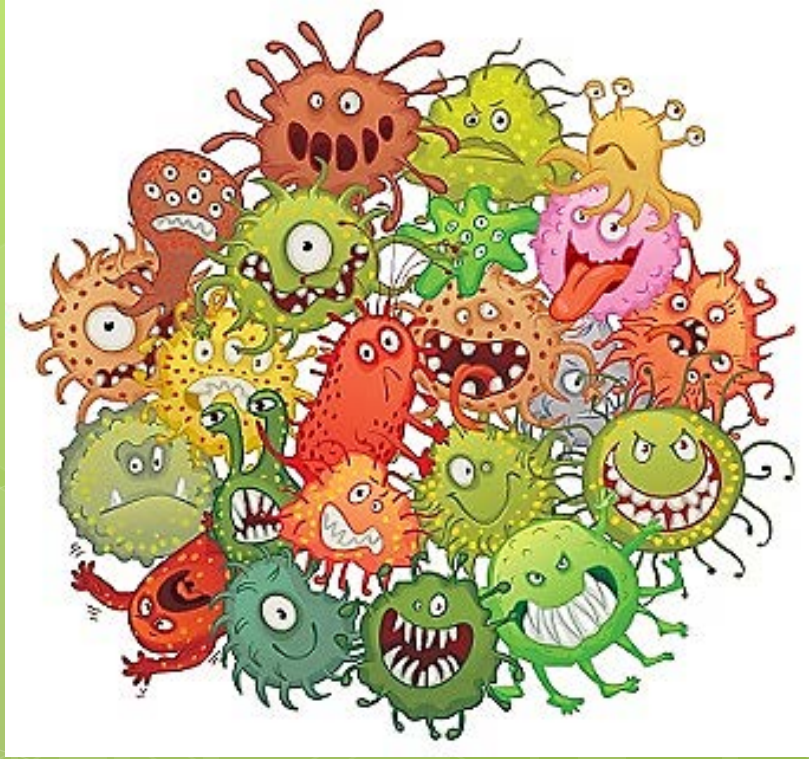

TFDA

Synthetic microcosms for studing the biodeterioration of cultural heritage

Laboratorio di Botanica e Biologia delle Alghe

Napoli 27 Febbraio 2019

Università degli Studi di Napoli *Federico II*
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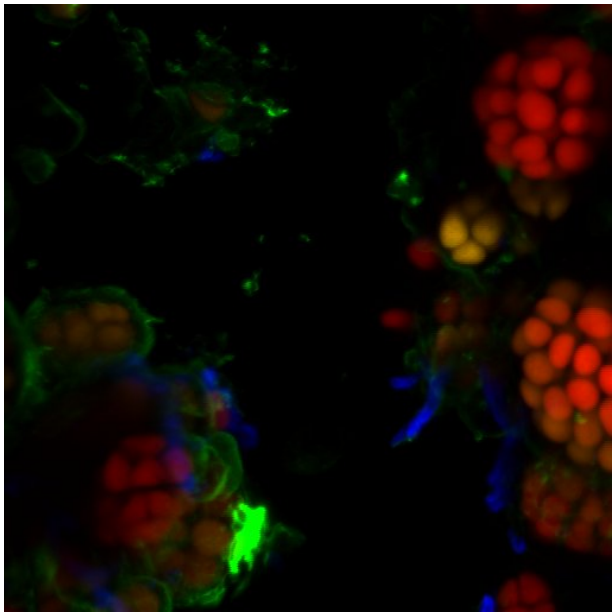
- Dr. Angelo Del Mondo
- Dr. **Mariagioia Petraretti**

Subaerial biofilms

Communities thriving at rock-atmosphere interface.



Biodeterioration (Hueck, 1965)
"[…] any undesiderable change in the properties of a material caused by the vital activities of organisms."

Sampling sites

- Pompei
  Casa di Maio Castricio
- Oplonti
  Villa di Poppea
- Caserta
  Fontana di Eolo
- Nola
  Anfiteatro laterizio
- Ercolano
  Terme suburbane
- Napoli
  Terme di Via Terracina

