

Supplementary material

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Eco-friendly solution based on *Rosmarinus officinalis* hydro-alcoholic extract to prevent biodeterioration of cultural heritage objects and buildings

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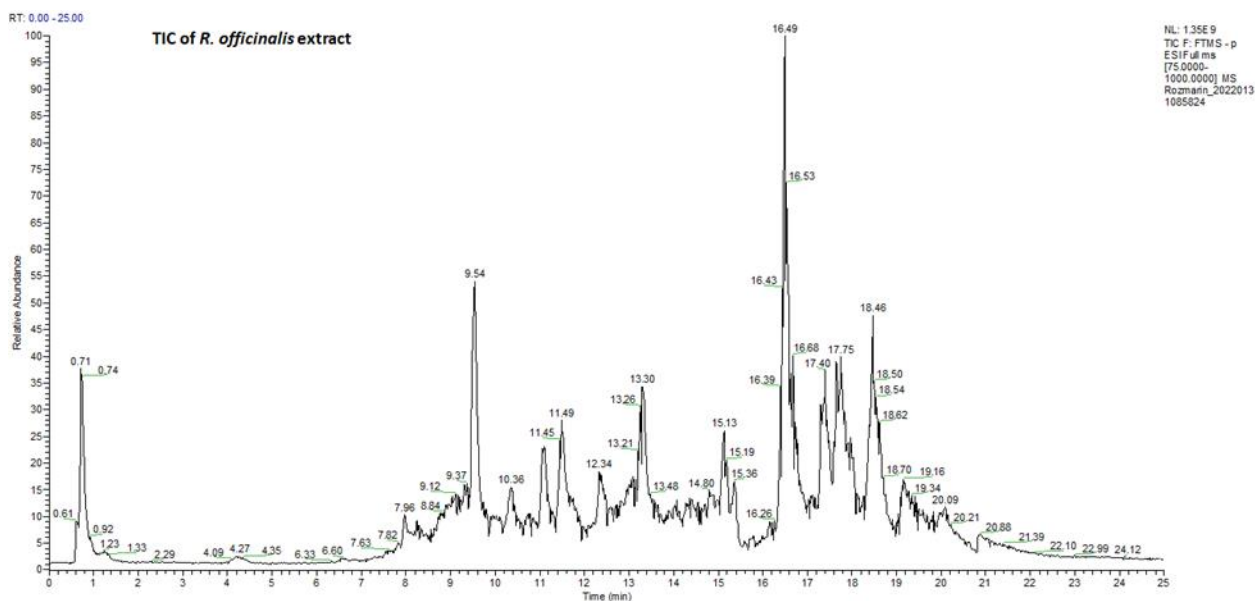


Figure S1. The total ion current (TIC) chromatogram *R. officinalis* extract by UHPLC–MS/MS detection in negative ionization mode

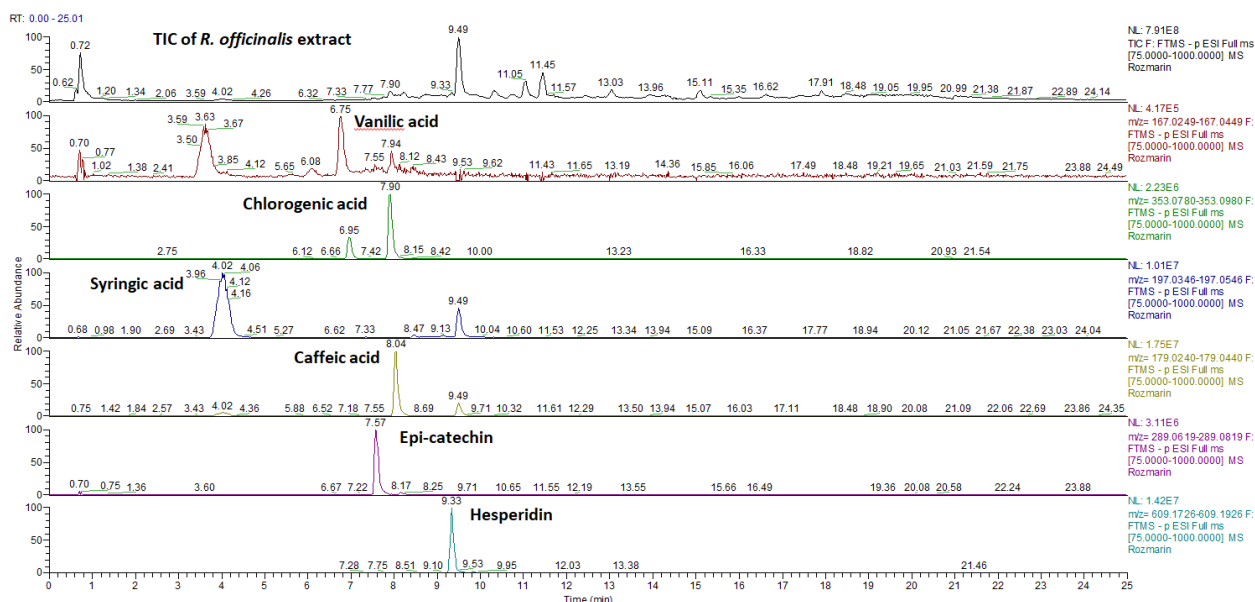


Figure S2. TIC and the extracted chromatograms of the main phenolic compounds quantified in *R. officinalis* extract (the chromatograms were extracted from TIC using a 5 ppm mass accuracy window; negative ion mode, full scan, base peak in the range 75-1000 m/z)

