KOYOH JAPAN
eco-bio-block

With the Help of Natural Microorganism

安全な自然の微生物を利用した

For Water Quality Improvement

EcoBio-Block®

池湖沼の水質改善提案

KOYOH JAPAN
eco-bio-block

Koyoh Cooperation., Ltd

〒835-0006　169 Sakata Setaka-machi Miyama-city Fukuoka

Tel +81-944-63-3133 Fax +81-944-63-6211

URL:http://www.koyoh.jp Email info@koyoh.jp

《Outline》 概略

Our water purification system is using EcoBio Block(EBB), block that contains Bacillus Natto together, with aerator(MFA). This biotreatment technology with useful microorganism decomposes organic matter and purifies water quality. This system is not only for water purification, but also is the system that increases diatom and relatively controls cyanobacteria(Blue-green algae) in lakes and marshes. This technology is developed with cooperation with Kyushu University Japan and Tongji University China. Tongji University is testing the real system of MFA.

水質浄化用納豆菌群を封入されたブロックと必要に応じて曝気装置（弊社製ＭＦＡ）を併用した浄化システム。有用微生物により有機物を積極的に分解し水質浄化を図る生物処理技術。同時に珪藻類の繁殖を促し、相対的に緑藻類･アオコなどの繁殖を抑える最新の湖沼浄化システムを説明する。本技術は日本では九州大学と共同で開発され、中国では上海同済大学と技術提携で中国の実情に適うシステムに研究されています。

POINT 1

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EBB has main functions

エコバイオ・ブロックの効果は二つに分ける

1.Decomposing Organic Matter

1. 有機物の分解

2.Odor Removal

2.悪臭除去

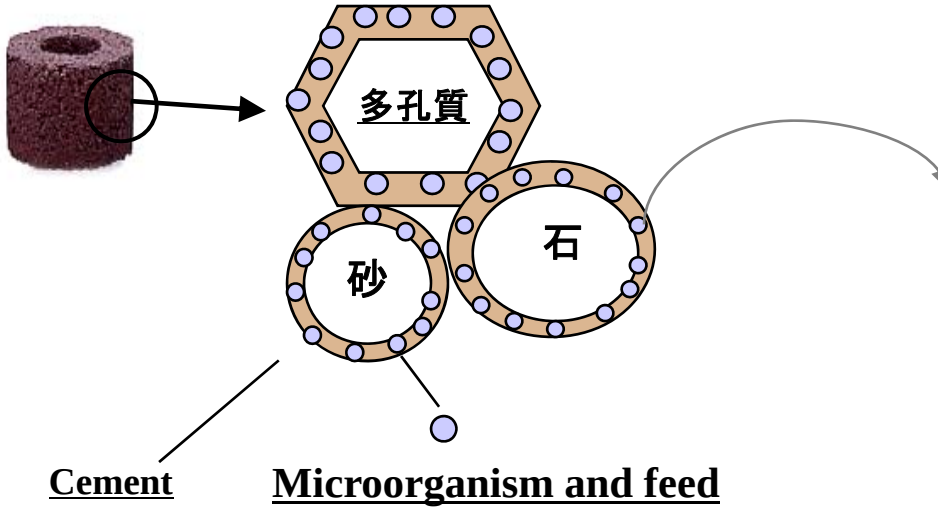
Reducing water changing frequency

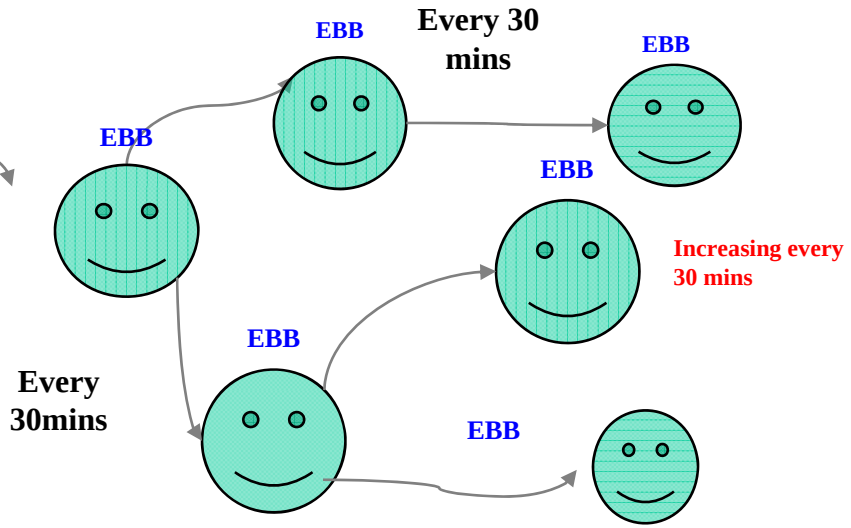
If you change 2/3 of the water in the 60L tank every week the result will be that 2 ton of water contain Ammonia and nitrate.

