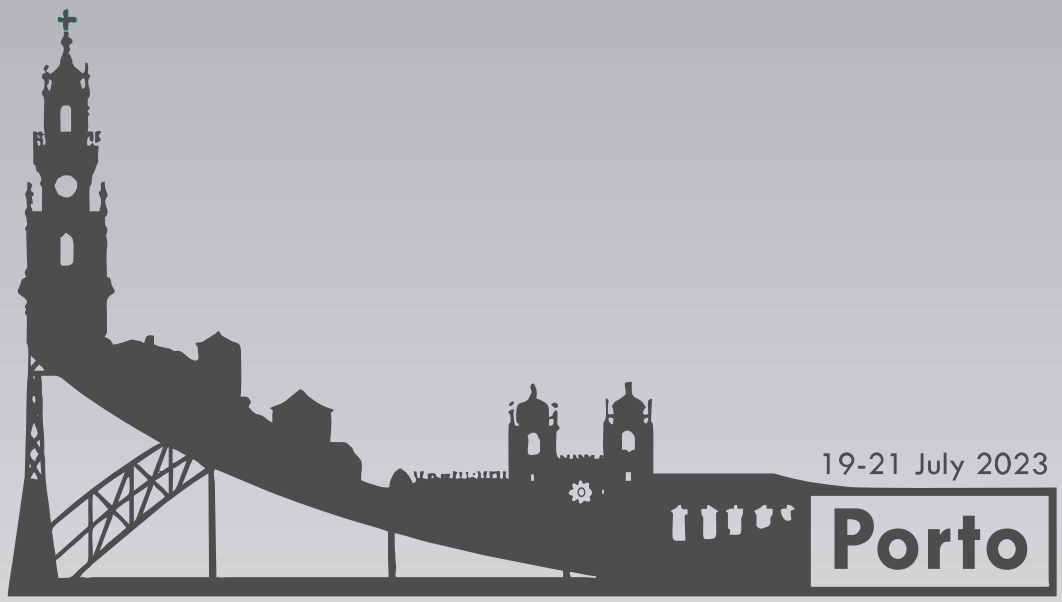
BOOK OF ABSTRACTS

EDITORS
ANA R. R. P. ALMEIDA
JORGE M. GONÇALVES



MEDICTA 2023

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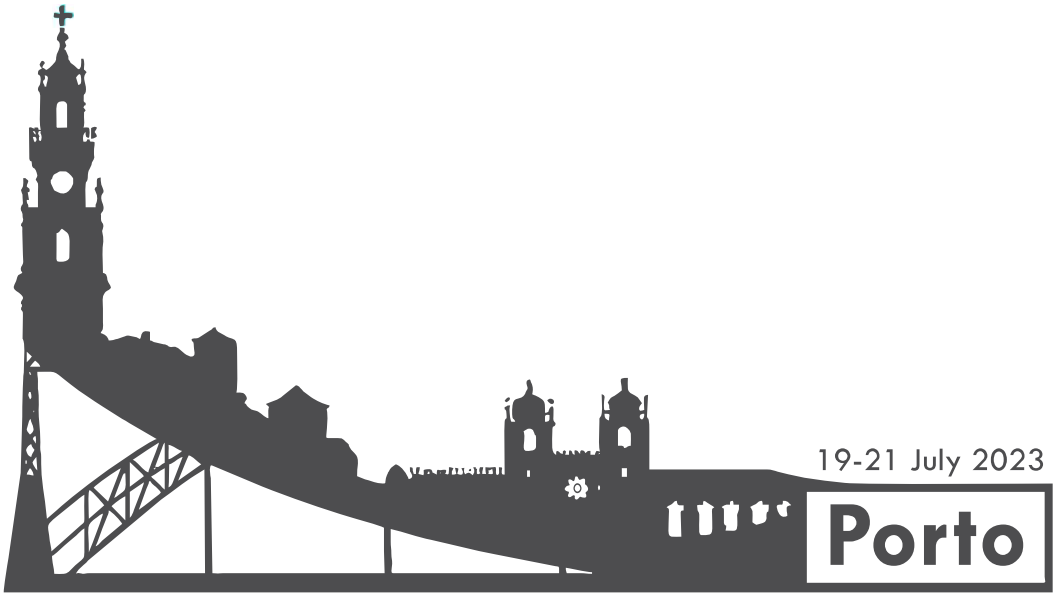

