

## Abstract

# Green Composites from Recycled Polypropylene and Hazelnut Shell Flour for Application in Irrigation Systems <sup>†</sup>

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Recycled polymers and agricultural waste could be used as important tools to reduce the environmental impact of plastic manufacturing and to valorize agricultural waste. In this work, recycled polypropylene (PP) and hazelnut shells were used in order to produce green composites to be applied in the production of fittings for irrigation systems. In order to improve the poor adhesion between the matrix and filler, an adhesion promoter was also used. The adhesion was particularly improved in composites including recycled polymers, probably because of the presence of polar groups in the recycled sample. The rheological properties clearly indicate that the composites show a processability similar to that of the pure polypropylene, and this feature was corroborated by industrial preliminary injection molding tests where the fitting was easily produced. The deformability of the composites was reduced with respect to the pure matrix, although slightly improved by the presence of the adhesion promoter. Composites utilizing recycled polypropylene (RPP) as the matrix and 5% hazelnut shells with and without the adhesion promoter were also used to produce fittings by injection molding, all of which were resistant to a water pressure of 3.50 bar according to the internal test used by the company.

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