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# SUSCEPTIBILITY OF THERMOPLASTIC BASED COMPOSITES TO DEGRADATION BY MICROORGANISMS

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**Abstract**

In the present study, several selected formulations based on recycled (rPP) or virgin polyolefins (vPP) and lignocelluloses were prepared and subjected to microorganism attack. Biodegradation tests were performed with microbial strains belonging to fungal genera, like *Aspergillus, Penicillium* and *Fusarium.* The initiation of biodegradation was demonstrated by Scanning Electron Microscope (SEM) micrographs showing the colonization of surface samples by microbial strains. The crystallinity of composites calculated based on Differential Scanning Calorimetry (DSC) curves evidenced some fluctuations as effect of biodegradation process. The most significant increase of crystallinity was obtained for v(PP)-wood samples, from 35.4% (sample without microbial contact) to 58.84% (sample incubated with *Fusarium*), 47.97 % (sample incubated with *Penicillium*) and 51.37 % (incubation with *Aspergillus*), respectively. The microbial activity upon rPP based composites did not induce significantly changes of crystallinity. Fourier Transform Infrared Analysis (FTIR) showed the increase of the peak corresponding to the carbonyl group at 1740 $cm^{-1}$ that indicated the oxidative reactions in the chain in polymer matrix. Also there were observed new bands at 1647-1651, 1547 $cm^{-1}$ assigned to protein materials from microorganisms, and at 1046-1450 $cm^{-1}$ assigned to polysaccharides. The results showed that the some polymeric composites suffered a slowly biodegradative process, the process depending on polymer characteristics (structure, complexity, composition) and microorganism ability. From the obtained results, it can be concluded that *Aspergillus* strain is active in the biodegradation of tested composites.

*Key words:* biodegradation, composites, differential scanning calorimetry, infrared spectroscopy, polyolefins

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