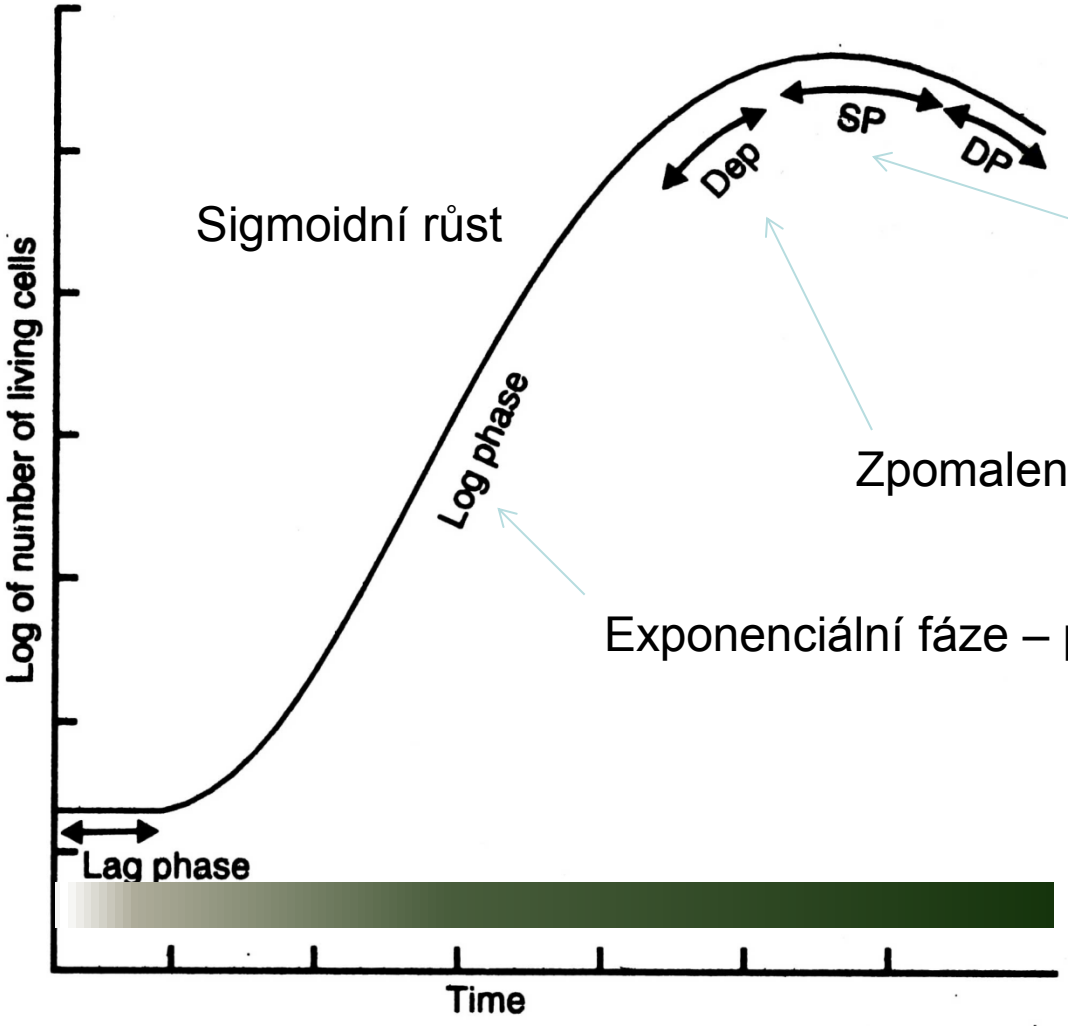
Složení media BBM

Stock Solutions	**per Litre distilled water (dH_2O)**	
1. $NaNO_3$	25.0 g	
2. $CaCl_2.2H_2O$	2.5 g	
3. $MgSO_4.7H_2O$	7.5 g	
4. K_2HPO_4	7.5 g	
5. KH_2PO_4	17.5 g	
6. NaCl	2.5 g	
7. EDTA KOH	50.0 g 31.0g	
8. $FeSO_4.7H_2O$ H_2SO_4	4.98 g 1.0 mL	
9. H_3BO_3	11.42 g	
10. Micronutrients $ZnSO_4.7H_2O$ $MnCl_2.4H_2O$ MoO_3 $CuSO_4.5H_2O$ $Co(NO3)_2.6H_2O$	$g.L^{-1}$ 8.82 g 1.44 g 0.71 g 1.57 g 0.49 g	Add each constituent separately to ~800 mL of dH2O and fully dissolve between each addition. Then make up to 1L.

