

Natural rubber biodegradation in soil in relation to the waste disposal of used latex products

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Abstract Biodegradation was studied by burying natural rubber (NR) latex gloves in tropical soils amended with nitrogen and phosphorus, and in a composting environment created from dried grass clippings, cattle manure and soil. Manipulating soils to favor microbial growth enhanced biodegradation compared to natural attenuation processes in unamended soils. The mean specific degradation rate of NR glove pieces in a high soil nutrient treatment was three times higher than in the unamended controls. Polychloroprene and nitrile gloves remained intact after 40 weeks, while plasticized PVC gloves showed small weight losses due to plasticizer and other additive losses.

In a composting environment, biodegradation rates over 24 weeks were twice that compared to the fertilized treatment in soils, suggesting an efficient means of waste disposal. Leachates of accelerated residues from NR gloves undergoing 20-weeks burial in soil lysimeters were however not significant.

Degradation of NR condoms in soil was slower compared to gloves with 42% of the initial weights remaining after 48 weeks. In contrast, the manufactured polyurethane condoms were hardly biodegradable. The simulating effect of nutrient application on indigenous soil microbes, the likely effects of accelerators or antioxidant, or of the interactions of modulus and thickness in affecting NR latex product degradation are discussed.