

University of Applied Sciences
Department of Conservation and Restoration
Science Laboratory

FH;P

Church of the Virgin (Gelati)
Salt analyses – Part I
Short report

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Introduction

11 salt samples (efflorescence and crusts) from surfaces of the Church of the Virgin (Gelati monastery complex) were sent to the Science Laboratory of FHP with a request for analysis. The samples were taken on December 19, 2023 and documented by the restoration team.

Analytical methods

The samples were analyzed microscopically and using X-ray diffractometry (XRD). An Empyrean X-ray diffractometer from Malvern Panalytical with CuK α radiation was used to determine the salt phases.

Results

The results are summarized in Table 1.

Table 1: Sample ID, location, and results of the XRD measurements, (+) = main salt, (-) = to a lower degree

Sample ID	Location	Crystallized Salts
1	E5	Niter [KNO ₃] (+), Aphtitalite [K ₃ Na(SO ₄) ₂] (-)
2	E5	Niter (+), Picromerite [K ₂ Mg(SO ₄) ₂ •6H ₂ O], Syngenite [K ₂ Ca(SO ₄) ₂ •H ₂ O] (-)
3.1	E5	Dypingite [Mg ₅ (CO ₃) ₄ (OH) ₂ •5H ₂ O] (+), Gypsum [CaSO ₄ •2H ₂ O] (-)
3.2	E5	Dypingite [Mg ₅ (CO ₃) ₄ (OH) ₂ •5H ₂ O] (+), Gypsum [CaSO ₄ •2H ₂ O] (-)
4	E5	Hydromagnesite [Mg ₅ (CO ₃) ₄ (OH) ₂ •4H ₂ O] (+), Dypingite, Niter (-)
5	4	Niter [KNO ₃]
6	S14	Nequehonite [MgCO ₃ •3H ₂ O] (+), Dypingite [Mg ₅ (CO ₃) ₄ (OH) ₂ •5H ₂ O] (-)
7	S14	Nequehonite [MgCO ₃ •3H ₂ O] (+), Dypingite [Mg ₅ (CO ₃) ₄ (OH) ₂ •5H ₂ O] (-)
8	E8	Niter [KNO ₃] (+), Calcite [CaCO ₃] (-)
9	W5	Hexahydrate [MgSO ₄ •6H ₂ O] (+), Gypsum [CaSO ₄ •2H ₂ O] (-)
10	W5	Nequehonite [MgCO ₃ •3H ₂ O] (+), Dypingite [Mg ₅ (CO ₃) ₄ (OH) ₂ •5H ₂ O] (-)

The analyses on the samples have not been completed. The detailed report on this analyses series will be sent in mid-March 2024.