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Novel organic waste based hybrid polymer materials

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This work is aimed at the valorization of the organic fraction of urban solid waste through the stabilization and the inertisation in thermoplastic and thermoset resins. After being ground, the organic waste was subjected to a stabilization process; different procedures were used in order to obtain a partial or complete removal of the bacterial activity. Afterwards, the inertisation process was carried out through the incorporation of the organic waste into water soluble thermoplastic and thermoset matrices. Samples produced were tested by using differential scanning calorimetry (DSC), and thermogravimetric analysis (TGA), in order to evaluate the water content of the mixture. The viscosity of the material was then assessed through rheological analysis, thus allowing to understand times and temperatures necessary for the polymerization, in case of the thermoset matrix, or for the evaporation of water, in case of the thermoplastic one. Flexural and compressive tests were carried out on samples obtained after inertisation. Results showed good values of flexural and compressive strength. Also, the influence of the residual water content on the mechanical properties was studied, and an increase of the compressive modulus with the increase of the water content was found. Finally, different amounts of foaming agents were added to the mixtures during the inertisation; compressive tests were then carried out to evaluate the influence of the voids on the mechanical properties.

Biography

Antonio Greco has received his Master's degree in Materials Engineering at University of Lecce in October 1998. He has received his PhD degree in Materials Science and Technology in May 2001. From December 2002, he become an Assistant Professor at University of Salento. He keeps scientific collaborations with several Italian and International research institutions. He has around 80 papers in international journals (h-index=21) and 60 presentations at international conferences, most of them are about innovative polymer based materials.

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