attributed to the fact that the set of primers used gave only sequences producing significant alignments with gram negative bacteria such as *Pseudomonas* genus, while our communities were prevalently composed by gram positive bacteria. The presence of key genes involved in the aromatic degradative pathways could suggest that microorganisms may potentially use the pollutants deposited on the stone surfaces and support the hypothesis of the heterotrophic microflora as first coloniser of the stone.

The main problem for heterotrophic bacteria as primary colonisers of stones is the availability of carbon sources for growth. The presence of relatively high amounts of aromatic compounds could guarantee carbon source availability only if the bacteria harbour the metabolic pathways for the compounds. The presence of key genes of the degradation pathway could show that microorganisms may potentially use the pollutants on the surface. A molecular approach to the biodeterioration study may supply very useful information on the colonisation and deterioration processes by evidencing the metabolic functions of the microbial colonisers.

**References**


Acidobacteria in Paleolithic painting caves


The colonisation of building materials by microorganisms as revealed by culturing and molecular methods

L. Laiz, G. Piñar, W. Lubitz & C. Saiz-Jimenez

Description of novel bacterial species associated with biodeteriorated mural paintings using molecular techniques

J. Heyrman & J. Swings

Analysis of the microbial diversity present on the wall paintings of Castle of Herberstein by molecular techniques

G. Piñar, C. Schabereiter-Gurtner, W. Lubitz & S. Rölleke

Classifying bacterial isolates from hypogean environments. Application of a novel fluorimetric method for the estimation of G+C mol% content in microorganisms by thermal denaturation temperature

J. M. Gonzalez, L. Laiz & C. Saiz-Jimenez

Fluorescent In Situ Hybridization (FISH) to study biodeterioration in Cultural Heritage

C. Urzi, V. La Cono, F. De Leo & P. Donato

Biocide treatment of rock and mural paintings: problems of application, molecular techniques of control and environmental hazards

A.A. Gorbushina, E. Diakumaku, L. Müller & W. E. Krumbein

Cyanobacteria and biodeterioration of monumental stones

G. Lamenti, L. Tomaselli & P. Tiano

Biodeterioration of miniature paintings from the 18th and 19th centuries

J. Peltola, M.S. Salkinoja-Salonen & S. Hornytzkyj

Microbial contamination in museum collections. Organic materials

N. Valentin

Microbial toxins in moisture damaged indoor environments and cultural assets

M.S. Salkinoja-Salonen, J. Peltola, M.A. Andersson & C. Saiz-Jimenez

**Forthcoming Activities**

**INTERNATIONAL CONGRESS ON MOLECULAR BIOLOGY AND CULTURAL HERITAGE, SEVILLE 4-7 MARCH 2003**

**Programme**

**Session 1. COALITION communications**

Overview on existing molecular techniques with potential interest in Cultural Heritage

J. M. Gonzalez
An investigation of bacterial dissolution of Maya limestone: Biodiversity and functional analysis

Molecular biology for investigation of cyanobacterial populations on historic buildings in Brazil
C.A. Crispim, C.C. Gaylarde, P.M. Gaylarde, J. Copp & B.A. Neilan

The potential of DGGE for analysis of fungal biofilms on historic buildings
D.S. Saad & C. C. Gaylarde

Session 3. Biodeterioration European Commission projects

Cyanobacteria attack rocks (CATS): control and preventive strategies to avoid damage caused by cyanobacteria and associated microorganisms in Roman hypogean monuments

Aerophytic biofilms in dim habitats
M. Roldan, E. Clavero & M. Hernandez-Marine

The importance of light in the conservation of hypogean monuments
P. Albertano & L. Bruno

Biomineralisation of different crystalline phases by bacteria isolated from catacombs

Multiple approach to study the structure and diversity of microbial communities colonizing artistic surfaces. Study case: the Roman catacombs of St. Callixtus and Domitilla
C. Urzi, F. De Leo, P. Donato & V. La Cono

Effect of Algophase on the cyanobacterium Gloeobacter membranacea CCAP 1430/3

Biomediated calcite treatments for stone conservation
P. Tiano

Microbial calcium carbonate precipitation for reinforcement of monumental stones
C. Barabesi, F. Salvianti, G. Mastromei & B. Perito

Fungal colonization on treated and untreated stone surfaces
F. De Leo & C. Urzi

Microbial communities in black crusts: an approach for assessing carbon utilisation

Insect infestation in museum collections. Organic materials
N. Valentin

Session 4. Biodeterioration cases study

Biodeterioration control in Cultural Heritage: methods and products
M.P. Nugari & O. Salvatori

Deterioration and bioremediation of fresco: a case study

Diagnostic tools for monitoring phototrophic biodeteriogens
L. Tomasselli, G. Lamenti & P. Tiano

A comparative study on biodeterioration and weathering effects in three sites of the Latin American Cultural Heritage
H. A. Videla & L.K. Herrera

Microbiological studies of biofilm present on stones from the National Museum building, Bogotá, Colombia
M. Martinez, P.C. Martinez, P. Laverde & C.C. Gaylarde

Experimental evidence of oxalate formation by fungal strains on marble samples
M. Monte

The microbial flora of naturally-aged silk fibroin
E. De Rossi & O. Ciferri

Atmospheric and biological deterioration of two churches of the Cultural Heritage of the city of Medellin, Colombia
L.K. Herrera, C. Arroyave & H. A. Videla

Preliminary microbiological analysis of biofilms of some monuments in Villa de Leyva, Colombia
M. Martinez, C. C. Gaylarde & A. Otalora

Mycological investigations of the State Hermitage Museum indoor environment
O.L. Smolyanitskaya