Stacionární kultivace

Kultivace v uzavřeném systému

Ukázka kultivační křivky stacionární kultury



Sigmoidní růst

Odumírání kultury

Stacionární fáze
Ukládání zásobních produktů, škrob, oleje

Zpomalení růstu – lineární fáze

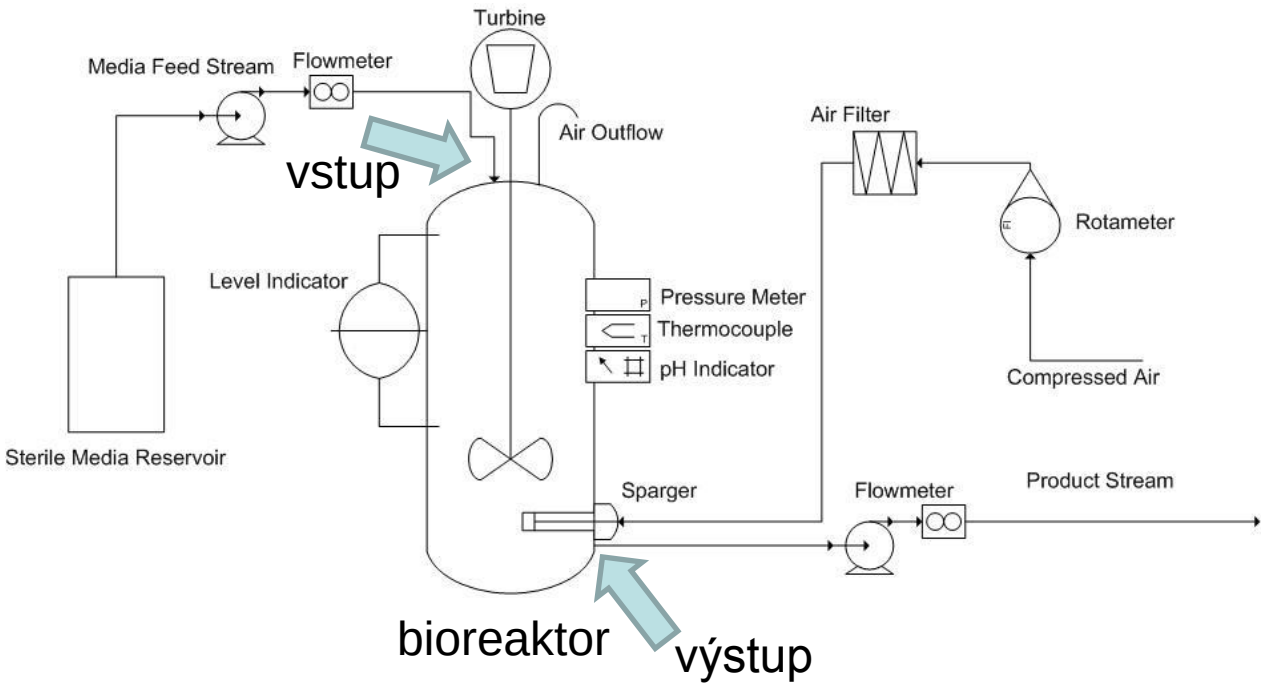
Exponenciální fáze – prudká akcelerace růstu

Klesá průhlednost a množství dostupných fotonů

Kontinuální kultivace

- Dlouhodobé kultivování
- Otevřený nebo částečně otevřený systém
- Průběžná kultivace s postupným doplňováním živin a odebíráním produktů
- Sofistikovaná kultivační zařízení oproti stacionárním kultivacím – specifická zařízení se vstupy a výstupy - bioreaktory

Schéma kontinuální kultivace



Úroveň media na vstupu a výstupu je stejná

Vhodné pro testování vhodných kultivačních podmínek, zachování optimálních růstových rychlostí

