Microbes on building materials - Evaluation of DNA extraction protocols as common basis for molecular analysis

Building Material

CASE STUDY

Ettenauer, J. D.; Piñar, G.; Lopandic, K.; Spangl, B.; Ellersdorfer, G.; Voitl, C.; Sterflinger, K. *Science of the Total Environment.* **2012**, *439*.

Overview

Keywords: Building materials, DNA extraction, DNA purity, PCR

Aim of the study: Analyzing microbial communities in building materials

Sample name: Plaster, red brick and gypsum

Material: FastPrep-24™ instrument, FastDNA™ SPIN Kit for Soil containing Lysing Matrix E

Buffer: Sodium Phosphate Buffer & MT Buffer (provided with the Kit)

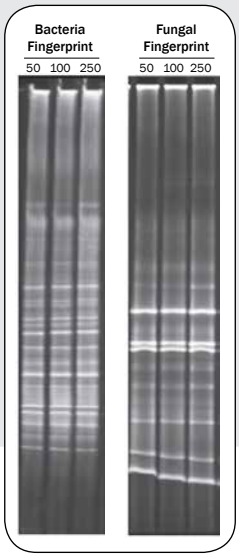
Protocol and Parameters

1. Sampling was done using a sterile scalpel or an ethanol flamed hammer and chisel to remove the material from the walls and was collected in sterile plastic bags.
2. The transport and storage of the sampling material were done at room temperature.
3. In the laboratory, samples were ground for 2 min in liquid nitrogen using a sterile mortar and pestle, collected in a sterile 50 mL falcon tube and homogenized by manual shaking.
4. Three different sample amounts of each material, 50 mg, 100 mg and 250 mg (each in triplicate), were weighed using a Sartorius precision scale for each extraction method.
5. Tubes were either immediately processed or stored at -20 °C. The resulting nine samples for each method were further subjected to the different DNA extraction methods.
6. When using the FastDNA™ SPIN Kit for Soil method, samples were processed two times in a FastPrep® instrument for 40 s at a speed of 6 m/s.

Results

A Proven Gold Standard Method

Representative examples of bacteria and fungal fingerprints obtained from the plaster material. The banding patterns of the three tested sample amounts (50, 100, 250 mg) from the FastDNA™ SPIN Kit for Soil.



Of the thirteen methods evaluated, the FastDNA™ SPIN Kit for Soil proved to be the best DNA extraction method and could provide positive results for all tests with all tested samples.

This study shows that the FastPrep® extraction method is a gold standard for quantification of indoor fungi and bacteria in building materials.