

Different cyanobacterial populations present in Kandy lake

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- Studies of metabolic similarities and ribosomal RNA sequences suggest that cyanobacteria form a good monophyletic taxon.
- They are widely distributed over land and water often in environments where vegetation can not exist .
- Unicellular and filamentous blue greens are almost invariably present in in fresh water lakes forming dense planktonic populations or water blooms in nutrient rich waters like Kandy lake.

- Factors determining the development of planktonic populations.

1. Light
2. Temperature
3. pH
4. Nutrient concentrations
5. Presence of organic solutes

- Many blue greens grow ,
attached on the surface of rocks and stones,
submerged plants
bottom sediments of lakes.

- Why do cyanobacteria attached to surfaces.
 - a. Due to gravity – just settle.
 - b. Due to some charge effects.

Negative charge \leftrightarrow Positive charge

{Outer envelop of cyanobacteria} – {Charge on the substrate}

Materials and Methods

- Methods

1. Direct plating method

2. Using biofilm technique

Direct plating

Using ordinary
BG11 medium
1% bacto agar

Using modified
BG11 medium
1% bacto agar.

Serially diluted
with sterile dist.
water.

serially diluted
with 0.03M
phosphate buffer.

serially diluted
with sterile dist.
water.

serially diluted
with 0.03 M
phosphate
buffer.

- Inoculum -water sample taken from the Kandy lake.
- Composition of the 0.03M Phosphate buffer adjusted to pH 7.
 - Na₂HPO₄ - 4.2588g/l
 - KH₂PO₄ - 4.0818g/l
- 0.1 ml aliquots of the each dilution was spread on the surface of the 1% bacto agar plates

Composition of ordinary BG11 medium

Composition for g/l

NaNO₃	1.5
K₂HPO₄	0.04
MgSO₄·7H₂O	0.075
CaCl₂·H₂O	0.036
Citric acid	0.006
Ferric ammonium Citrate	0.006
Disodium EDTA	0.001
Na₂CO₃	0.02
<i>Micronutrients</i>	<i>1ml</i>
Agar	10g

- Experiment was repeated in the same way using modified BG11 medium adding,

1. Thyamine · HCl - 0.5g/l

2. Biotin - 0.01g/l

3. Vitamin B12 - 0.002g/l

Culture conditions

- Citrate and Manganese should be autoclaved separately.
- Agar should be autoclaved separately
- Trace elements should be added after autoclaving.
- pH should be adjusted to 7.1 after sterilization