POINT 2

Immersing EBB in water Bacillus Natto will increase and purify water

ＥＢＢを水に入れると、浄化納豆菌が繁殖し、水を浄化する





POINT 3

Characteristic of the Microorganism

ＥＢＢを水に入れると、浄化納豆菌が繁殖し、水を浄化するブロックである

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Viable Temperature　：from minus to 110℃　not active under10℃

Range of the effective propagable temperature：10℃～65℃（Most effective temperature 25℃～60℃）

pH：pH3～pH11（Viable in strong acidic and strong alkaline）

EcoBio-Block

Large aquarium garden pond use
EBB　aqua
アクア
Weight＝400ｇ/piece
Weight including box
＝450ｇ/box
Size＝９０×９０×80mm
Box size＝９５×９５×90mm

Garden pond, lake, marsh, water tank use
EBBnsM
Weight＝average770ｇ/piece
60～90　φmm diameter

Pond, lake marsh, water take use
EBB oct
オクト
Weight＝850ｇ/piece
９０×９０×８０mm

Various use
EBB pebbles
（small stone）
※Ask about shape, design variation
５～１０mm diameter

Water channel, lake, marsh etc. use
EBB　wave
ウェーブ
Weight＝8.5ｋｇ/piece
３９０×１９０×９０mm

The safety of EBB

SIRIM BIOTEST

TEST REPORT

Sponsor	MAMORU (M) SDN BHD	Technical initiation	29 March 2001
Address	No 18 Jalan U5/ 91P 47620 UEP Subang Jaya Selangor	Technical completion	30 March 2001
Contact	En Zainudin Idris	Report Date	2 April 2001
		Job Number	040/01

Test Article	Water sample	Study	Direct Contact Assay

REFERENCE: This study was based on the procedure and method described in British Standard (BS) 6920-2.5:2000 Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water – Part 2: Methods of test – Section 2.5: The extraction of substances that may be of concern to public health.

GENERAL PROCEDURE: The degree of cytotoxicity in a mammalian cell culture, CCL 81 Vero cells, in response to the test articles was determined. Validation solution (zinc sulfate) and a blank were included in the study to verify the proper functioning of the test system. The test articles, validation solution and blank were tested in replicates of six at the Neat concentration. The cultures were incubated at 37 ± 1 °C in a carbon dioxide incubator, and assessment carried out after 24-hour incubation through microscopic observation.

RESULTS:

Effects on culture	Validation solution	Blank	Test articles	
			Before treatment	After treatment
Monolayer	Dissociated	Confluent	Confluent	Confluent
Cellular damage/lysis	Positive	Negative	Negative	Negative

CONCLUSION: The test articles exhibited non-cytotoxic responses.

AUTHORIZED PERSONNEL:

Dr Md Anuar Osman, Ph.D
Consultant

Dr Siti Intan Mokhtar, Ph.D
Researcher

Testing Institution	SIRIM (Malaysian National Research and Testing Center
Testing Standard	British Standard 6920 and 2.5 Test by international standards in 2000
Testing Method	Verify by applying EBB solution directly into mammalian cells

Safety has been confirmed by the acute toxicity test and the survival rate examination by Japan Food Research Center

Oversea Construction EBB海外工事例

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2001/4/4 Mahathir bin Mohamad, Prime Minister of Malaysia

2006 India

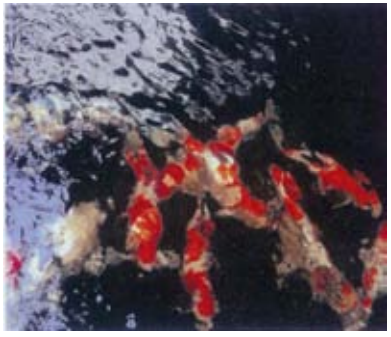
印度 前森林环境大臣

Domestic Construction EBB国内工事例

Nobeoka River

Fukuoka Central Park

Carp farming (1ton of water for 20 pieces)