Jednoduché nastavení reakčních podmínek

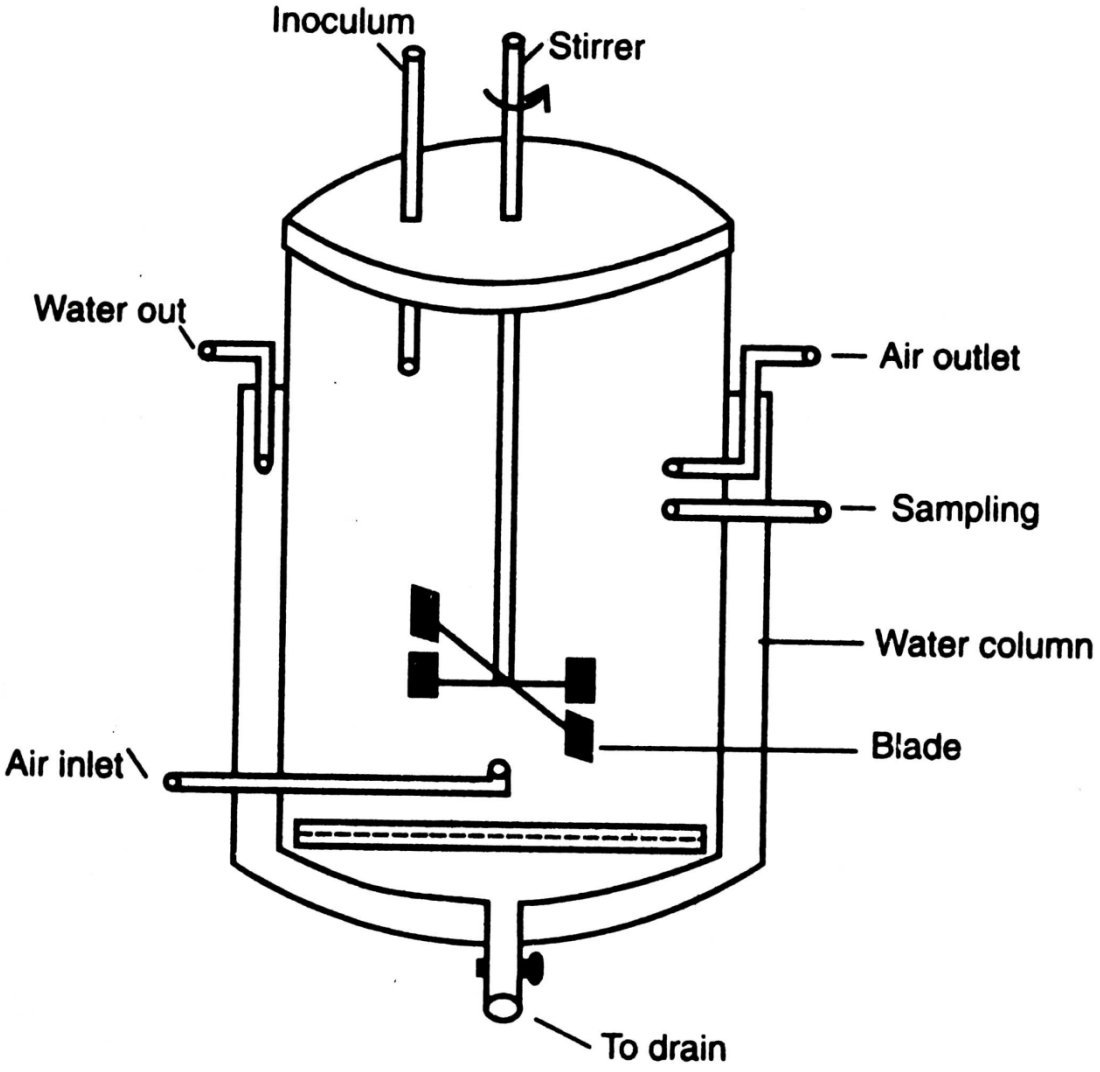
Produktivita

- Stacionární vs. Kontinuální kultivace

Nízké vstupy,