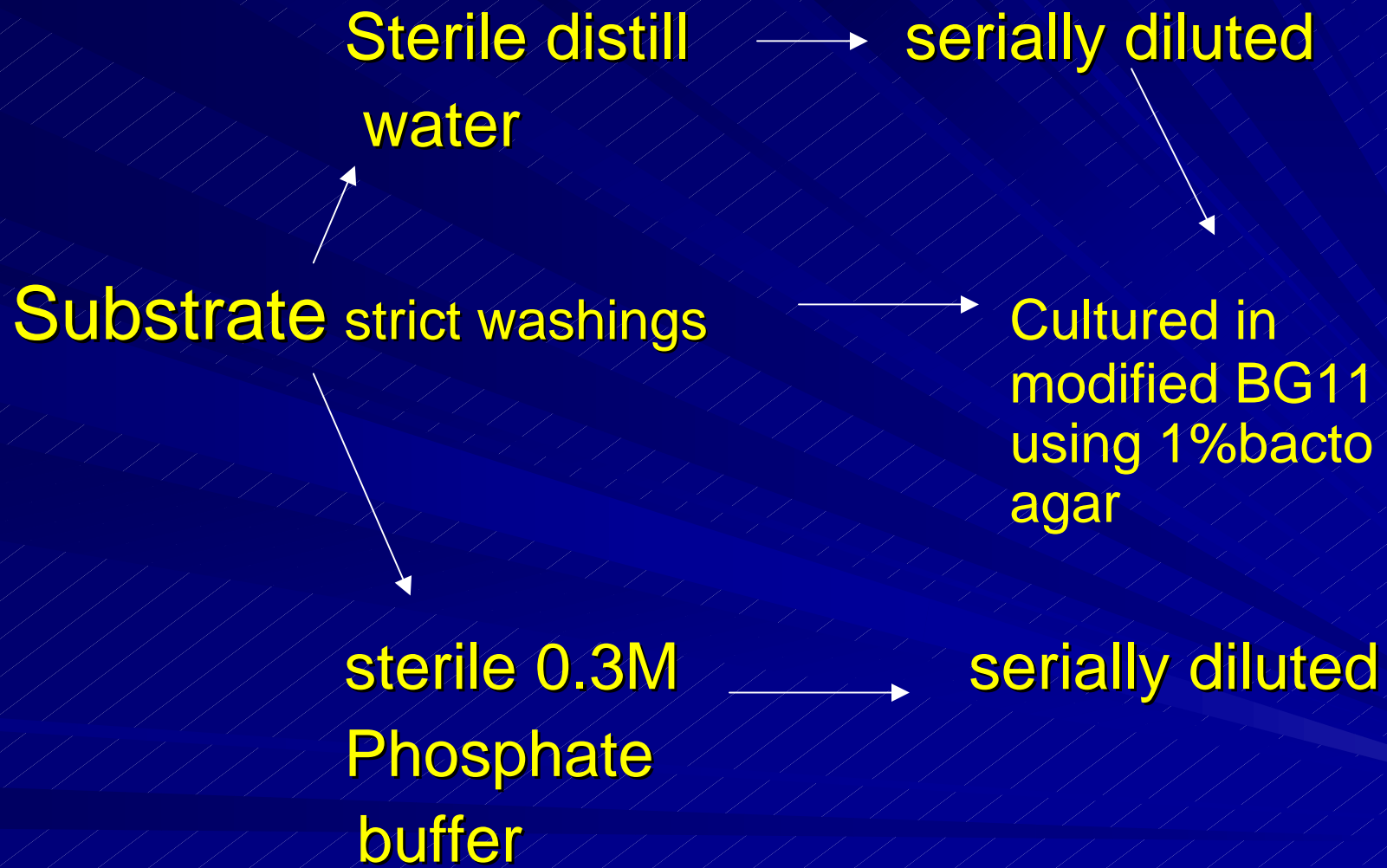
Biofilm technique

- Observation of disturbed cultures.
- Agar pieces in liquid BG11 medium

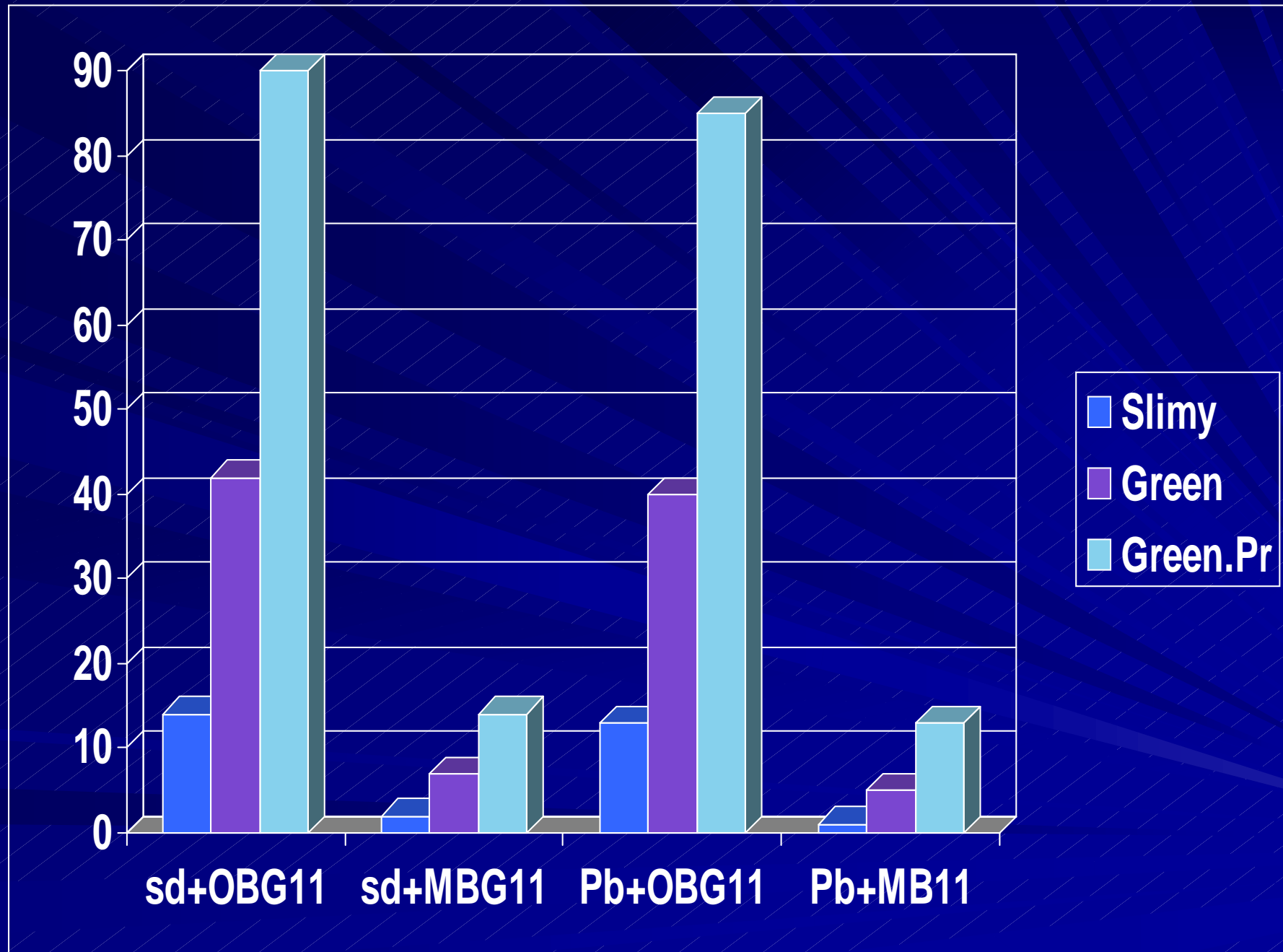
Substrates

1. Terrazzo chips - white
2. Migmatite - Dirty white
3. Granite - Reddish brown

