

MouldPulp

Development of Durable, Fully Bio-Based Thermoplastic Composites from Bioplastics and Pulp Fibres for Injection Moulding Applications

Project Start Month: 01/2011

Project Duration: 36 months

Project Consortium

Project Coordinator

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Project Partners

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Hammarplast Consumer AB, Box 6, SE362 21 Tingsryd, Sweden
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Project Objectives

The motivation to perform the project is the promising wood-polymer concept DuraPulp® from cellulose pulp and PLA. It is fully renewable, shows good mechanical properties, a perceived naturalness, and nice tactile properties and can be dyed with clear colours. The problem today is the lack of viable industrially production methods to make end consumer products. The overall project aim is to develop a processing technology that allows making injection moulded parts out of DuraPulp® but keeping the material identity.

Project Approach

The project consortium covers the whole value chain from a raw bio-based material up to plastic products for consumers. It consists of R&D-institutes, material, application and packaging developers, raw material producers, and plastic processing companies.

The multidisciplinary and international approach is required to reach the project goals:

- Preparation of functionalized fibres (Innventia, Södra)
- Development of bioplastics (Fraunhofer UMSICHT)
- Plastics processing (FKuR, Hammarplast, Elastopoli)
- Techno-economic and environmental assessment (nova, Innventia)

The trans-European approach was chosen due to the long-termed regional knowledge build-up:

- Sweden: wood and pulp processing
- Germany: bioplastics production and promotion
- Finland: fibre reinforced plastics

In addition the transnational approach will help to disseminate the project results and to transfer the technology into the industry.

The technical approach is to combine the DuraPulp® process with a special compounding process. This will lead to high fibre amount but however to a gentle compounding process and a homogenous fibre dispersion. The granules will be injection moulded to sample specimens and technical parts. The material properties and moulded parts characteristics will be tested and evaluated. A recycling concept will be elaborated. The development process is framed into a techno-economic and ecological assessment.

Expected Project Impact

The novel natural fibre reinforced composite DuraPulp® is a 100% bio-based composite (PLA & cellulose pulp). If the project is successful regarding the injection moulding of DuraPulp® based composites this will open up new markets and will lead to a significantly increasing of using natural fibre reinforced biopolymers for technical applications.

This is due to the viability of the injection moulding as a high efficient processing technology to manufacture durable, high-quality consumer products. The injection moulded parts with the material characteristics of DuraPulp® are light-weighted with a naturally impression and can dyed in different clear colours. This is a keen improvement against present WPC.

The outcomes of the MouldPulp project have the potential for innovative bio-based consumer products made in Europe for a worldwide market. So they are enhancing the forest-based value chain by using cellulose pulp. The need of novel and modified processing technologies will create new opportunities for machine manufacturers in the pulp and plastics industry. Regarding the focused market of consumer products the outcomes will generate manufacturing capacities in all sectors of the value chain.

This is in accordance to the European Lead Market Initiative focused on bio-based products.

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