

## ■ Improvements of the Tensile Properties of Recycled High Density Polyethylene (HDPE) by the Use of Carbonized Olive Solid Waste

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Recycling of plastic poses several concerns to manufacturers. The most important concern is the unpredictability of their mechanical properties (modulus of elasticity, tensile strength and ductility). Olive solid waste, an abundant material usually thrown into land causing harm to the environment, was mixed with HDPE plastic and used as a filling material. The mixture was fed to a house-made extruder operating at different speeds and temperatures. Two carbon particle size ranges (less than 150  $\mu\text{m}$  and 180-250  $\mu\text{m}$ ) were used. The effect of carbon contents from 0 to 10% wt/wt and operating conditions were tested on the mechanical properties of the recycled HDPE plastic. It was found that up to 5% wt/wt carbon of less than 150  $\mu\text{m}$  resulted in a noticeable improvement of modulus of elasticity and tensile strength. The optimum value of modulus at carbon particle size 180-250  $\mu\text{m}$  was found at 2.5 olive solid carbon content. Increasing screw speed was found to increase tensile modulus and strength of used plastic. This was related to melt viscosity and reduction in particle size. An increase in processing temperature was found to improve tensile properties up to a certain point where degradation of the polymeric matrix begins to occur and therefore tensile properties deteriorate.

■ **Fecha:** 10/01/2011

■ **Enlace:** [Elaboración Propia](#)