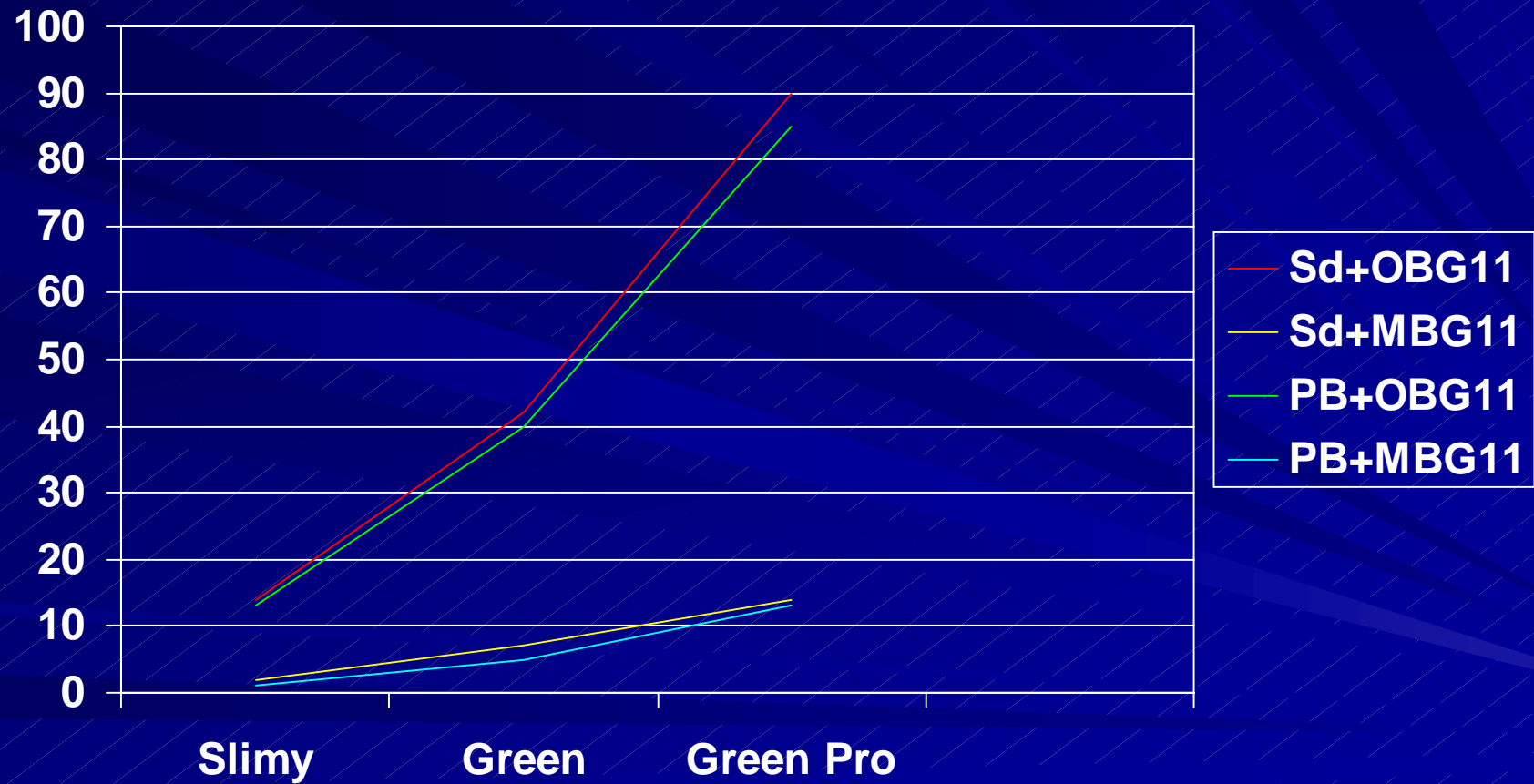
- Soaked in distilled water for 24 hours and autoclaved.
- Porous bottles were dipped in Kandy lake with the materials in the deepest basin for 24 hours
- Bottles were taken in to the lab and washed with sterile distill water and Phosphate buffer.



