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CHALLENGES FOR BIO-BASED PRODUCTS IN SUSTAINABLE VALUE CHAINS

**Ludwig Cardon^{1,2*}, J.W. Lin³, Maarten De Groot^{1,2}, Kim Ragaert^{1,2},
Jarmila Kopecká⁴, Rolf Koster⁴**

¹University College Ghent, Centre for Polymer and Material Technologies - CPMT, Belgium

²Ghent University, Department of Materials Sciences and Engineering, Belgium

³Kat Digital Corp., Taipei, Taiwan

⁴Delft University, Faculty of Industrial Design Engineering, Netherlands

Abstract

This work concerns studies related to strategic development of products in which bio-based plastics are or will be applied, referred to as bio-based products. The studies cover (1) current and potential benefits of bio-based products in extended value chains including activities after end-of-life of products, (2) value communication between stakeholders in extended value chains, and (3) creating an integrated development approach for optimized bio-based products. Most existing models for value chains were found to be one-way single-flow models to which iterations and interactions have been added to obtain realistic representations of best practices. Interviews of thirteen professionals clarified some barriers between the current implementation of bio-based plastics and the ideal sustainable value chain fulfilment. The most noticeable barriers included trustful information sharing, information and knowledge gaps, sub-optimum application of bio-based plastics, and the need for facilitating product design. The main designers' needs are increased integrated literacy related to bio-based materials, eco-effectiveness and a more effective communication competence in value chains. Based on all findings, six approaches of design tasks integration into value chains have been proposed. These approaches encourage designers to think and act widely across value chains and particularly help implement life cycle thinking to achieve profitable sustainability.

Key words: bio-based plastics, cyclic material flows, end-of-life, integrative product design, sustainability

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* Author to whom all correspondence should be addressed: e-mail: ludwig.cardon@ugent.be; Phone: +3292424292