Investice
Energie
Vybavení
Nižší
produktivita

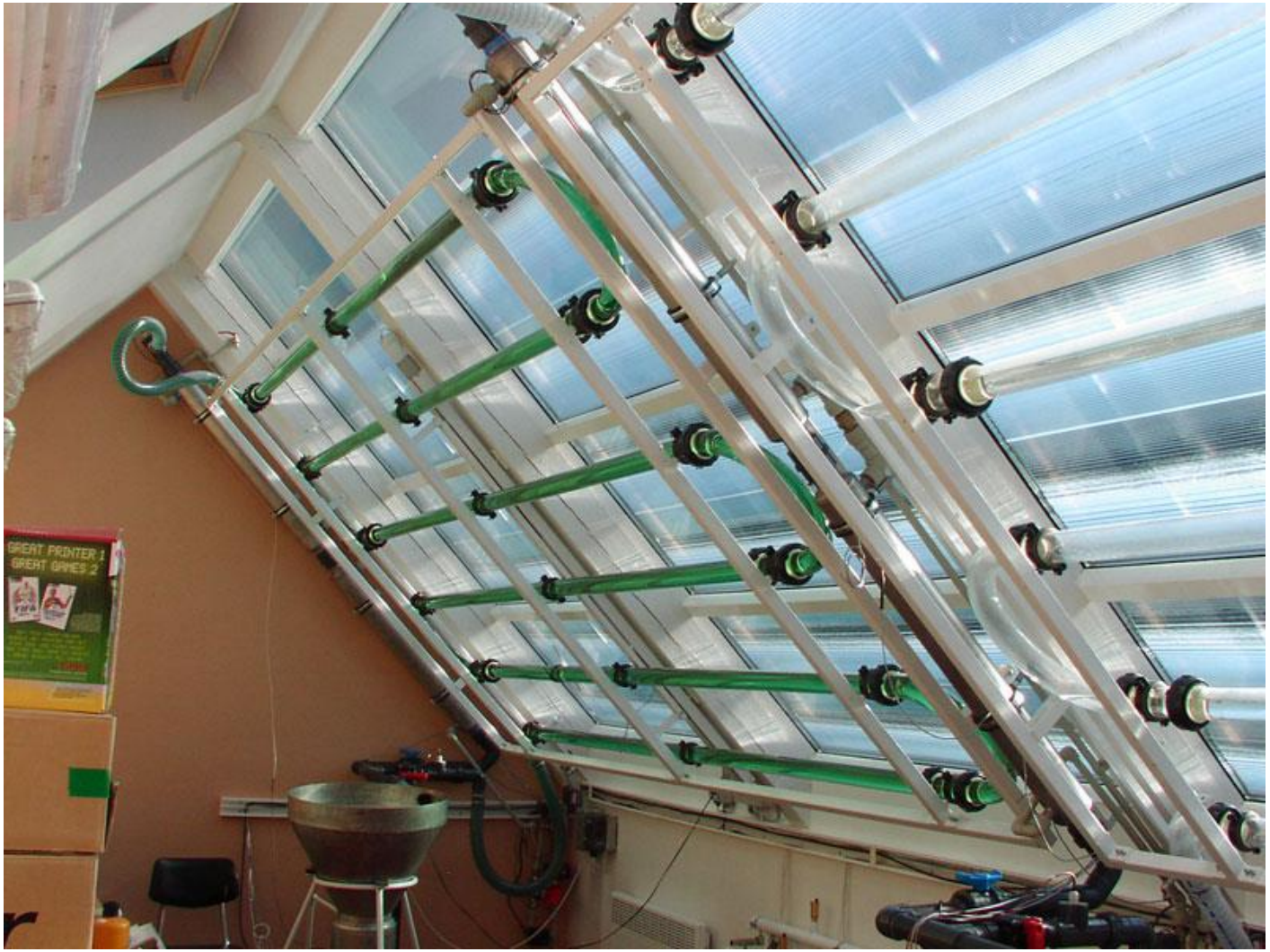
Dražší zařízení
Vyšší know how
Vyšší produktivita (až několikanásobná)