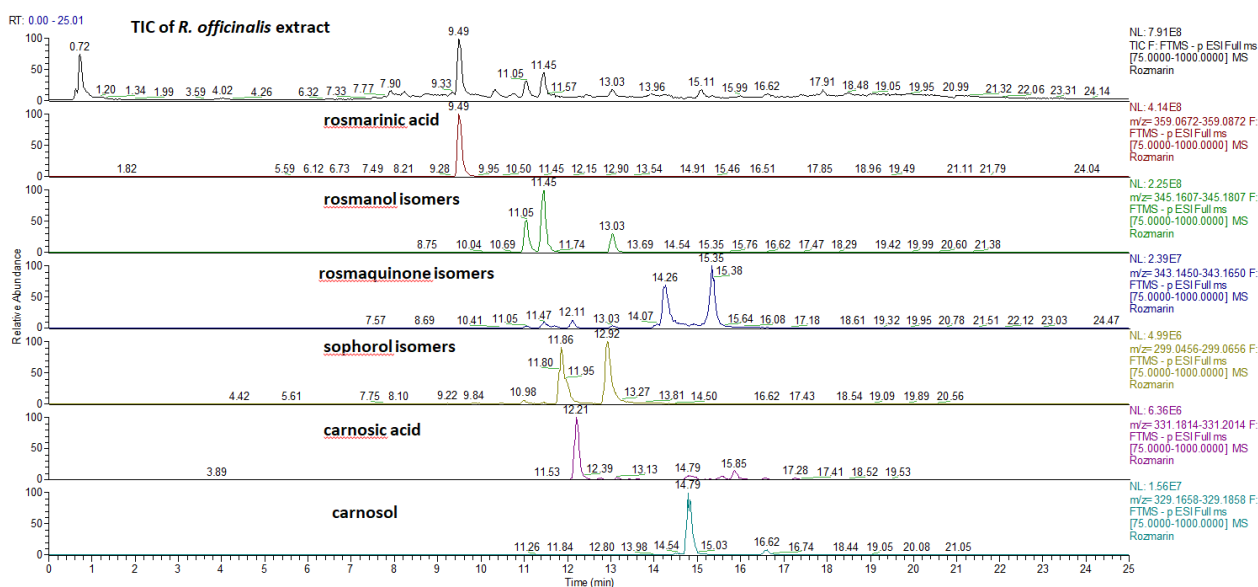


Figure S3. TIC and the extracted chromatograms of the main terpenoids in *R. officinalis* extract (the chromatograms were extracted from TIC using a 5 ppm mass accuracy window; negative ion mode, full scan, base peak in the range 75-1000 m/z)

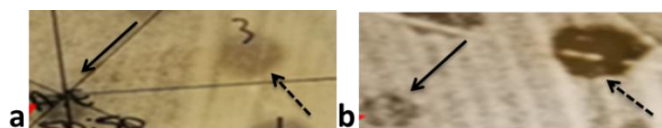


Figure S4. Example of the disk diffusion screening assay of the antimicrobial activity of the tested *R. officinalis* extract against *P. chrysogenum* strain isolated from the wooden churches (a- reverse; b-averse); full arrow- solvent inhibition zone; dashed arrow- *R. officinalis* extract inhibition zone.

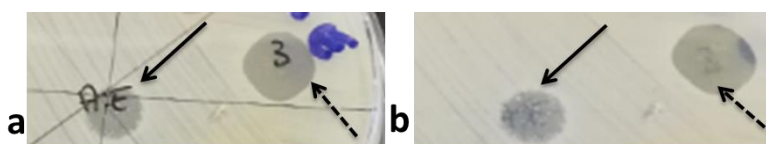


Figure S5. Example of the disk diffusion screening assay of the antimicrobial activity of the tested *R. officinalis* extract against *B. subtilis* strain isolated from the museum objects (a- reverse; b-averse); full arrow- solvent inhibition zone; dashed arrow- *R. officinalis* extract inhibition zone.

