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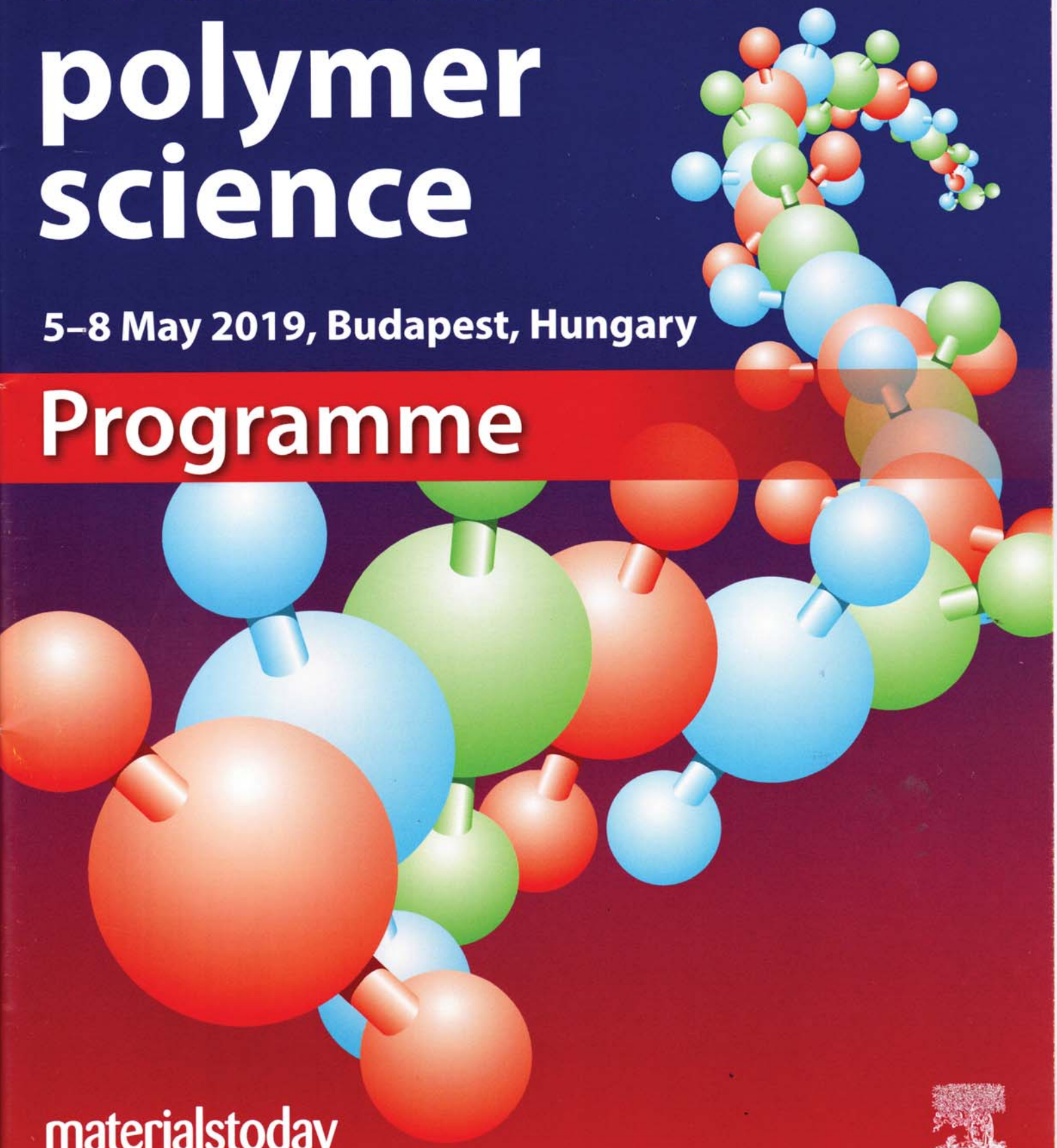

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Agave Americana for composites production by rotational moulding

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The paper shows results of research work performed with Agave Americana (also called century plant), a plant considered with invasive character in Canary Islands. Leaves were cut and used to obtain fibres (AAF) with potential interest in composites industry. Fibres were obtained by a mechanical procedure consisting in a scraping process; they were then cut and mixed with polyethylene (PE) or polylactic acid (PLA) and processed by rotational moulding to obtain test parts (in cube - shapes), using 5 and 10 % of fibre. Fibres were also treated with NaOH 1N (1h, room temperature) to increase their thermal stability. Test parts obtained from cubes were tested to determine their tensile, flexural and impact properties.