Model bioreaktoru



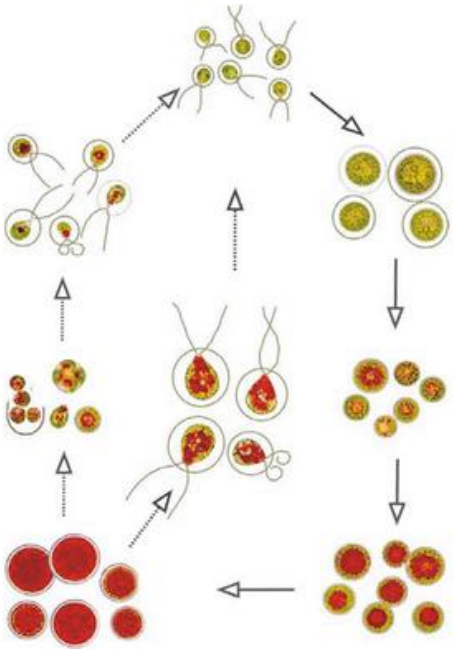
Biorekator

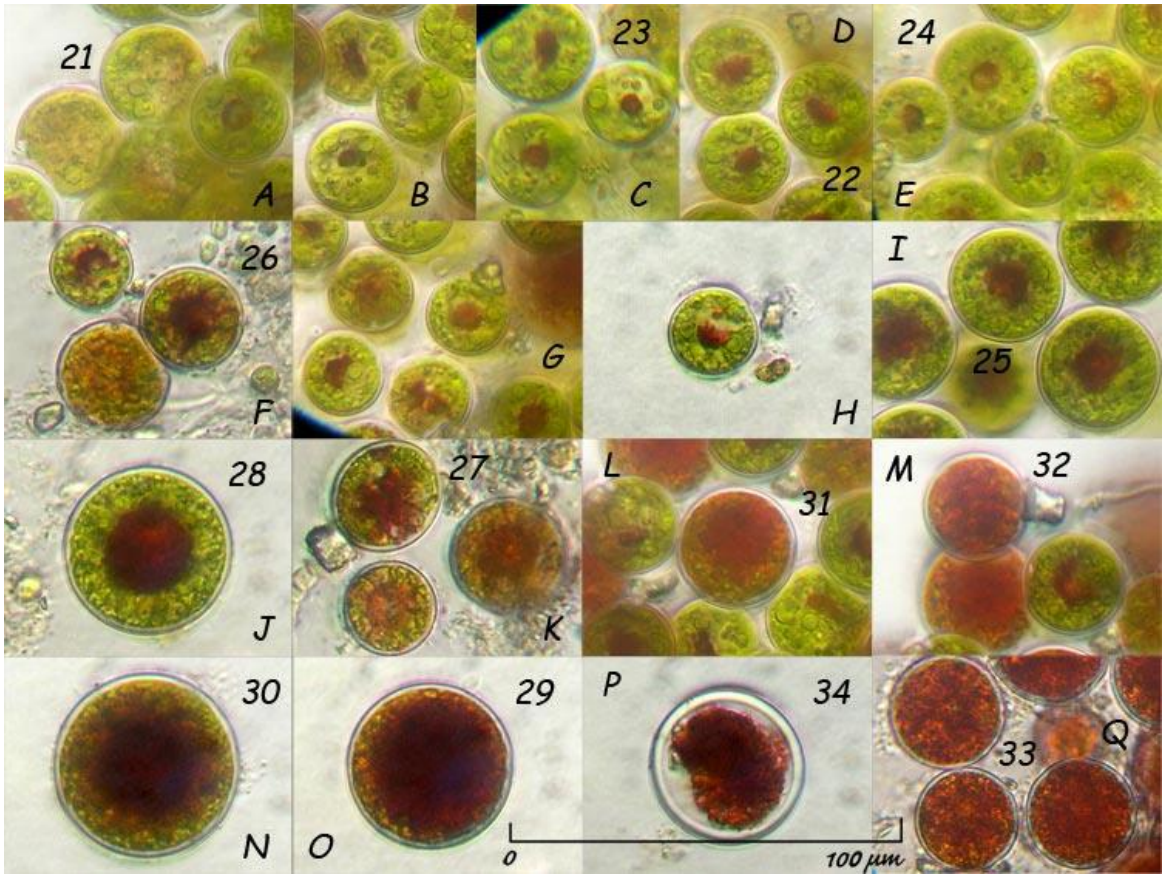
Koncentrační bioreaktor



Velkoobjemová kultivace

Haematococcus pluviatilis – životní cyklus



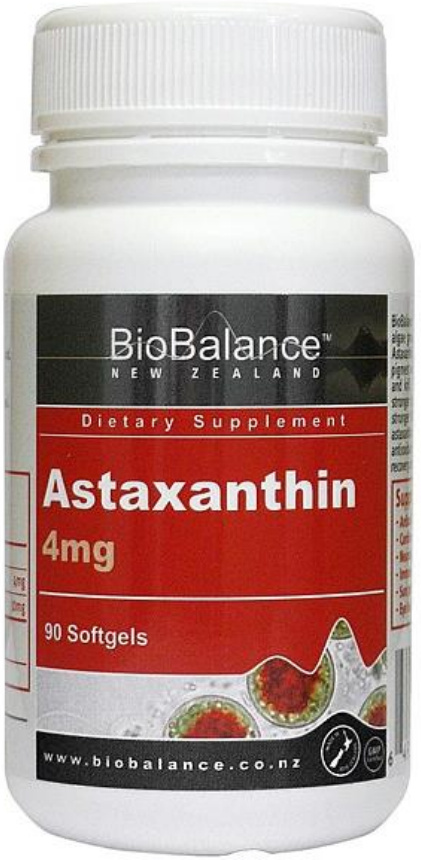


Haematococcus pluviatilis

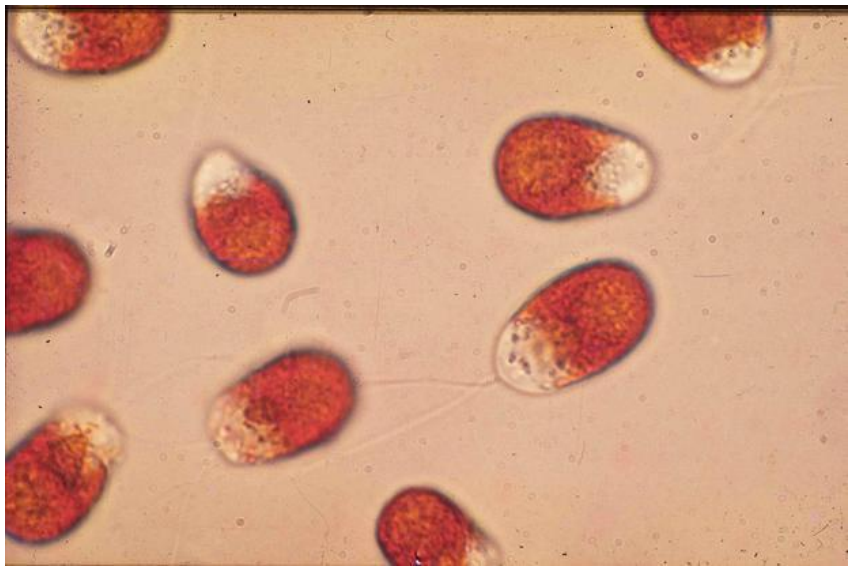
Od zelené řasy k červenému prášku

Produkce astaxanthinu v Izraeli

Astaxanthin



