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DESIGN AND CHARACTERIZATION OF CONTROLLED RELEASE PK FERTILIZERS FROM AGRO-RESIDUES

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Abstract

The aim of this study is to design and characterize a new controlled release fertilizers category by using valorization of residues from agri-food, industrial and post consumers activities normally allocated into landfill disposal. The underlying strategy in materials research fully agreed with the circular economy perspective and the more recent European legislation about critical raw materials recovering. This study covers the development of lightweight aggregates, based on a local red clay (km 0 concept) and pores former such as coffee grounds and brewery sludge. Functionalization has been performed with vegetable biomass and cattle bone flour ashes, as received and after vitrification in a tailored fertilizer glass, containing high quantity of potassium and phosphorous. Fully characterization by means of a multidisciplinary approach, including chemical, mineralogical, thermal, physical, and plants growth in soils tests has been performed on starting and derived materials. Finally, growth test on basil's plant have demonstrated the beneficial effect of the aggregates designed and produced in this study in comparison with standard fertilizer already on the market.

Key words: agro-waste, circular economy, core-shell fertilizer, LWAs, PK fertilizers

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