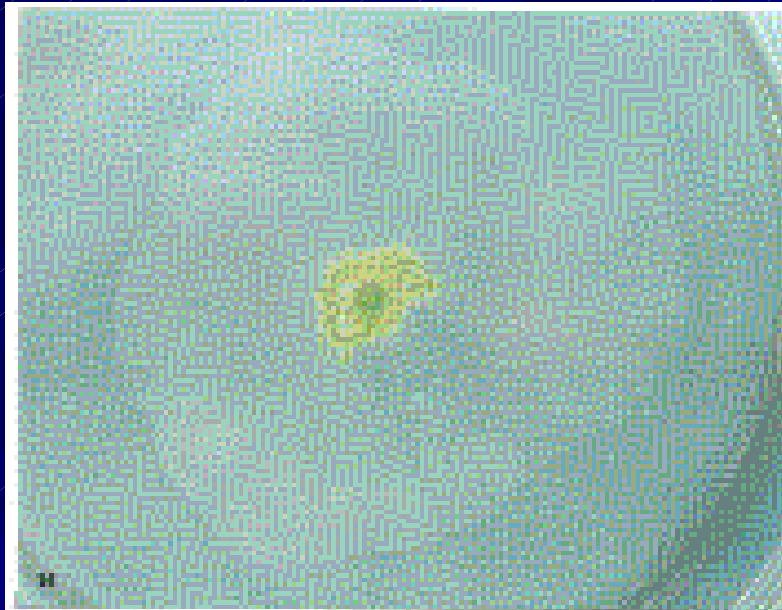
Culture technique	Medium	Colony morphology in number of Days			
		White slimy	Green	Green Prominent colonies	
1. Direct plating	a. Sterile distilled water	Ordinary BG11	14	42	90
		Modified BG11	02	07	14
	b. 0.03M Phosphate buffer	Ordinary BG11	13	40	85
		Modified BG11	01	05	13



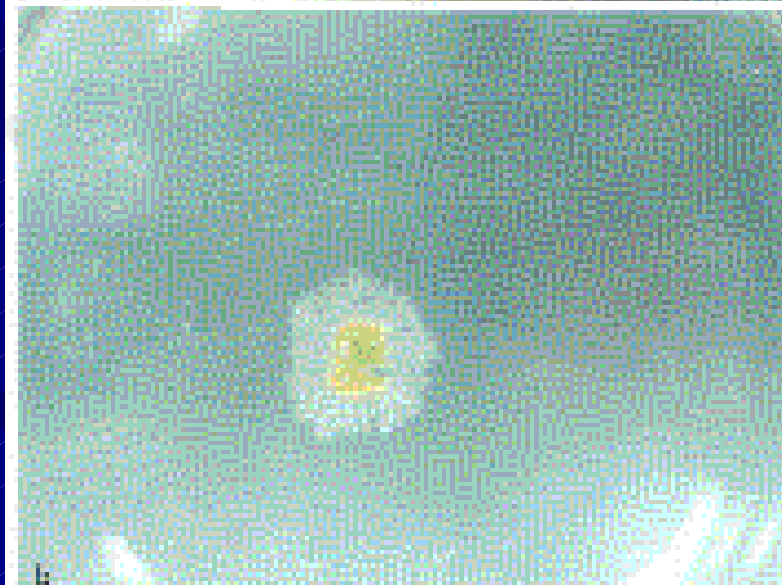
Relationship between the time taken to show visible colony morphology with the culturing technique



