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Comparison of Emission Profiles for Volatile Organic Compounds from Cotton and Polypropylene-based Tarp

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Volatile organic compounds were determined in headspace atmospheres over samples of cotton (*Gossypium hirsutum* L.) and polypropylene $\{[\text{CH}_2\text{CH}(\text{CH}_3)]_n\}$ at 100 and 150°C in He and air. A small number of volatile organic compounds were released from cotton at 100°C in He with comparatively low emission rates of 0.2 to 0.3 $\mu\text{g g}^{-1}$ per component. These components had C numbers below 21. In contrast, emission rates for volatile organic compounds from polypropylene-based tarp were 0.6 to 9 $\mu\text{g g}^{-1}$ at 100°C in He, and constituents were predominantly alkanes with C numbers of 14 to 19. Increases in emission rates were observed for components with low vapor pressures (i.e., C numbers >16) though little increase was observed for components with high vapor pressures (i.e., C numbers <16). Exposing cotton to an air atmosphere at 150°C created dramatically new chromatographic profiles for volatile organic compounds versus those from inert atmospheres, and emission rates per compound increased to 0.4 to 1.3 $\mu\text{g g}^{-1}$. Changes in volatile organic compound emissions for polypropylene-based tarp in air were less noticeable at 150°C, though emission rates per compound increased to 0.8 to 11 $\mu\text{g g}^{-1}$. Some compounds produced in air at this higher temperature were suggestive of oxidative decompositions. Prolonged heating of polypropylene-based tarp resulted in thermal desorption of residual solvents or impurities followed by thermal decomposition.