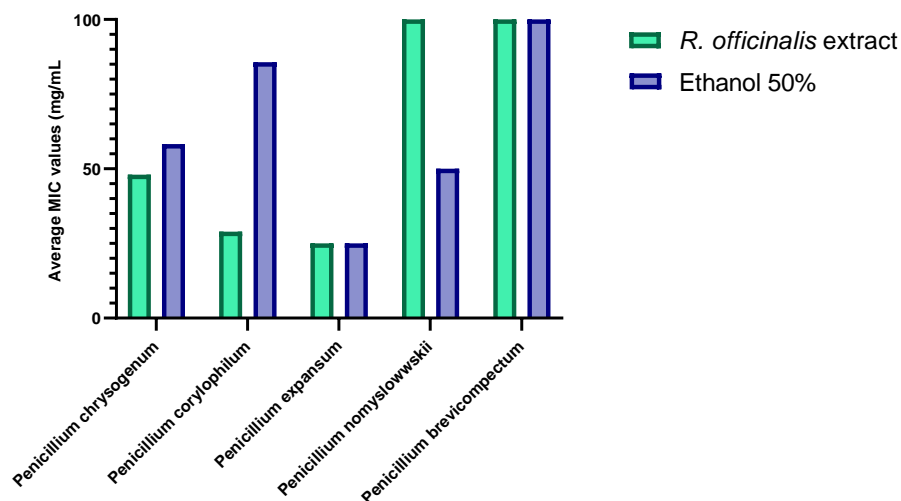


Figure S6 a. Graphic representation of the average values of the minimal inhibitory concentration (MIC) of *R. officinalis* hydro-alcoholic extract against *Penicillium* species.

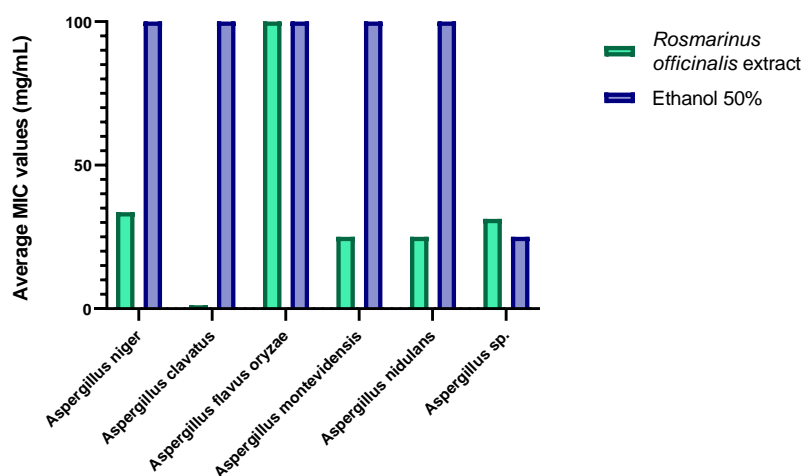


Figure S6 b. Graphic representation of the average values of the minimal inhibitory concentration (MIC) of *R. officinalis* hydro-alcoholic extract against *Aspergillus* species.

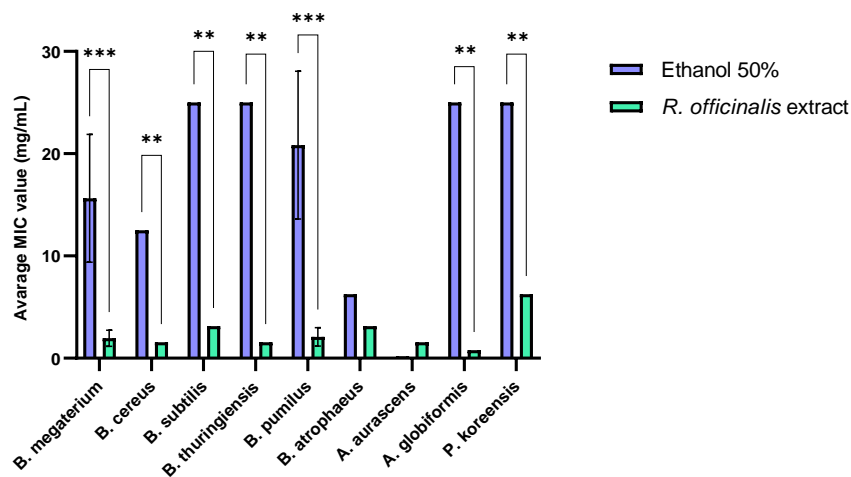


Figure S7. Graphic representation of the average values of the minimal inhibitory concentration (MIC) of *R. officinalis* hydro-alcoholic extract against bacterial strains by the species.

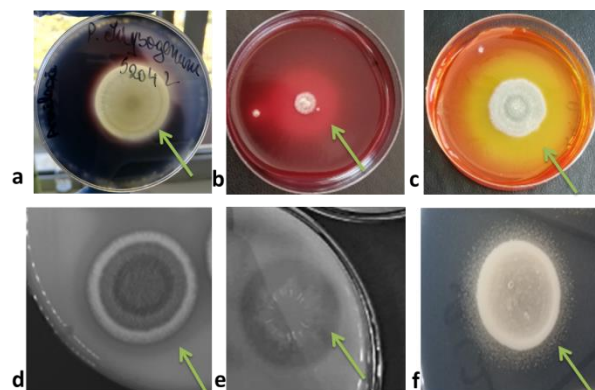


Figure S8. Examples of the influence of the *R. officinalis* extract and ethanol (50%) control on the ability of microbial strains to secrete compounds involved in the biodeterioration of heritage objects.

a) amylase- *P. chrysogenum*; b-cellulase-*P. chrysogenum*; c-organic acid-*P. digitatum*; d-caseinase- *P. chrysogenum*; e-caseinase- *B. cereus*; F- esterase- *B. thuringiensis*.