Fukuoka Rakusui Park

16days later

Water Pollution by Algae

汚染湖沼の現状

Getting worse

HABs
(Harmful Algal Bloom)

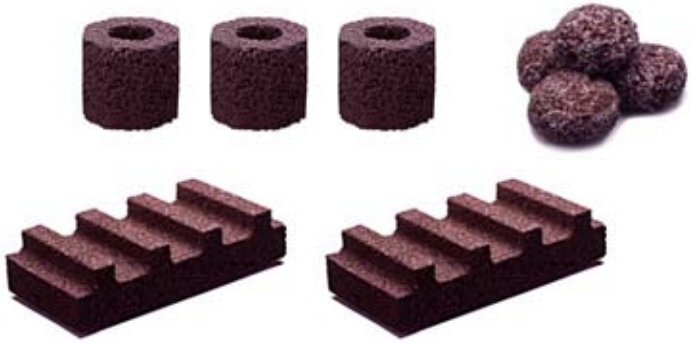
Release cyanotoxin such as Microcystin which is poisonous to human, animal

ミクロシスチン(毒) が出す毒素で

飲用水不適・ 家畜・ 発癌性

How to increase the diatom

珪藻を増やす方法



Technology of EBB and MFA aerator

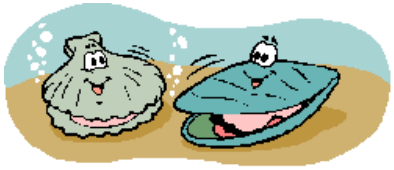
EBBの技術+MFA設置

To relatively decrease cyanobacteria and increase diatom

相対的に藍藻(毒性）を減らし、珪藻(無毒）を増や増加す。

Feed for aquatic animals

魚、貝、海老などの餌



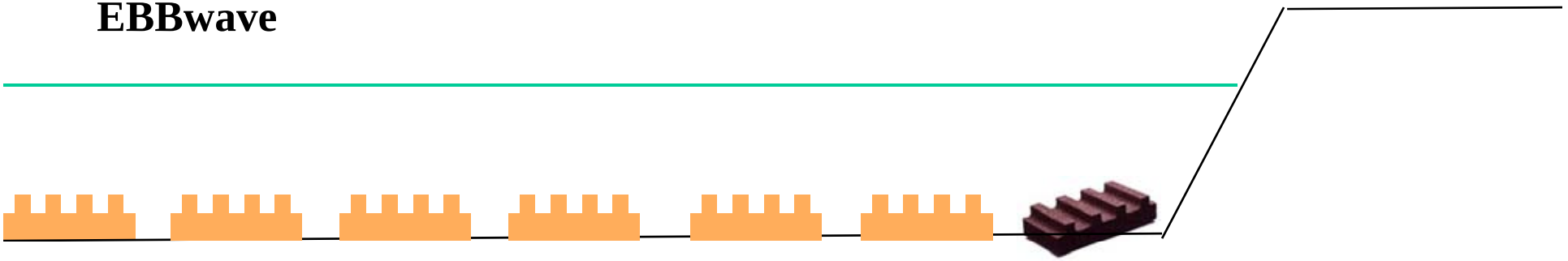
①Setting without equipment

底面直敷設方式

（ In case that water is not deep, sediment level is not high and there is plenty of DO ） 水中酸素濃度 (DO)が十分で、水深が浅く、底泥がない場合

