



“Gheorghe Asachi” Technical University of Iasi, Romania



MICROBIAL SAFETY OF PLASTIC MATERIALS OBTAINED FROM WASTES

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Abstract

Extensive use of plastics leads to the increase of non biodegradable wastes that have to be recycled due to both dramatically decrease of natural resources to producing them and to their increasing need as well as due to environmental issues. Most of goods made by materials based on wastes have to be commonly used by people. Antibacterial character of those is necessary to avoid epidemics. This paper deals with determination of antimicrobial character of materials based on polymeric wastes in comparison with virgin polyolefins. Surface contamination, total number of germs, *E. coli* and *Enterococci* growth on the samples surface have been determined and correlated with the surface characteristics of materials (hydrophobicity, surface energy, polarity, charge, roughness) as well as with bulk characteristics such as Young Modulus, crystallinity, water sorption. The conclusion of this study is that materials based on wastes are more sanitary safe by comparing to virgin polymers obtained without antimicrobial additives. This is due to possible maintaining in wastes of active antibacterial additives used in the plastic goods processing. High crystallinity and low water sorption avoid their release. Surface conformation seems to not fit to bacteria shape and dimensions, hindering their adhesion and growth. Negatively charged surface repels negative bacteria. Lower surface hydrophily of wastes, coming from OH and CO groups' elimination, due to photo-degradation during their life cycle, determines lower adhesion of more hydrophilic bacteria such as *E. coli*.

Key words: antibacterial character, polymeric wastes, polyolefins, roughness, stiffness

Received: December, 2014; Revised final: June, 2015; Accepted: June, 2015

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