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Recycling volcanic fly ashes through geopolymers: synthesis and characterization

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Volcanoes are geological structures widely distributed in different parts of the world. These are responsible for the formation of enormous quantities of fly ash (FA) which often, being considered waste, need to be disposed of in landfills. Currently, among the most innovative technologies for their reuse, there is their inclusion in geopolymers.
In this study geopolymers with 20 wt% of FA as filler are synthesized and analysed (Fig.1). The precursors used are metakaolin (MK), sodium hydroxide solution (NaOH 8 M), sodium silicate solution (Na_2SiO_3), and FA. The samples were cured at room temperature and 40°C for 24 h. The analyses performed evaluated their chemical, thermal, and antibacterial properties. The results of the integrity test, weight loss and TGA study revealed how increasing the curing temperature results in better stabilisation. The shift of the DOSPM (Density of State Peak Maximum) to lower wavenumbers in the FT-IR spectra confirmed the occurrence of the geopolymerization process in all the specimens. Finally, the antibacterial analysis showed how geopolymers, independently from the curing temperature, can inhibit both gram-positive and negative bacteria.

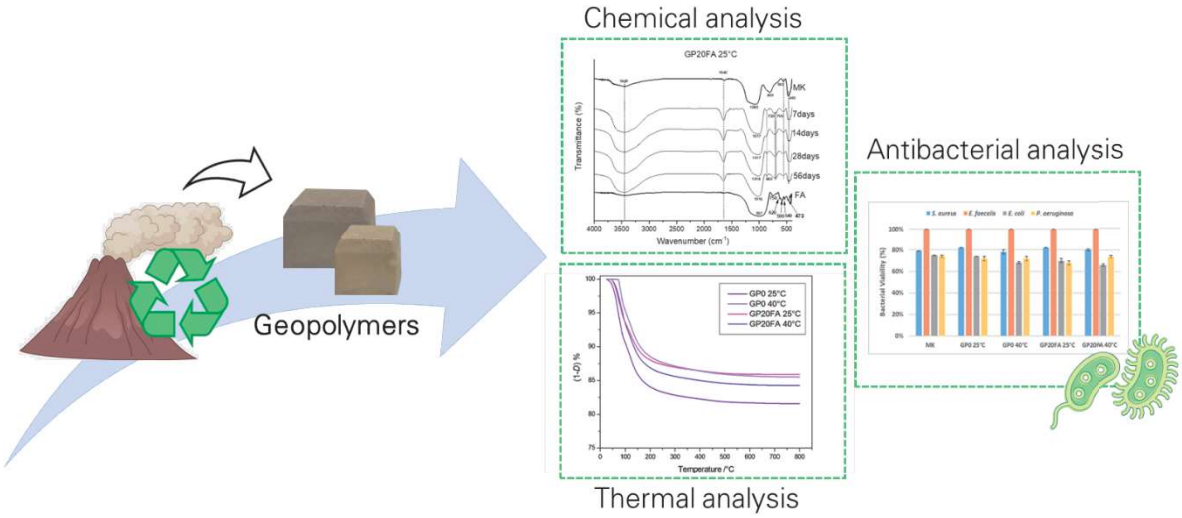

Figure 1: graphical representation of the study performed.

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[1] Cottrell, E. *Global Distribution of Active Volcanoes. In Volcanic Hazards, Risks and Disasters*; Elsevier, **2015**.