EBBnsM

EBBwave



Construction 直敷設方式施工例

Rakusui Park Fukuoka Prefecture　July 2006

楽水園　EBB設置プロジェクト　2006年7月

Water 50 ton
EBB nsM150 pieces

Before

After 20days

COD 9mg/L
Ammonia 0.8mg/L

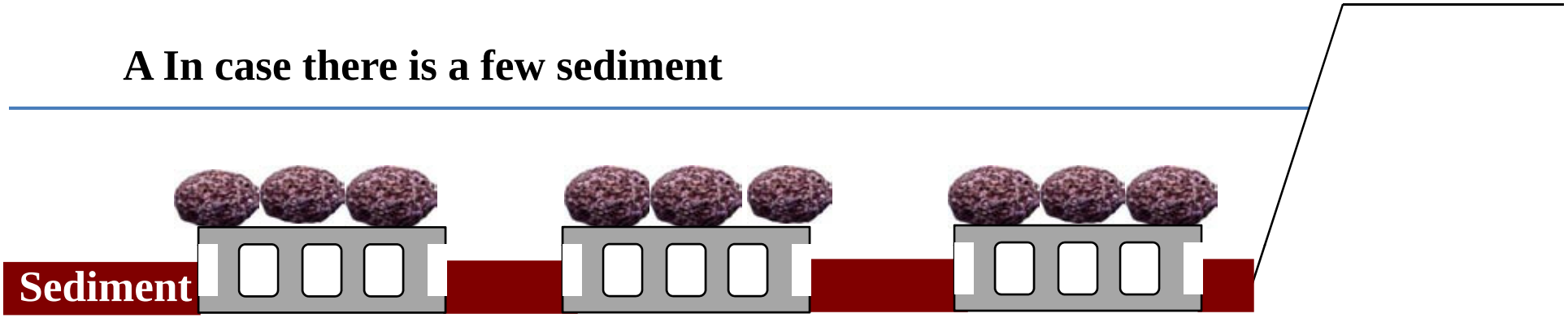
→

COD 3mg/l
Ammonia 0.3mg/L

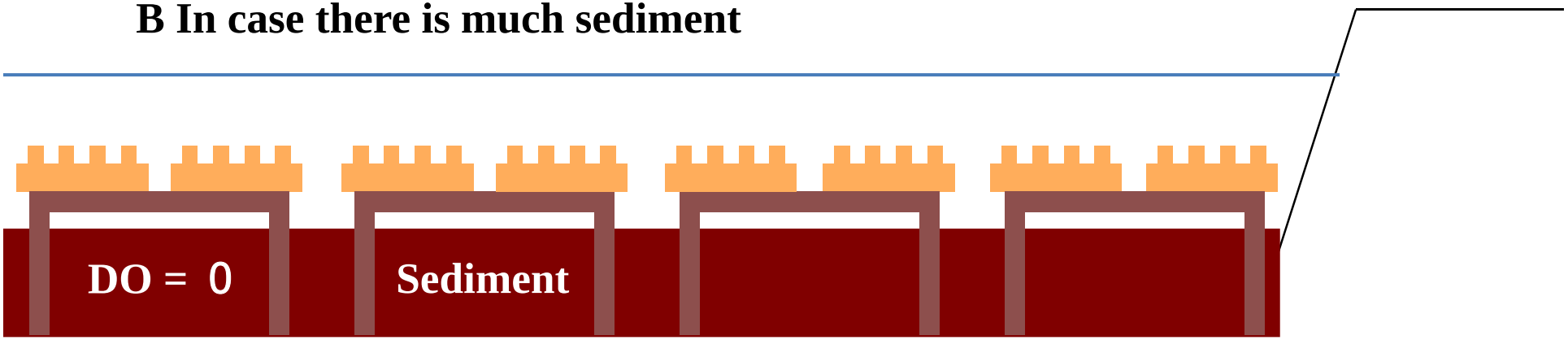
②Setting with rack

架台方式

A In case there is a few sediment



B In case there is much sediment



Construction 架台方式施工例

Nanjing Presidential Office
June 2009 南京 総統府

COD 51.7mg/L ⟶ COD 30.2mg/L

BOD 16.9mg/L ⟶ BOD 9.5mg/L

Ammonia 2.84mg/L⟶ Ammonia 1.22mg/L

Nanjing Presidential Office