Culture characteristics

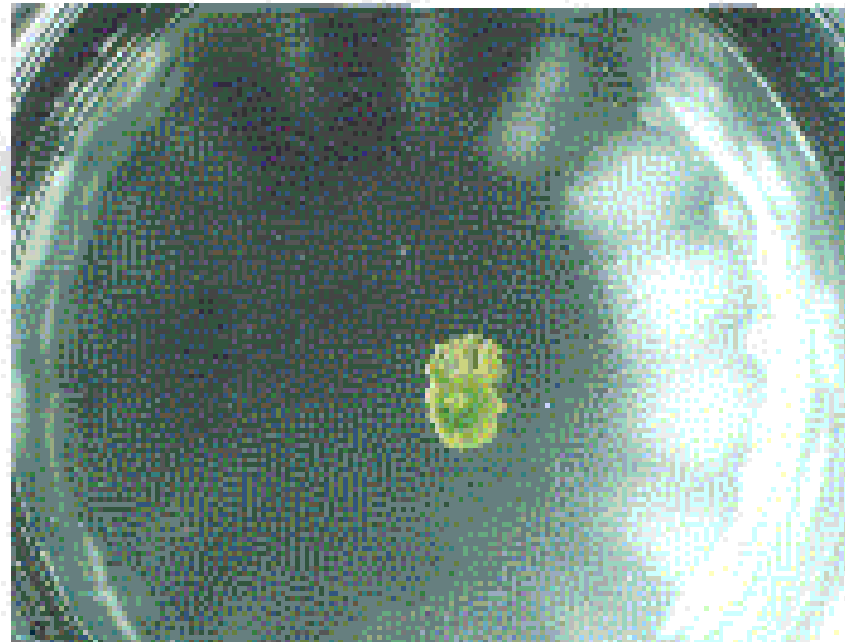
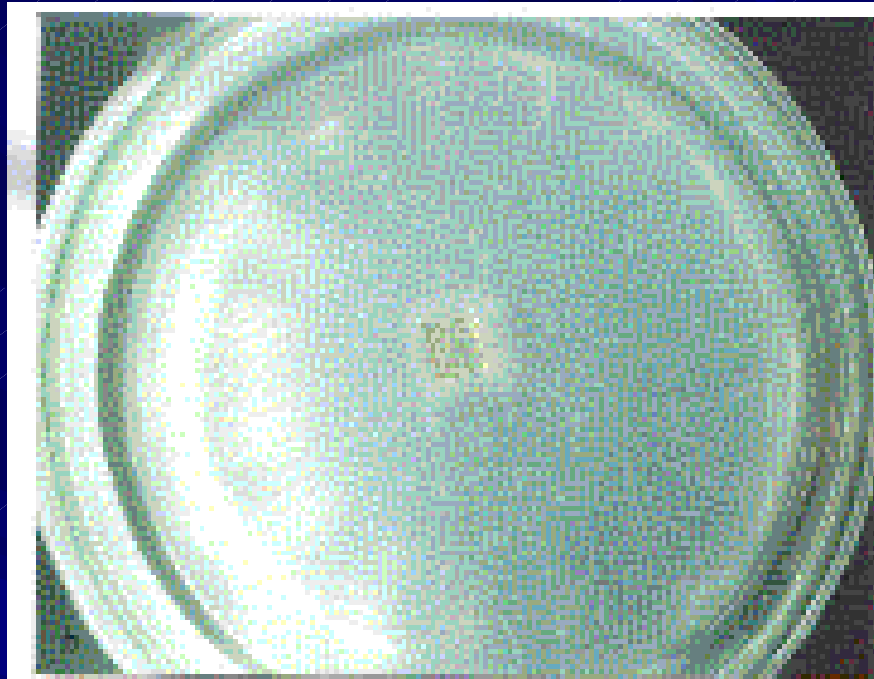


