

rezemo GmbH

## Coffee capsules: wood instead of aluminium

**In Germany alone, around three billion disposable coffee capsules made of aluminium and plastic are sold every year. This creates a gigantic waste problem, as only a small proportion of the capsules can be recycled. Fully compostable wooden coffee capsules that are compatible with all standard Nespresso® machines might be a solution to this problem. The capsules have been developed by a start-up company called rezemo, which also has other biobased packaging solutions in the pipeline.**

Around a decade ago, many adverts starring George Clooney made the colourful aluminium coffee capsules with a single serving of the hot beverage in a wide variety of flavours popular around the world. Since then, portioned coffee machines such as Nespresso®, Tassimo® or Cafissimo® have become increasingly trendy. The machines use practical single-serve pods or capsules for a quick and easy-to-prepare cup of coffee. However, while the good old filters used in filter coffee machines can be composted without problems, coffee capsules are barely suitable for recycling and are therefore a huge burden on the environment. And they exist in colossal quantities. Coffee manufacturers have estimated that around 12,300 cups of aluminium-capsule coffee are consumed worldwide every minute, which means that in Germany alone, we generate around 8,000 tons of packaging material every year.

### The idea comes from the flooring industry



In their start-up company rezemo, Julian Reitze and Stefan Zender develop alternatives for single-use packaging such as wooden coffee capsules.  
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Against this backdrop, two young industrial engineers from Stuttgart - Julian Reitze and Stefan Zender - set out to develop an environmentally friendly alternative to aluminium capsules. "When we were students living in a shared flat, we used a lot of coffee capsules. We became increasingly interested in disposable packaging like yoghurt pots and other disposable containers, especially as we realised that they had such a big impact on the environment," says Reitze. "We then started to look for alternatives, but did not really find what we were looking for. Although some solutions are rated environmentally friendly, they still contain traditional plastics." After their studies, they began to familiarise themselves with the issue and look into potential classes of material that consisted of fully renewable raw materials.

The two inventive engineers eventually found what they were looking for and founded rezemo GmbH in 2016. The company now has nine employees and is based in Waiblingen in the South of Germany. "We tried many things, and eventually found that wood composites worked best," said Reitze. "The idea comes from the

flooring industry, where wood fibres are stabilised with PVC. It is a relatively new idea in the packaging industry, particularly for packaging that comes into direct contact with food." The material that they were looking for not only had to be suitable for food, but also for producing thin-walled containers. The production process also had to be efficient enough to produce larger quantities economically. After months of basic research carried out in cooperation with the Institute for Industrial Manufacturing and Factory Operation IFF at the University of Stuttgart and the Fraunhofer Institute for Manufacturing Engineering and Automation IPA, and the manufacture of numerous demonstration tools and prototype machines, Reitze and Zender found a material that met their requirements. The two engineers had developed a completely new generation of coffee capsules made from renewable raw materials.

## Capsules made from local wood and plant starch

The start-up uses wood shavings from sawmills in Baden-Württemberg's Swabian Mountains. The wood shavings do not need to be chemically processed; they can be used directly in their natural state. The material is strictly monitored, certified and generally also suitable as a food additive - for example in yoghurt. One particular bioplastic has proven particularly well suited as a binder to stabilise the capsules: polylactate (PLA) from plant starch, which forms a matrix for the wood shavings from the local forests. In a process known as injection moulding, the two materials are heated in standard machines and shaped under high pressure using special tools. The coffee capsule made in Waiblingen is therefore fully biobased as well as completely biodegradable and does not leave any residues.



The innovative coffee capsules consist of wood shavings, polylactate and cellulose and can be used in all standard Nespresso® machines.  
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The coffee in the wooden capsules comes from fair-trade sources and, whenever possible, organic agriculture, and is processed by local roasters in the region where it is harvested. The product has been well received by customers. Reitze comments: "We deliver the empty capsules to a company that fills them. The full capsules are sealed with a thin cellulose lid made of a material similar to filter paper. The ready-to-use capsules can be purchased in our online store, selected delicatessens and supermarkets. Depending on the coffee it contains, a capsule costs between 42 and 46 cents (of a Euro). It is not really a discount product, but the feedback we get is very positive."

## Further biobased products in development



The rezemo capsules are currently available for four different coffee varieties in selected delicatessens and supermarkets or in the online store.  
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The rezemo coffee capsules have a nine-month storage life, slightly less than the original aluminium capsules, but they fit all standard domestic Nespresso® machines. Another slight difference with the original capsules is that it can be slightly harder to close the coffee machine. Reitze comments: "You may have to press a little harder, but that has no appreciable disadvantages in terms of comfort, and it does not damage the machines. We have tested this with many thousands of our capsules." Reitze continues: "There are no comparable competing products yet," says Reitze: "So far, there has been no other satisfactory solution that dispenses with traditional plastic. Some capsules have a compostability label, but this is actually not right as they consist of 30 percent fossil plastic. At the moment, we are the market leader when it comes to a clean solution."

At present, rezemo is looking for other similar solutions for disposable packaging. "We are thinking about offering our capsule systems for other platforms," Reitze reports. "Tests are already underway and we hope to be able to present something similar for the cosmetics sector this year."

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### Article

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