Dunaliella salina



Johnsons Medium (J/l)

To 980 ml of distilled water add:	
NaCl	as needed to obtain desired salinity
$MgCl_2 \cdot 6H_2O$	1.5 g
$MgSO_4 \cdot 7H_2O$	0.5 g
KCl	0.2 g
$CaCl_2 \cdot 2H_2O$	0.2 g
KNO_3	1.0 g
$NaHCO_3$	0.043 g
KH_2PO_4	0.035 g
Fe-solution	10 ml
Trace-element solution	10 ml
Fe solution (for 1 litre)	
Na_2EDTA	189 mg
$FeCl_3 \cdot 6H_2O$	244 mg
Trace-element solution (for 1 litre)	
H_3BO_3	61.0 mg
$(NH4)_6Mo_7O_{24} \cdot 4H_2O$	38.0 mg
$CuSO_4 \cdot 5H_2O$	6.0 mg
$CoCl_2 \cdot 6H_2O$	5.1 mg
$ZnCl_2$	4.1 mg
$MnCl_2 \cdot 4H_2O$	4.1 mg
Adjust pH to 7.5 with HCl	

Chlorella

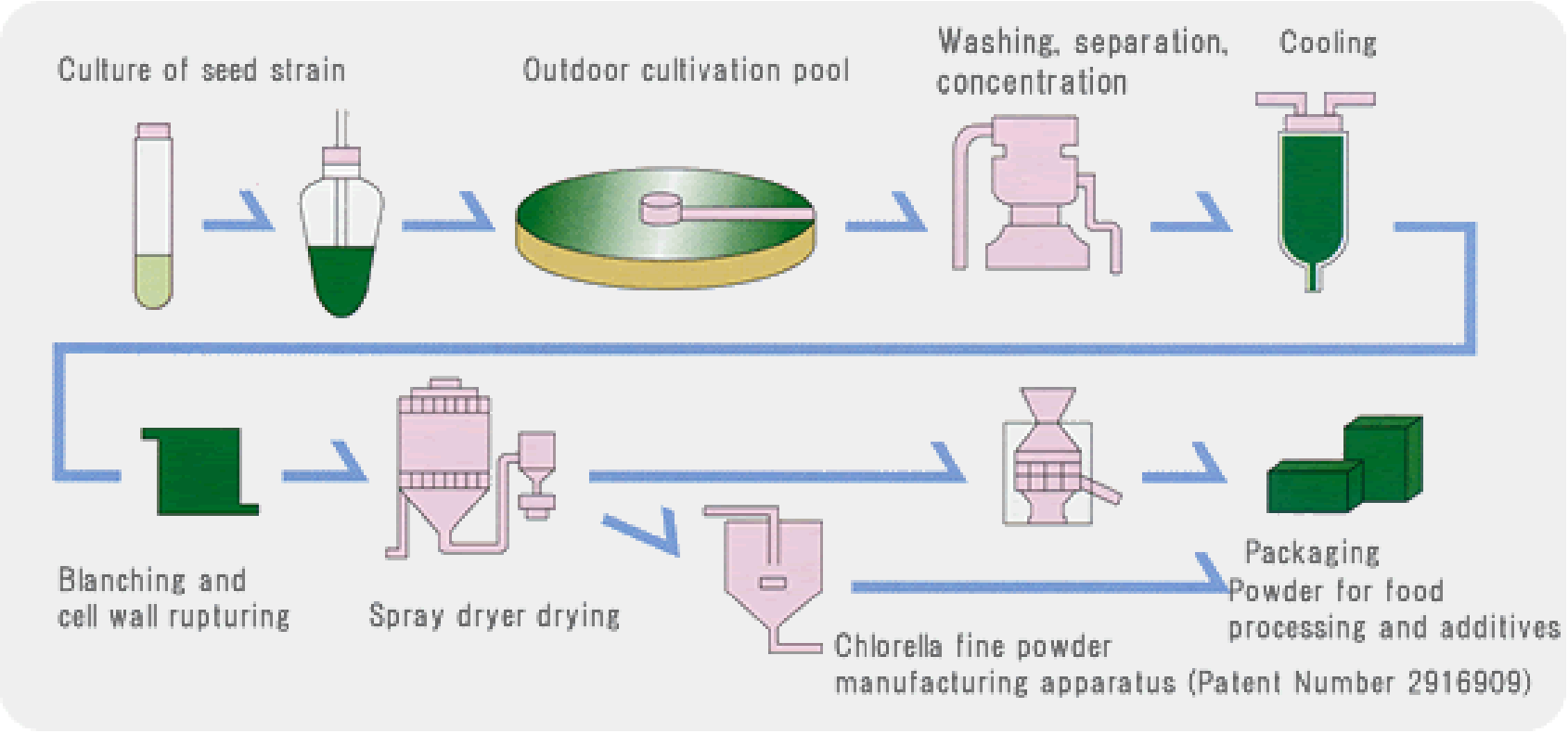
- Jedna z nejčastěji pěstovaných řas
- Široce hojný rod, drobné kulovité buňky, rozmnožování pomocí autospor
- Rychlý intenzivní růst, velká biomasa