Smooth margin

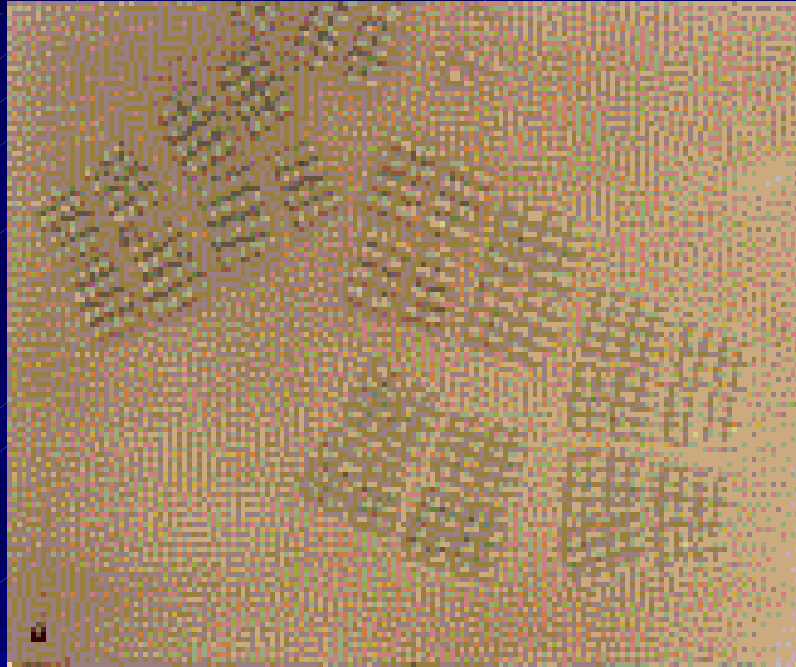


Wavy margin

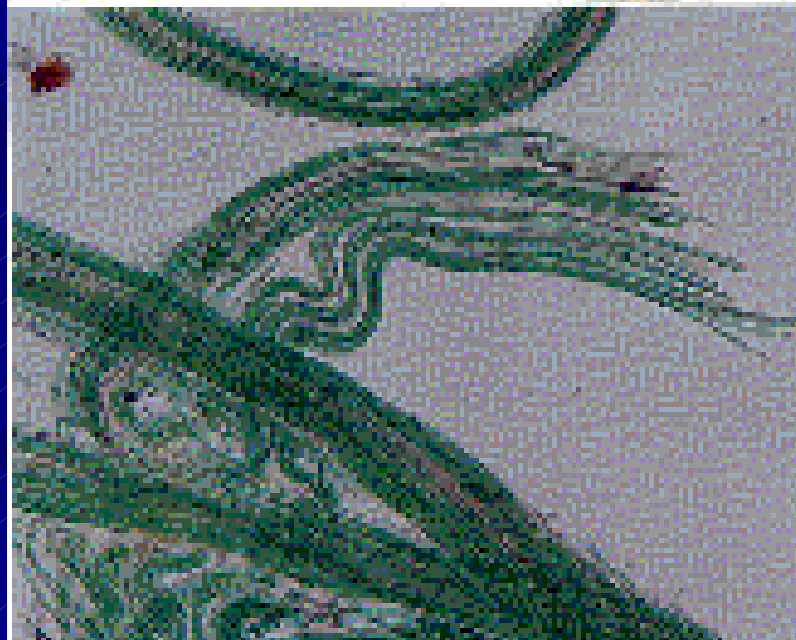
Culture characteristics



Filaments traversing through the medium

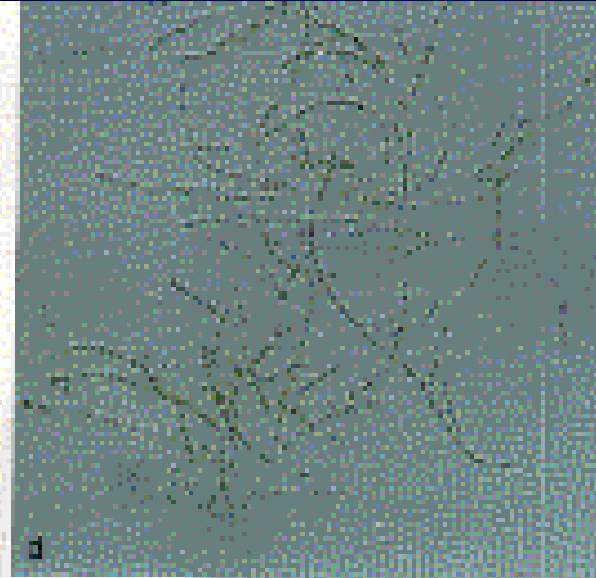
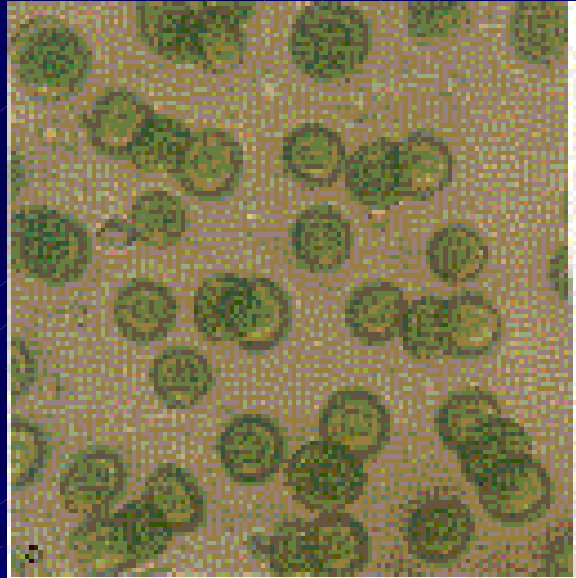