Setting EBB for water purification

Nanjing presidential office director

Under Construction

Under Construction

Interviewing by Nanjing TV

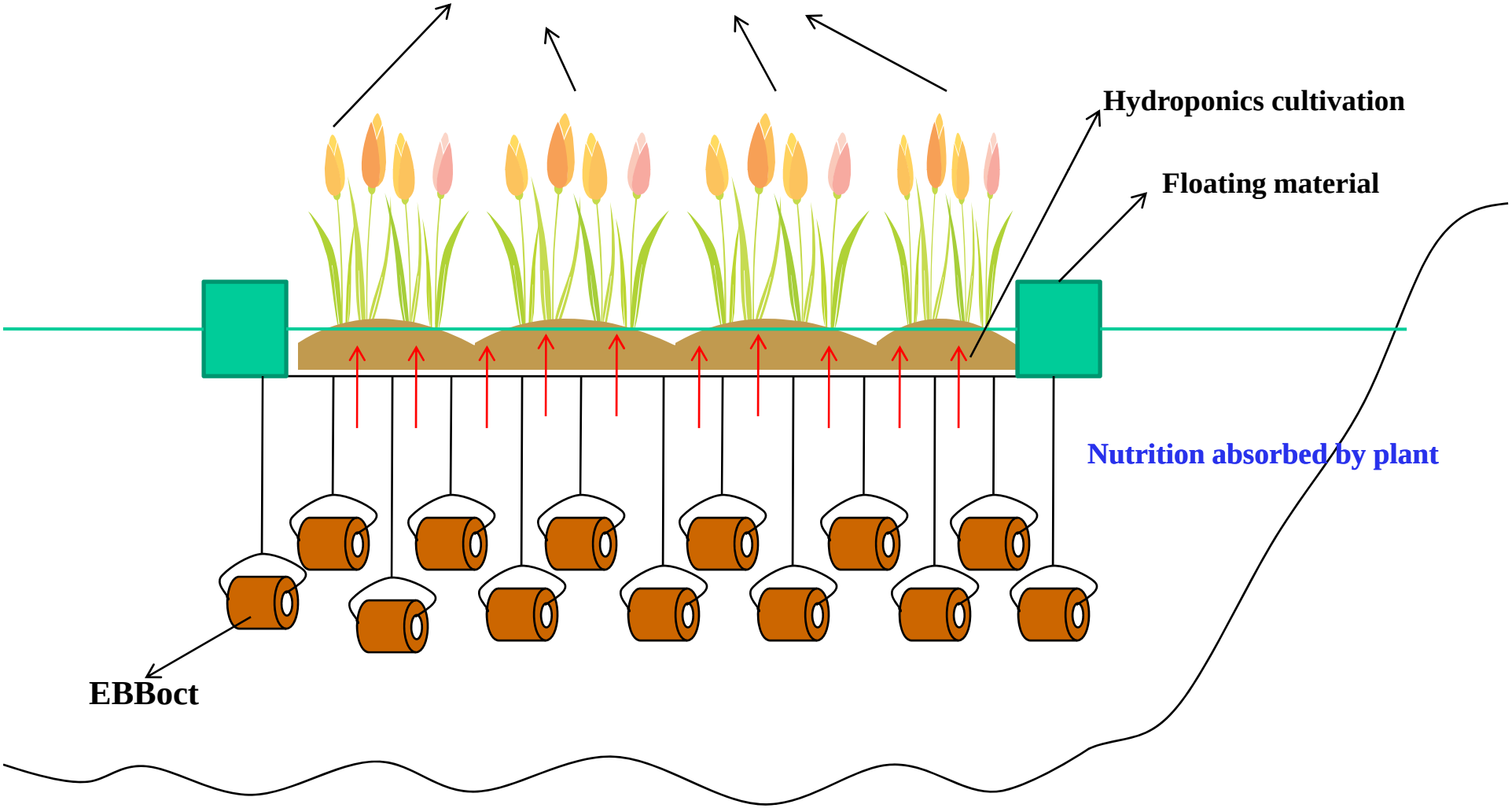
USA（New York suburbs Potato Farm）

③Floating island　浮島方式

(Using when Do in water is not plenty and water is deep enough)

水中酸素濃度（DO)が不安定な池や水深が深い池に利用する。　景観も非常に美しい

With this method, the beautiful island does not only purify water, but flowers can be harvested for sale.



Floating Island

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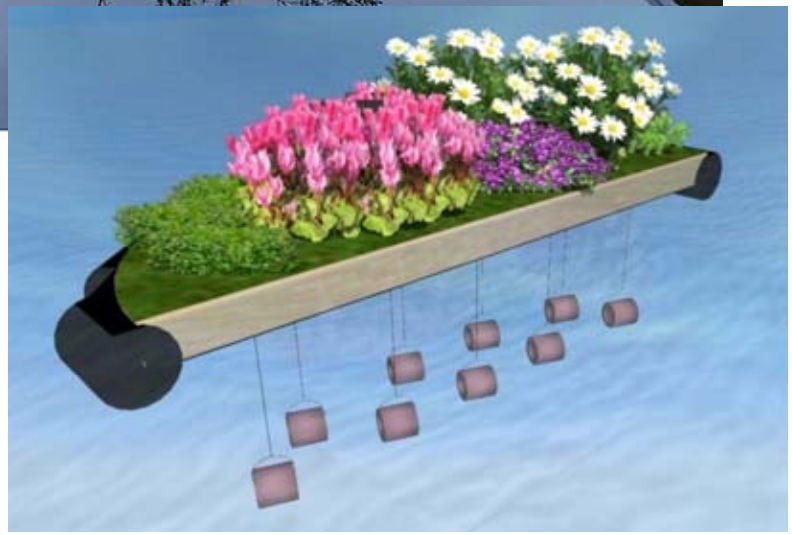

