

# **Evaluation of the Biodegradable Effect of Limonene and the Awareness Campaign for Reduction of Polystyrene Waste**

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The purpose of this research was to evaluate the effect of different essential oils contained in limonene as biodegrading agents for polystyrene, considering a possible larger scale application. This research had three stages: in the first stage the effect of the awareness, waste collection and counting campaign was assessed over the general environmental conscience and the amount of polystyrene waste. In the second stage various tests were carried out with three types of limonene essential oils to determine the most effective treatment for the biodegradation and size reduction of polystyrene waste, the following variables were considered; biodegradation time, temperature effect (30-80 °C), shaking strength (2000 - 3000 rpm) and mixture percentage (25-75 %). In the third stage we evaluated the potential use of the remnants of the polystyrene biodegradation process in the fabrication of new products. The research results show that the polystyrene awareness, waste collection and counting campaign did have a significant impact on the environmental conscience and the reduction of polystyrene waste. Also the essential oils obtained from citruses showed significant biodegrading power over polystyrene, particularly the orange oil. The remnants obtained from the polystyrene biodegradation process show potential as the basis of new products such as an ecological insecticide, adhesive, waterproof varnish, anticorrosive coating, plant substrate, fertilizer or stuffing for cushions and furniture.