Produkce řasy *Chlorella*

Produkce řasy *Chlorella*

Kultivace AV ČR v Třeboni

Technologie *Chlorelly*



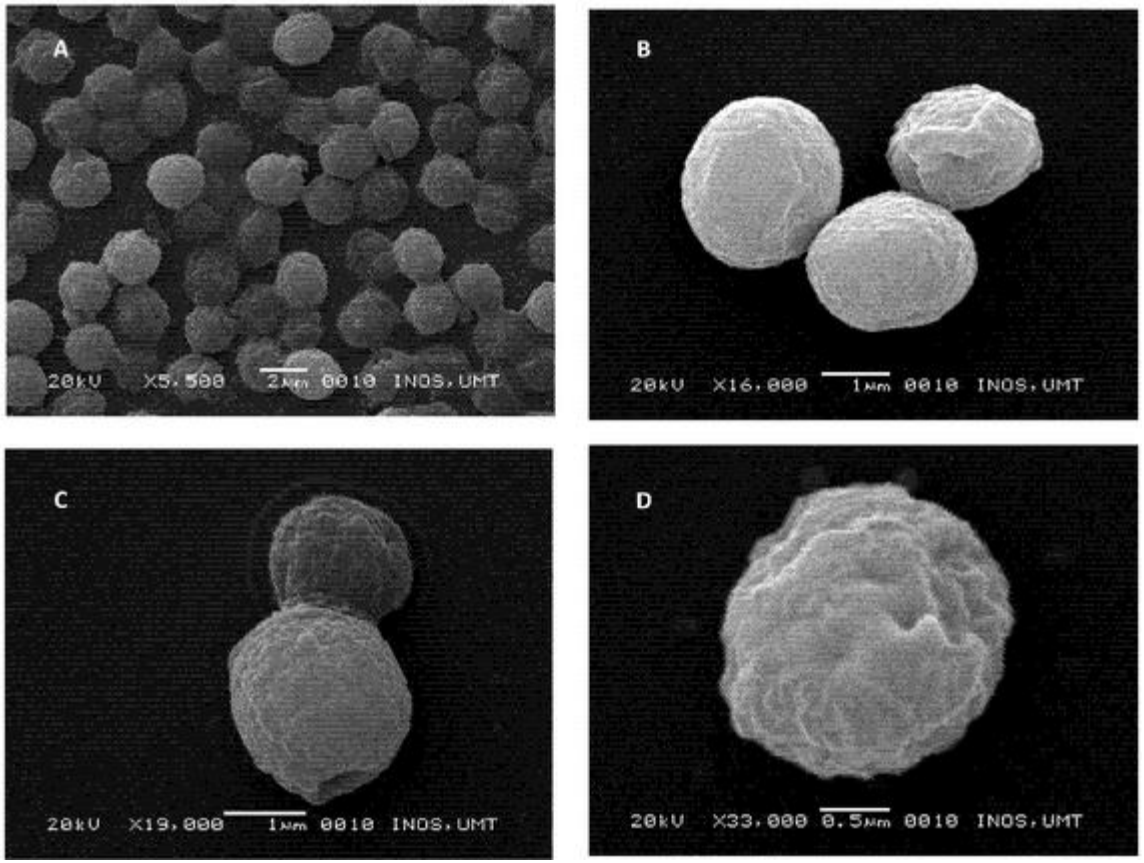
Produkce řas jako umění

Chlorella produkt

Informace k produktům *Chlorella*

- Velmi zajímavé složení živin 60% bílkovin (celé spektrum AMK, nižší obsah methioninu, vyšší obsah lysinu), 20% sacharidů, 10% tuků!
- Vhodný poměr nenasycených mastných kyselin – regulace cholesterolu
- Vysoký obsah β-karotenu, chlorofylu-a, vit. B_{12}, Ca^{2+}, Mg^{2+}, Fe^{3+}, Zn^{2+}, sloučeniny jodu
- Specifická struktura buněčné stěny – vazba těžkých kovů, pročištění trávicího traktu

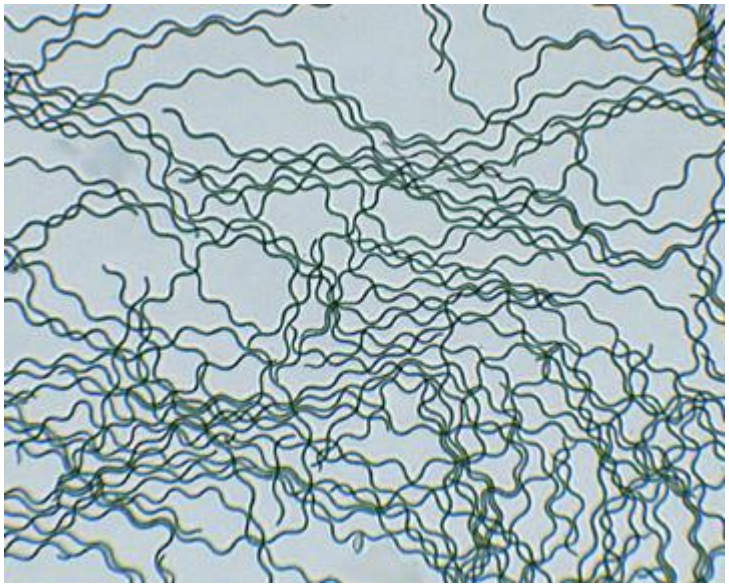
SEM snímek povrchu *Chlorelly*

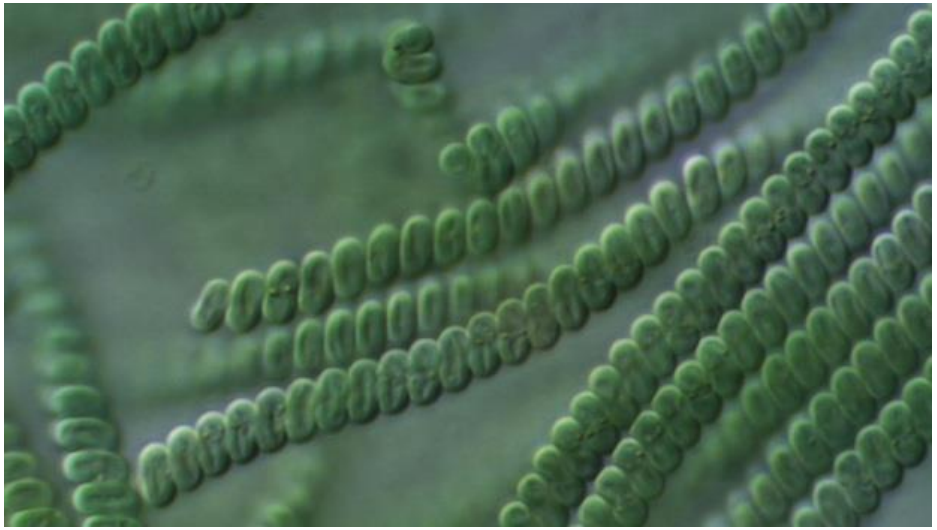


Arthrospira / Spirulina

- Vláknité sinice, spirálovitý vzhled
- Významný rod v biotechnologii
- Zejména v tropických a subtropických oblastech
- Výroba potravinových doplňků

65-71% bílkovin
Pigmenty – chlorofyl, β-karoten, zeaxanthin, fykocyanin
Nenasycené mastné kyseliny
Vitamíny B, E, H
Ca, Mg, K, P, Mn, Se, Zn, Fe





Biotechnologická firma

Produkce v rozvojových zemích

Produkce v rozvojových zemích

Moderní technologie *Spiruliny*