Guilt-free pleasure

CUNA products: Reusable cups made from plant-based raw materials

It's a shocking statistic: every minute, an estimated one million disposable cups cross sales counters worldwide. In collaboration with CUNA-Products GmbH, founded in 2018, Fraunhofer IOSB-INA and SmartFactoryOWL in Lemgo, Germany, ARBURG is playing a key role in finding an environmentally friendly solution to this problem.

In this project, ARBURG took the lead in the overall design and integration of the system technology, and also contributed know-how in the areas of automation, digitalisation, and bioplastics processing. In addition, ARBURG was involved with the other partners in using AI methodologies to identify optimisation potential for achieving process reliability in injection moulding production.

In October 2021, injection moulding production of reusable cups made from CO_2-negative plant-based raw materials started at SmartFactoryOWL (smartfactory-owl.de/cuna-real-production). The bio-based plastic is a bio-PE and consists of a sugar base and wood, thereby eliminating the need for petroleum.

Teamwork is key

The coffee cups are produced in a 2-cavity mould on a turnkey system based around an electric ALLROUNDER 570 A with GESTICA control system. The cups are removed by a six-axis robot with an adapted vacuum gripper, individually finished directly in a laser cell and discharged from the turnkey system via a buffer station and conveyor belt.

All in all, CUNA and Fraunhofer IOSB-INA have worked together with ten partners to set up a data-driven production system with end-to-end digitalised documentation. The highly transparent production facility continuously provides data for the AI real lab, which can be used on open platforms for the development of applications in the field of artificial intelligence (AI).

Can be used and recycled for years

The high-quality cups are reusable and recyclable. This proves that, by using a deposit system, the 'cradle-to-cradle principle' works. As the term suggests, this is an approach for a continuous and consistent circular economy. The dishwasher-safe cups in various sizes can be used for years and later recycled into new products through the recycling loop organised by CUNA.

Successful partnership

The entire project is therefore a very good fit with the arburgGREENworld programme which aims to continuously increase the production efficiency of plastics processing in order to sustainably reduce the carbon footprint of part production, for example through the use of recyclates and bioplastics. In future, customers will be able to go online to place their orders for CUNA cups, customise the products and experience the production of their cups live.

CUNA founder and managing director Rafael Dyll is thoroughly pleased: "We produce in Germany, from renewable raw materials, reduce CO_2 emissions, and carry out our own recycling. These are all groundbreaking features. And with ARBURG and our other partners, we have leading technology experts for plastics production to support us. A unique configuration for exploring the future of bioplastics production."

Photos: CUNA Products

Cups on the conveyor belt: Nissrin Perez, Innovation Manager at Fraunhofer IOSB-INA, and Dr Florian Gellert, Research Team Leader, Machine Learning at Fraunhofer IOSB-INA, are thoroughly pleased with the performance of the system.

PROJECT PARTNERS

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In addition to ARBURG, technology partners KUKA (robotics), fpt (automation), REA Jet (laser marking and labelling), BARTH Mechanik (mechanics and integration), Digicolor (material preparation and conveying), Hadi-Plast (plastics processing) and wlanus Simulation (digitalisation) are also involved in the 'CUNA Production' project.