As a first result, it is interesting to note that AAF are suitable to be processed by rotomoulding for the obtaining of composite parts with good aesthetics, using PE and PLA as matrices, without significant loose of mechanical properties.

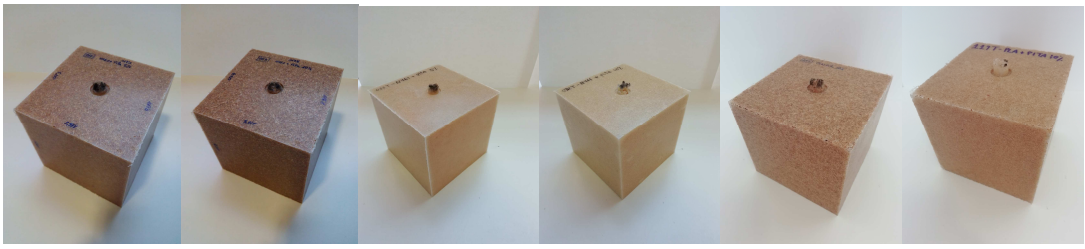

Fig 1. Rotomoulded parts with: 5, 10 % of AAF in PE matrix, 5 and 10 % of treated fibres in PE matrix, 10 % of fibres in a PLA matrix and 10 % of treated fibres in PLA (left to right)

PLA parts reduce their flexural properties due to the introduction of fibres, while PE ones do not show significant differences due to fibres use. On tensile properties, PE behaviour is quite similar, while PLA reduces the elastic modulus (from around 865 MPa for net PLA to 665 MPa for 10% untreated fibres), while the maximum tensile strength is unchanged (from 19 MPa for PLA to 20 MPa for the composite). Finally, impact resistance decreases for PLA composites, while energy absorption is similar for PE composites with 5% of fibre than for net PE.

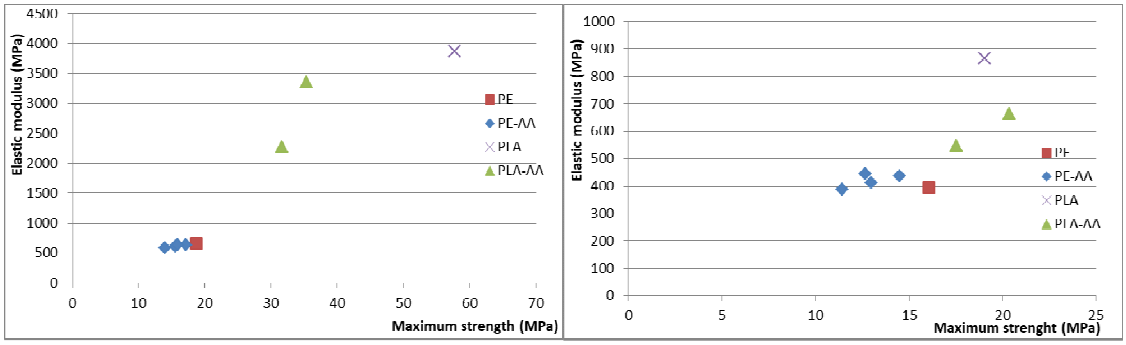

Fig 2. Flexural (left) and tensile properties (right)

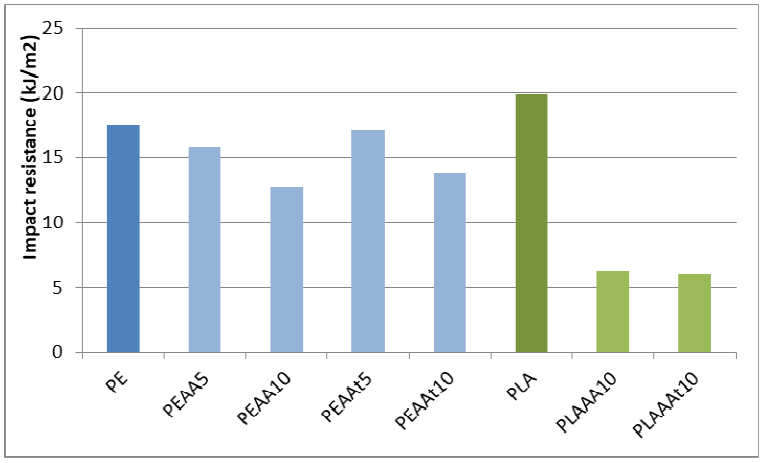

Fig 3. Impact properties

Keywords: Rotational moulding, Natural fibres, Polyethylene, Polylactic acid