

Towards a Circular Textile Economy: Enhancing Enzymatic Textile Recycling through Mechanical Pre-processing Methods

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Flagship: Textiles

Objective(s)

Enzymatic back-to-monomer recycling of textile fibres offers a mild and sustainable strategy, but is challenging due to the crystallinity of the material. Building on the results of our previous Wildcard project, we aim to investigate the effects of mechanical pre-processing methods on decreasing crystallinity in textile materials, thereby increasing susceptibility for enzymatic degradation, in particular for cotton/polyester textile blends.

Target audience

Our project aims to gain scientific knowledge with the aim to develop more sustainable methods for textile recycling. Target audiences for outreach therefore include scientists in the fields of chemistry, biotechnology, polymer science and recycling technologies. Furthermore, these insights can be very useful to industrial stakeholders in textiles and waste management technologies.

Medium

Our scientific findings will be communicated in reports and poster presentations internally. However, for outreach purposes, depending on the audience, these methods of communications are adaptable to fit a different audience, for example in the form of an oral presentation or newspaper article.

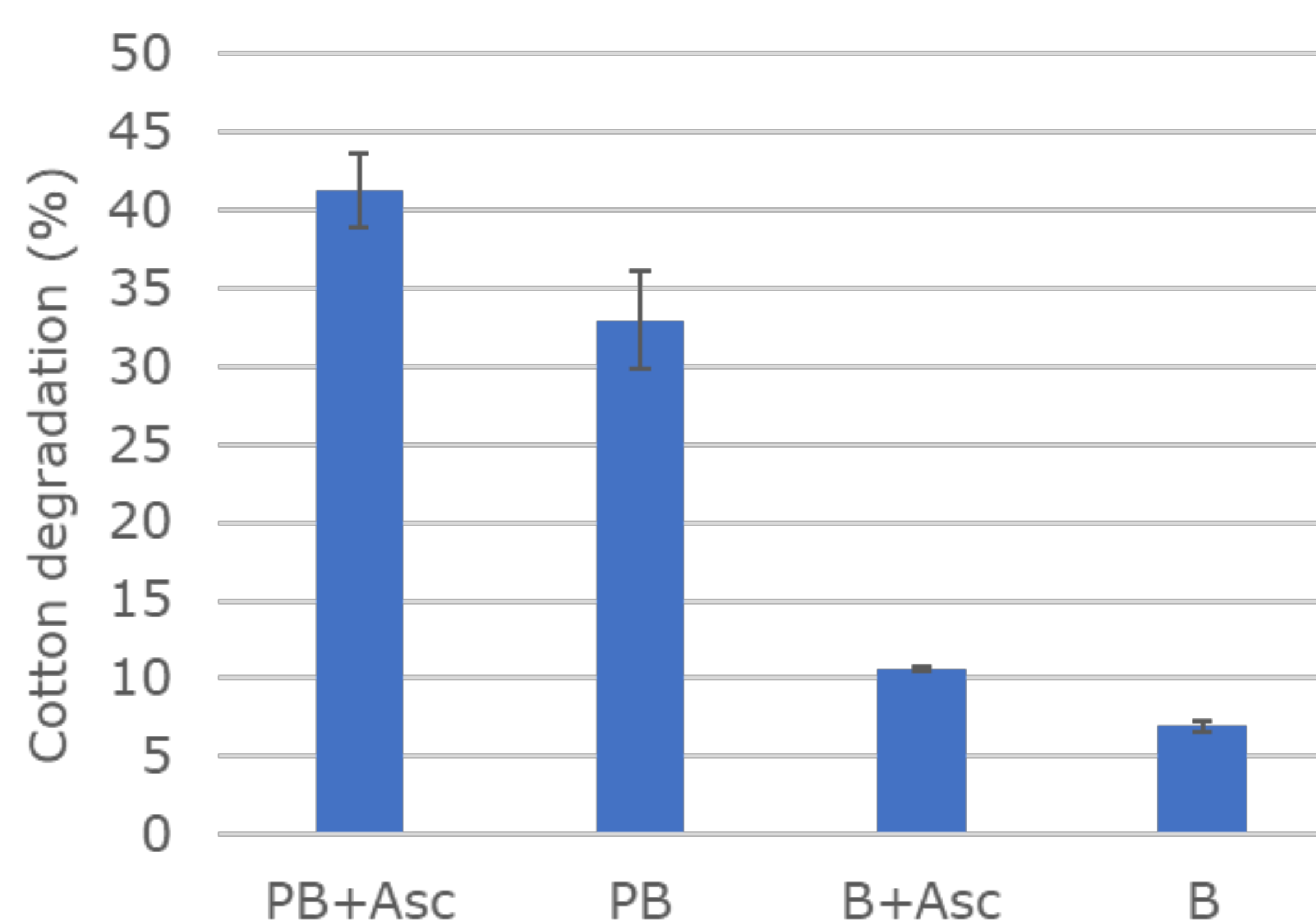
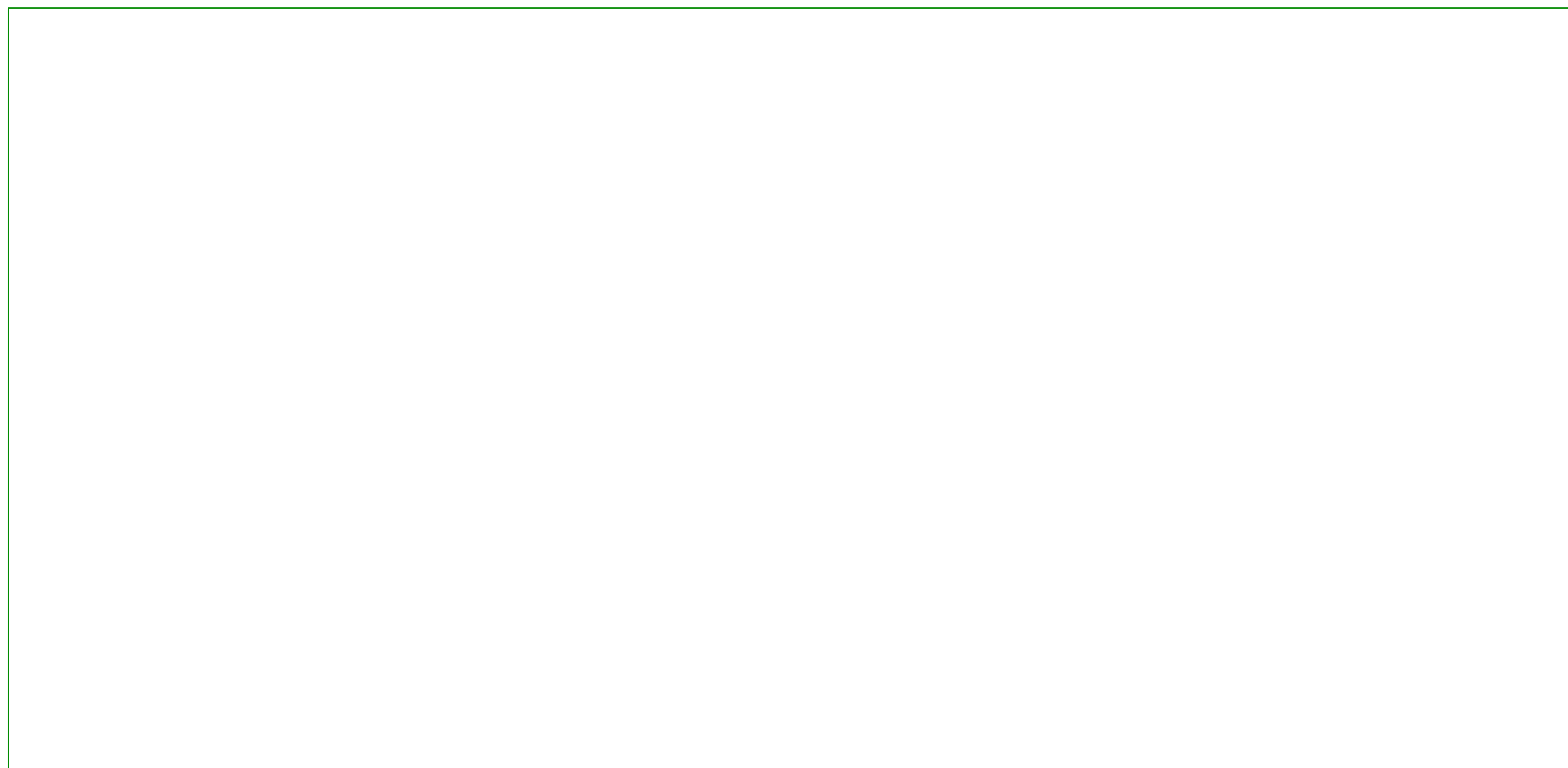


Figure 1: Degree of cotton degradation in a polyester/cotton textile material using CellicCtec3 (commercial enzyme cocktail). Reaction conditions: 24 mg enzyme/g substrate, 100 mM NaAc buffer, pH 5.0, 50 °C, for 72h adding 1 mM ascorbic acid (Asc) every 24h. Degradation percentage based on glucose release. B = Bead milled, PB = Bead milled + Planetary ball milled.

Scientific story



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BAPS number: KB 45-005-018