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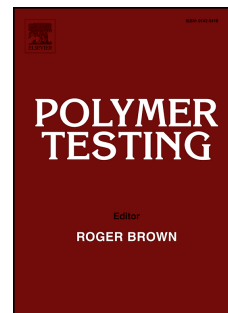
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Product Performance

Evaluation of the functionality of bio-based plastic mulching films**Demetres Briassoulis ^{a*}, Anastasios Giannoulis ^a**^a Department of Natural Resources & Agricultural Engineering, Agricultural University of Athens, 75, Iera Odos Str., 11855 Athens, Greece, * e-mail: briassou@aua.gr**Abstract**

Bio-based products represent a key component of the growing global bio-economy. New markets develop for innovative products made from bio-based feedstocks. The functionality of bio-based and conventional plastic films used in the agricultural sector was investigated for a set of representative mulching films. The evaluation was based on testing critical mechanical and other functional properties of the films. Specific mulching film characteristics were addressed, including durability and sensitivity of tensile properties to external field conditions, tear and impact resistance, and penetration strength. Other functional properties tested include water vapour (WV) permeability, CO₂ transmission rates and radiometric properties. Differences were identified in the performance of the various bio-based biodegradable in soil mulching films. Differences were also identified in the performance of bio-based films as compared to the performance of a conventional reference polyethylene film. Higher water vapour permeability was measured for the bio-based films and there were differences in the penetration and impact resistance, tensile strength and degradation behaviour. Adaptations are proposed for some standard test methods to be applicable to testing bio-based plastic films. The overall functionality of the bio-based mulching films was found to be satisfactory. The characteristics of the bio-based biodegradable in soil films offer new design possibilities for environmental friendly, efficient and sustainable agricultural practices.

Keywords: Bio-based materials, mulching films, biodegradable, mechanical and functional properties, test methods

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