Floating Island in USA（ using Solar energy ）

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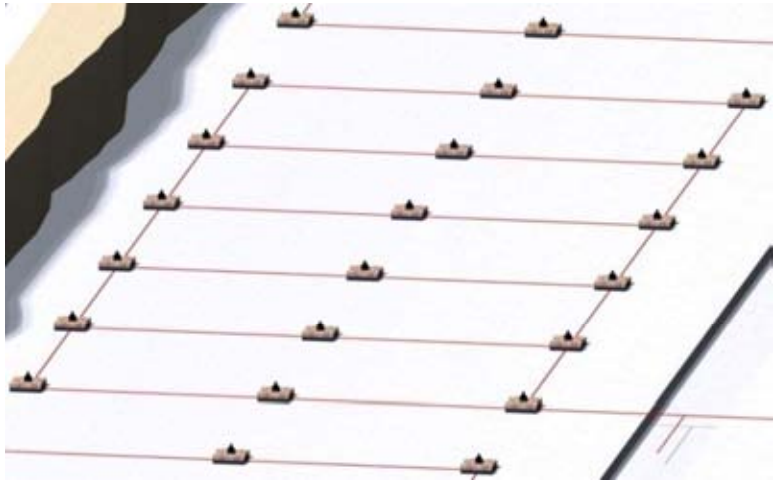
④ Setting MFA

MFA併用方式

(In case there is no oxygen in the water, MFA aerator must be install.)

水中酸素濃度 (DO)が低い場合はMFAなどの曝気装置を設置する



For the effective EBB using

ＥＢＢとＭＦＡによる改善提案

For the effective EBB using to control cyanobacteria, using MFA aerator is recommended.

エコバイオ･ブロックと酸素供給装置設置して、水質改善と藻類の競合により、アオコ発生を抑える

For the effective EBB using

ＥＢＢとＭＦＡによる改善提案

To control the amount of cyanobacteria and diatom

緑藻と硅藻を競合させる

Cyanobacteria

Balancing

Diatom

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When cyanobacteria is not much, water will be slightly green and beautiful.

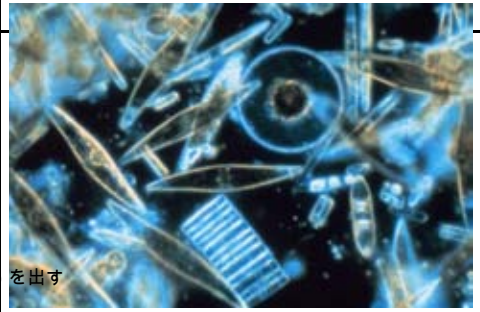
汚染度合が少ない場合、適量繁殖すれば、緑色で美しい

Water is slightly brown colour, not beautiful.

茶色で見た目が悪い

But when they breed much more, toxin will be released

汚染が進行し、大量に繁殖すると、毒性(ミクロシスチン)を出す

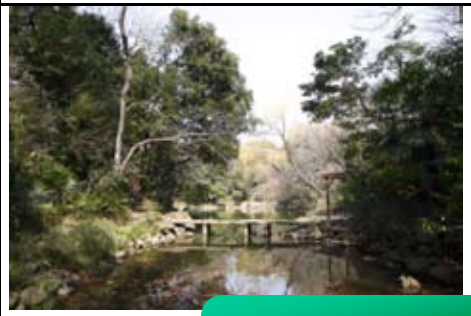


Food for aquatic animal

魚、貝、海老の餌

Destroying the life ecosystem in water

さらに、毒性が強くなると、魚介が死ぬ



Good for lives

魚介、アメンボ、トンボがいる

Bad Environment

Good Environment

The best way is to balance cyanobacteria and diatom for good environment

藍藻と珪藻の両方をバランス良く繁殖させることが池の水質浄化には最も有効である

Thank you for your attention

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