

Biocomposites in circular economy

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As versatile materials, biocomposites can be tailored to meet numerous application requirements as well as the circular economy principles. Regarding circular economy, raw materials for biocomposites, both the reinforcement and plastic matrix, can be derived from side streams or even waste streams. Supporting also bioeconomy targets, biocomposites can be designed to be totally bio-based, and also biodegradable if this is favourable for the application and its end-of-life, like might be the case with packaging. On the other hand, in many products, such as furniture, long lifetime of the material is the most relevant and ecological choice. At their end-of-life, there are several options for biocomposites depending on the product, e.g. mechanical recycling, chemical recycling like pyrolysis/thermolysis, and composting. However, due to the versatile and heterogeneous compositions and applications of biocomposite materials and products, the current end-of-life for them is often incineration to energy (or even landfilling, depending on the region). While it is known that thermoplastic biocomposites could be recycled, the challenge with the mechanical recycling is the lack of feasible business models including collection and separation systems. On the other hand, more information is needed on the effect of biocomposites on current recycled plastic streams, as well as suitability to chemical recycling. At VTT, research and development work has been made concerning the biocomposites in circular economy with different end-of-life scenarios. The presentation gives examples of different biocomposite solutions and the possible routes in the circular economy. Also the bottlenecks concerning biocomposites end-of-life will be discussed.