

Controlled Release Behavior of Impregnated Insect Repellent Essential Oil-Polymer in Mesoporous Silica Nano Particles

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The insect repellent polymer nanoparticles containing essential oil (cinnamon bark oil) were successfully prepared by impregnation of mesoporous materials. These samples were and characterized by thermogravimetric analysis (TGA), Brunauer-Emmett-Teller (BET) and transmission electron microscope (TEM). TGA data and BET data showd that insect repellent polymer was successfully impregnated in the mesoporous silica nanoparticles. Thermogravimetric analysis data showed that the mesoporous silica powder was thermally stable up to high temperature. The emission behavior of essential oil from a mesoporous silica nanoparticles was investigated by gas chromatography/mass spectrophotometry (GC/MS). The diffusion and releasing kinetics of essential oil from mesoporous material were obtained by analyzing the simple exponent type of time dependent on fractional mass release equation. The diffusion coefficient of essential oil was estimated from the experimentally observed essential oil emission behavior. The emission mechanism was influenced by controllable experimental variables, such as matrix and oil, insect repellent polymer mass method.