Merismopedia X100



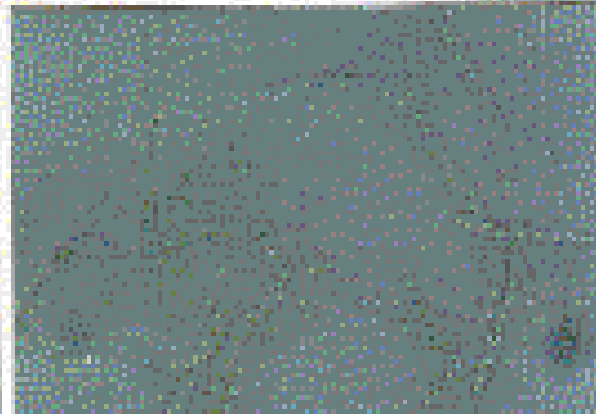
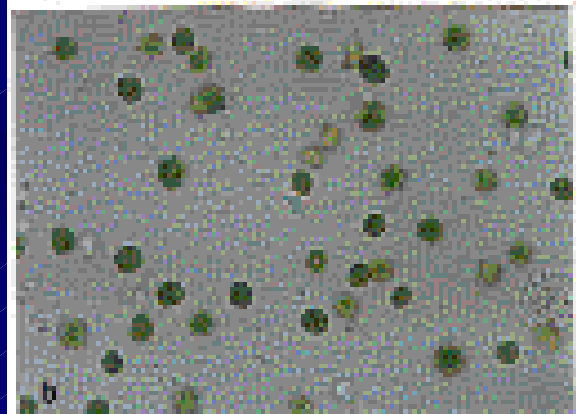
Schizothrix X100

Chlorococcus



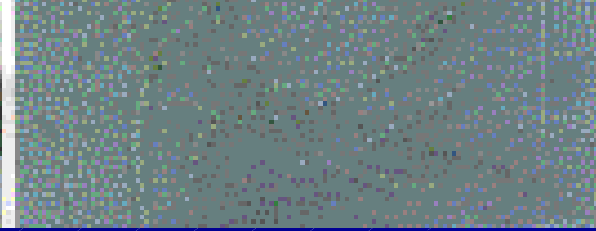
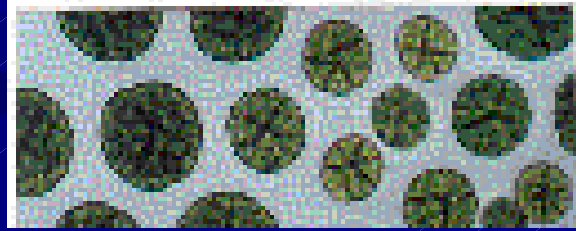
Unidentified
filamentous
cyanobacteria
X100