Development of synthetic microcosms

Step 1

- Isolation

Step 2

- Morphological and Molecoular Identification

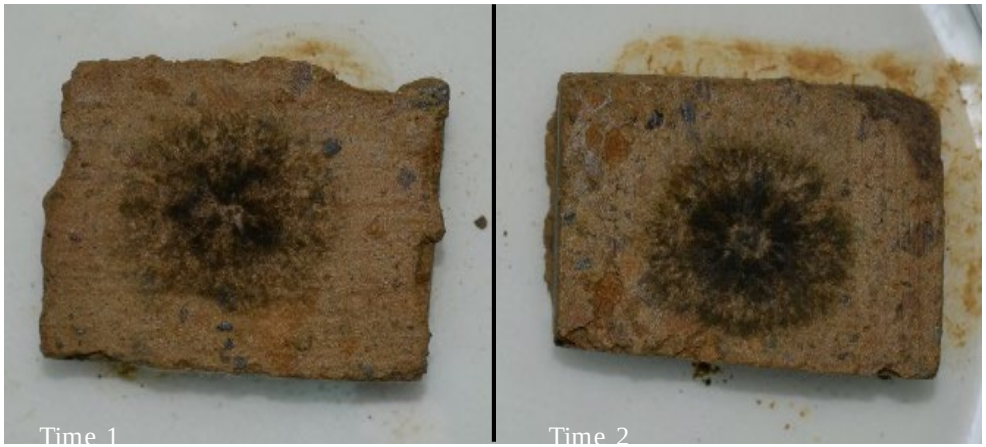
Step 3

- Assessment of bioreceptivity of materials

Step 4

- Choice of the environmental conditions

In microcosm experiments an artificial close system is set in which several environmental parameters may be varied by the operator.

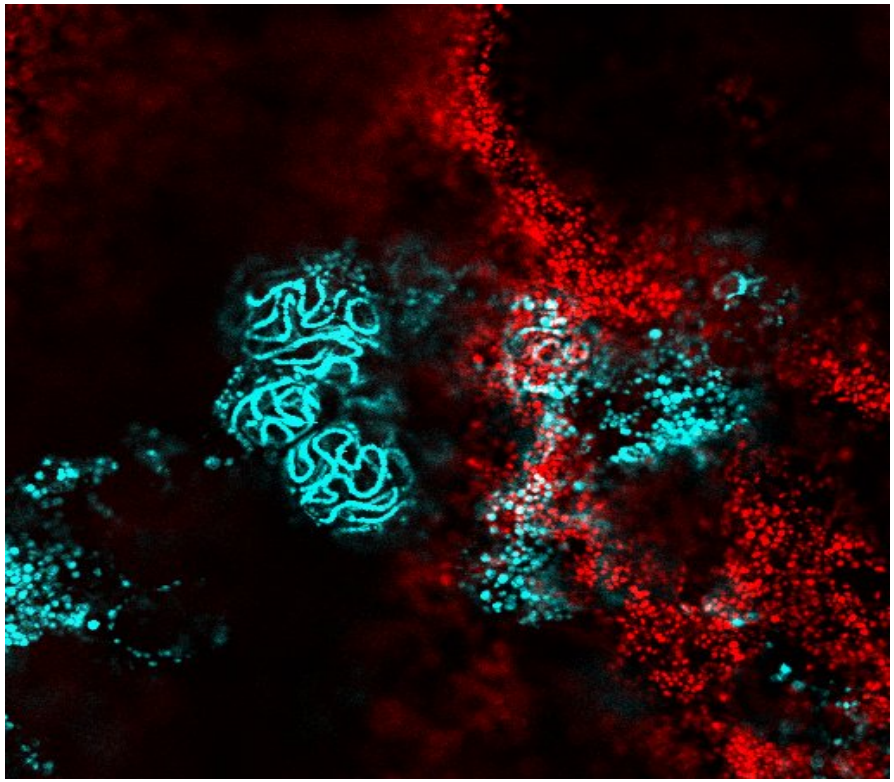


- Light:
  60µmol photons /m²/s
- Humidity:
  100% RH
- Temperature:
  22°C
- Nutrient supply:
  BBM+sucrose 12g/L
- Substratum:
  several stone, paper
- Organisms:
  algae, cyanobacteria, fungi

Experimental tests

1
ALGAE
CYANOBACTERIA
FUNGI

2
ALGAE+FUNGI
CYANOBACTERIA+ALGAE
FUNGI+CYANOBACTERIA



3
ALGAE + CYANOBACTERIA + FUNGI

Concluding remarks

The study of subaerial biofilms is a key field for all that concerns microecology, conservation science and development of anti-fouling systems. In vitro experiments and molecular biology greatly support the understanding of biofilms ecology.

What did we accomplish?

- Development of synthetic microcosms using microrganisms isolated from different sites and substrata.
- Validation of reproducibility.