

Successful with Wood

A Start-up Produces Organic Coffee Capsules Made of Wood and Plant Starch in Millions

Many people have good ideas and intentions. Few have the courage and determination to put them into practice. The young rezemo entrepreneurs Julian Reitze and Stefan Zender are one successful example. In 2019, some three years after their start-up was founded, the company was already producing well over one million compostable coffee capsules per year. A number that is growing rapidly. For the capsules, a compound of wood and plant fiber is processed on injection molding machines.

The rezemo GmbH success story began with a coffee maker in a shared flat in Stuttgart, Germany. Julian Reitze and Stefan Zender were studying industrial engineering and management in Stuttgart, and during stays abroad had taken a dislike to carelessly disposed of consumer packaging. Coffee capsules made of aluminum or plastic, of which around 60 billion are produced worldwide every year, and the resulting mountains of waste were a particular irritation.

100 Percent Biodegradable Capsules

"We wanted to produce 100 percent compostable coffee capsules made from renewable raw materials and offer an ecological alternative to Nespresso products. By using waste wood as a basis, we are able to create an additional value-added stage," Stefan Zender, who is currently responsible for marketing and sales as Managing Director, explains the basic idea.

Julian Reitze, who is responsible for technology and finances in the same position at rezemo, adds: "During our studies, we had access to an Allrounder injection molding machine at the Institute of Industrial Manufacturing and Management (IFF) and at the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA). That's where we taught ourselves the process of injection molding. With the intuitive Selogica control system and the help of a thick operating manual, it was basically easy."



Sawdust and wood shavings from the woodworking industry, PLA as a binding agent – the recipe for ecologically compatible coffee capsules © rezemo

Gentle Melting

In order to transform wood into a granulate suitable for injection molding, it is embedded in a matrix of polylactide (PLA) made from plant starch. The material is thus based entirely on renewable raw materials. The entrepreneurs tried out different compounds and optimized the process, as the granulate needs to melt homogeneously, without burning the wood content. In the beginning, the students made frequent use of the machine manufacturer hotline and have also visited Arburg GmbH + Co KG head-

quarters in Lossburg, Germany, several times.

Since then, they have continuously improved the capsules and the injection molding process. rezemo now cooperates with a mold maker and injection molding company near Lake Constance, which also uses Allrounders injection molding machines. The aim is to increase the percentage of wood fibers and to further reduce the layer thickness of currently 0.4mm at the thinnest point. Another objective is to avoid sprues as far as possible by using hot runner molds, thereby also reducing material consumption. »

Five Questions to ...

... **Julian Reitze, one of the two founders of rezemo GmbH**

Will the capsules survive the conditions in the coffee machine – we are talking about up to 19 bar pressure and up to 100°C water temperature – unchanged?

The capsules naturally withstand the brewing conditions during the brewing process. This is also important – a critical water pressure must build up in and around the capsule, which then leads to the sealing paper bursting. The extraction and above all the crema depend decisively on this.

Is the process of filling coffee different from conventional capsules made of aluminum or plastic and how do they seal the wooden capsules?

The wooden capsules can be processed on standard filling machines. The process is the same. The sealing medium must be

matched to the capsule. We use a coated cellulose to ensure both the appropriate barrier effect and a stable connection via the sealing seam.

What do gourmets say to the wooden capsule – how long does the aroma last?

Our coffee capsules, which we sell e.g. via our web shop, have a best before date of nine months. With the general trend towards fresh and preferably regional foods, we believe this is becoming more and more accepted by the market. To be honest, there is no need for a shelf life of 24 months for coffee.

Is there a kind of organic certification for compostability?

Our capsule consists of wood shavings and a small amount of PLA. This bioplastic is obtained from renewable raw materials and is tested and certified for compostability. The wood fibers come from sustainable PEFC certified forestry and are naturally compost-

able as a direct natural material. Our capsule is the first on the market that – certified by DIN CERTCO – is 100% bio-based, i.e. made from renewable raw materials.

Under what conditions and in what time do the capsules degrade?

The duration of decomposition generally depends on the environmental conditions. These include in particular the ambient temperature in the compost, the season, the place of installation, ventilation, humidity and the microbacterial environment. In industrial plants, e.g. for organic waste, these are relatively constant. Therefore a rough decomposition time can be given there. The throughput in such plants is about two to six weeks. Since home composting often has very different environmental conditions, the composting time can only be estimated. Comparable to a branch of softwood or a pine cone, one should rather expect six to twelve months here.

Interview: Dr. Clemens Doriat, Editor

Regional Proximity

Rezemo places emphasis on regional proximity, not only when it comes to injection molding technology. The company, which currently employs eight people, purchases its coffee from a roasting plant in its home region. The base material for the 3,5 g weighing capsules, foodgrade wood shavings from

sawmills, comes from domestic forests. Since this is scrap in wood processing and the shavings for further processing at rezemo do not have to be chemically treated, the process chain is resource-friendly and the product is suitable for use with food.

The coffee capsules are sold in an online shop and through regional coffee houses. Retailers and hotels are also showing increased interest. "There is enormous demand. Many hotels have Nespresso machines in their rooms and there is a great deal of awareness

for sustainable products," says Stefan Zender.

The young entrepreneurs are currently exploring the international market. "For 2020, we are planning for a production volume in the double-digit million range. In addition, we aim to position ourselves more strongly as packaging experts. This is because other disposable products such as cosmetics jars or containers for cleaning products could also be produced from our material, making them carbon neutral and 100 percent biodegradable," says Julian Reitze. ■

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Service

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Julian Reitze (left) and Stefan Zender have made their idea for 100 percent ecological coffee capsules a reality

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