Pandorina
X100

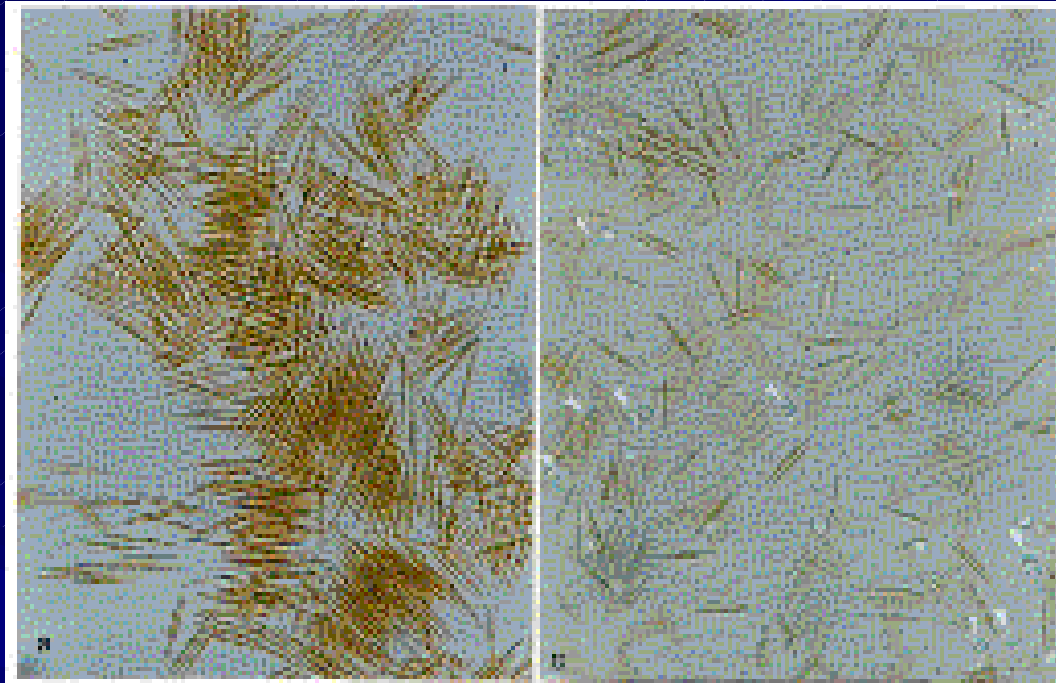


Unidentified
filamentous
cyanobacteria
X400

Pandorina
X400



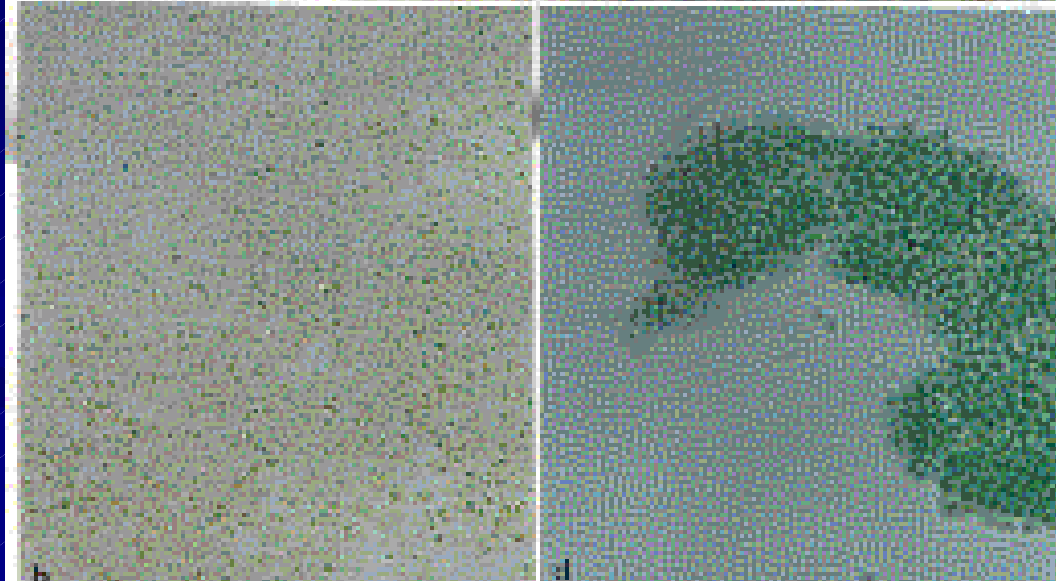
An unidentified
baciillariophyte
X100



Unidentified
bacillariophyte
X100.

Kirchineriella
(lunate cells,
arrows)

An unidentified
unicellular
chlorophyte X100



Unidentified
phytoplankton
X100

Conclusions

- Use of Phosphate buffer as the diluting medium makes the pure colonies to be much more discrete.
- But no effect on incubation period.
- Modification of BG11 will decrease the time taken for show visible colony morphology.