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CULTURAL HERITAGE

EU project targets salt eating away at Europe's cultural treasures

An EU-funded project is devising advanced restoration procedures to protect Europe's vast cultural heritage. The single biggest threat faced by the majority of Europe's historical monuments is erosion caused by the corrosive effects of salts. Salt can work its way into tiny cracks and fissures in anything from building facades to statues, and destroy it from the inside out. SALTCONTROL, a DG Research-funded project headed by Ghent University, aims to develop a new method to prevent damage caused by salt crystals through the application of compounds that inhibit their growth. They will focus on the Monastery of Saint Jerome in Granada and the Terezin fortress on the outskirts of Prague.

More information:

- SALTCONTROL project details
- Journal of Crystal Growth

Salt crystals can have very abrasive effects on stone and other building materials.
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The project, funded under the sixth framework programme for research and technological development, began in January and has just concluded its initial phase with promising results. Throughout the centuries, structures and artefacts alike are subject to a wide array of corrosive conditions, the Monastery of Saint Jerome being no exception.

"Dampness, pollution deposits or antisocial behaviours are the main causes for the appearance of salts in this building and the effects provoked by them such as the loosening of some pictorial layers, material loss, sand and dust accumulation in the low areas and severe damage in sculptural heritage", says Dr Carlos Rodríguez-Navarro, a professor at project partner University of Granada and coordinator of the Saint Jerome work site.

To best protect against harmful salts that penetrate stone, the researchers are investigating techniques that coax the salt to the surface enabling restoration experts to then safely remove it.

Researchers first looked at salt crystallization dynamics and kinetics through the use of the electron microscopy technique of environmental scanning. They are attempting to identify the inhibitors that best prevent salt accumulation in ornamental materials adorning the inside of the impressive Monastery of Saint Jerome.

"The (lab) experiments have been carried out with sodium chloride, sodium sulphate and magnesium sulphate, which are the salts that most affect at present Granada's heritage, and up to now we have managed to apply effective additives in low concentration that, besides being very effective in the fight against these alteration problems, are quite cheap," he says.

Though initial laboratory tests produced better than expected results, researchers are cautious about rushing to the experimentation phase for fear of further damaging the priceless historical artefacts. The next step of the project will be to put initial findings through rigorous testing that simulates the conditions found in the monastery. In the lab, they are conducting their tests on limestone quarried from the same area where the original building material was found.

Depending on the success of their work at the Monastery of Saint Jerome, the research team hopes to begin work on other damaged buildings in Granada, such as the cathedral or the chancery, but understand that each project requires a unique solution. "There is no single recipe," Dr Rodríguez-Navarro notes.

Project participants hope to wrap work up by the end of the year. They have published their initial results in scientific review *Journal of Crystal Growth*.

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