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Polyethylene/organically-modified layered-silicate nanocomposites with antimicrobial activity P. SONGTIPYA, M.M. JIMENEZ-GASCO, E. MANIAS, Departments of Materials Sci & Eng and Plant Pathology, Penn State University — Despite the very intensive research on polymer nanocomposites, the opportunities for new functionalities possible by nanofillers still remain largely untapped. Here, we present polyethylene/inorganic nanocomposites that exhibit strongly enhanced mechanical performance and, at the same time, also an antimicrobial activity originating from the organo-filler nature. Specifically, PE/organically-modified layered-silicate nanocomposites were prepared via melt-processing, and antimicrobial activity was designed by proper choice of their organic modification. Their antimicrobial activity was measured against three micotoxinogen fungal strains (*Penicillium roqueforti* and *claviforme*, and *Fusarium graminearum*) as model soil-borne plant and food contaminants. Montmorillonite-based organofillers, which only differ in their organic modification, were used to exemplify how these surfactants can be designed to render antifungal activity to the nanocomposites. The comparative discussion of the growth of fungi on unfilled PE and nanocomposite PE films is used to demonstrate how the antimicrobial efficacy is dictated by the surfactant chemistry and, further, how the nanocomposites' inhibitory activity compares to that of the organo-fillers and the surfactants.

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