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**Thermal and mechanical properties of biocomposites made of biopolymers and potato pulp powder**Norma Mallegni<sup>1</sup>, P Cinelli<sup>1</sup>, A Lazzeri<sup>1</sup>, M Seggiani<sup>1</sup> and M C Righetti<sup>2</sup><sup>1</sup>University of Pisa, Italy<sup>2</sup>National Research Council, Italy

The thermal and mechanical properties of different biocomposites made of poly (lactic acid) (PLA) and poly (3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) (5 wt% of valerate units) with the addition of potato pulp powder were investigated in order to quantify how the addition of this filler modifies the structure of the polymeric material and to obtain information on possible miscibility/compatibility between the biopolymers and the potato pulp. The potato pulp powder utilized is a residue of the processing for the production and extraction of starch. The study was conducted by analyzing the effect of the potato pulp concentration on the thermal and mechanical properties of the biocomposites. The results showed that the potato pulp powder does not act as reinforcement but as filler for the polymeric matrix. A progressive decrease in elastic modulus, tensile strength and elongation at break was observed with increasing the potato pulp percentage. This moderate loss of mechanical properties, however, still meets the technical requirements indicated for the production of rigid packaging items. The incorporation of potato pulp powder to the biopolymer matrices offers the possibility to reduce the cost of the final products and promotes a circular economy approach for the valorization of agro-food waste biomass.

**Recent Publications**

1. M C Righetti, P Cinelli, N Mallegni, C A Massa, M Irakli and A Lazzeri (2019) Effect of the addition of rice bran oil on the thermal, mechanical, and viscoelastic properties of Poly (lactic acid). *Sustainability* 11(10):2783.
2. M C Righetti, P Cinelli, N Mallegni, C A Massa, L Aliotta and A Lazzeri (2019) Thermal, mechanical, viscoelastic and morphological properties of Poly(lactic acid) based biocomposites with potato pulp powder treated with waxes. *Materials* 12(6):990.
3. M C Righetti, P Cinelli, N Mallegni, A Staebler and A Lazzeri (2019) Thermal and mechanical properties of biocomposites made of Poly (3-hydroxybutyrate-co-3-hydroxyvalerate) and potato pulp powder. *Polymers* 11(2):308.
4. M C Righetti, P Cinelli, N Mallegni, C A Massa, S Bronco, A Staebler and A Lazzeri (2019) Thermal, mechanical, and rheological properties of biocomposites made of Poly (lactic acid) and potato pulp powder. *International Journal of Molecular Sciences*, 20(3):675

**Biography**

Norma Mallegni is a PostDoc at University of Pisa in the Department of Civil and Industrial Engineering. She has completed her Master's degree in Chemistry. She is working on copolymerization, blending and processing of biobased polymers for tuning properties and sustainability of biobased materials.

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