Ice Cream Spoons and Golf Tees: Completely Absorbed by Nature

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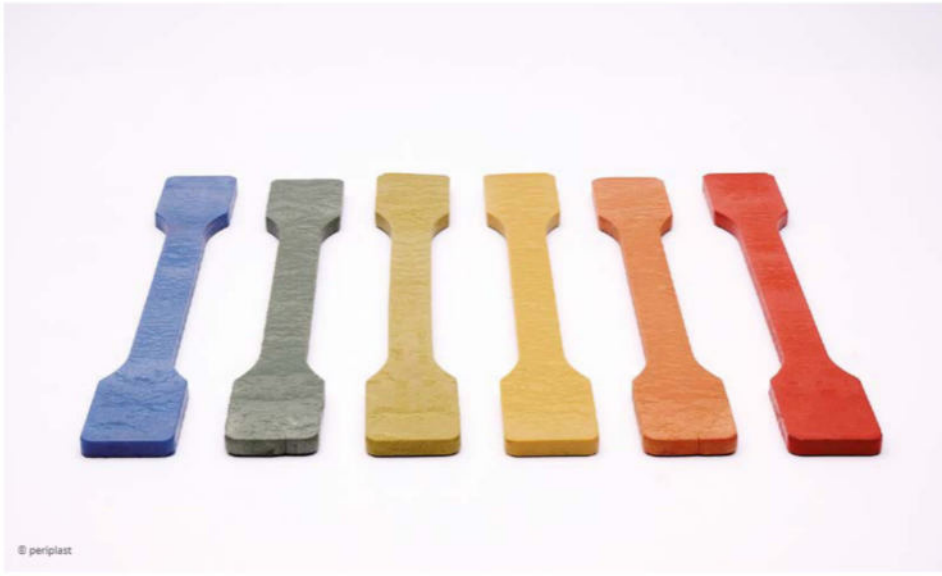
Rotamat drum coating clears the way for eco-friendly throwaway goods.

In Europe alone each year billions of plastic ice cream spoons are produced, most of which are carelessly discarded into the environment. periplast produces spoons consisting of a bio-degradable granular material – developed in-house – that completely dissolves when it is exposed to moisture. To prevent this dissolution process from happening too early, the spoons receive a thin protective film in a Rotamat coater.

Currently the annual worldwide production of plastic materials amounts to more than 400 million metric tons. Around 50 % of this staggering quantity is used for packaging purposes and throwaway goods, which are only used for a limited time. Only 15 % of these items are recycled, and more than 30 % are carelessly discarded into the environment. For example, ice cream spoons are only used for about half an hour. Subsequently they become garbage ... or, worse, are dumped into the

Ice cream spoons in the drum of the Rotamat system, model R 80.



The coating in the Rotamat system ensures that the spoons dissolve only after they have been used. periplast supplies items for one-time use in different colors.

environment. Each spoon weighs just a few grams, but in Germany alone 360 million ice cream spoons are used each year, whereas in Europe this number reaches several billion. For this reason, periplast searched for a solution that allows the cost-efficient production of such spoons which simply dissolve after they have been used.

A material that recycles itself!

The solution is the granular material "periamyl", developed by periplast, and for which a patent application is pending. This is a 100 % natural polymer consisting of corn starch – a naturally growing raw material. When it reaches the environment, it degrades under practically any condition. It can be reproduced naturally at very reasonable costs. periplast produces the granules at its Wuppertal location.
Another significant benefit of periamyl is that it can be easily shaped under heat. This allows the cost-efficient production of items for one-time use with standard injection moulding equipment – thus creating ideal conditions for the economic production of throwaway goods on an industrial level. For example, it allows the production of throwaway cutlery pieces or golf tees with a plastic look, but which consist of a 100% naturally growing material that is available in abundance. Above all, the material degrades very quickly, even in salt water.

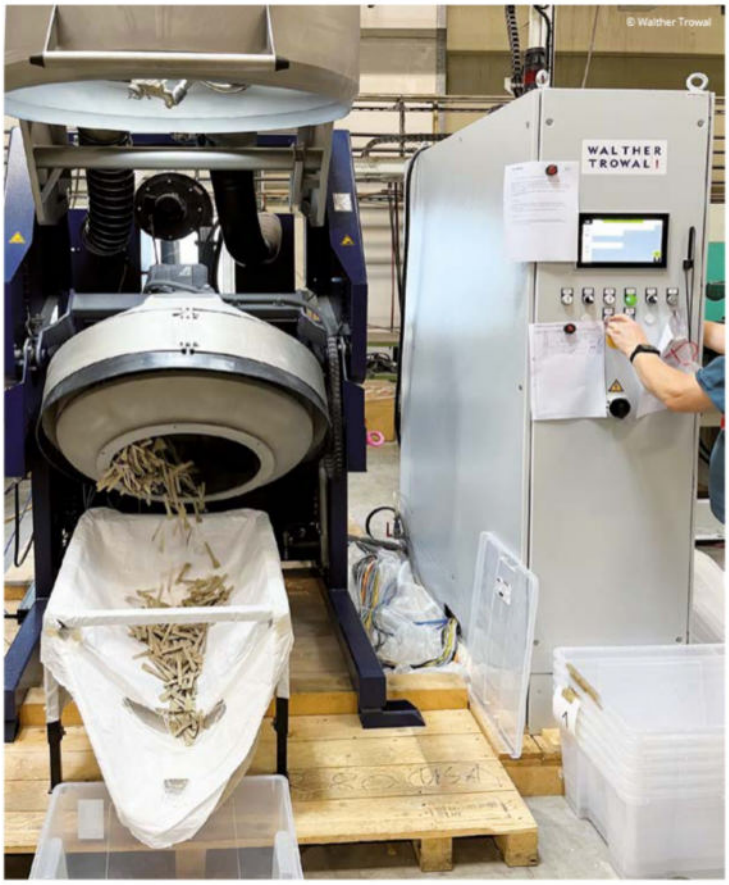
Initial project "ice cream spoons"

The first industrial-level application for this material are ice cream spoons. Once they are thrown away, the bacteria in the environment ensure that they are completely dissolved within a time period of about 20 weeks. However, to make sure that the spoons are not dissolving during use, for example, the consumption of ice cream, they must be coated with a waterproof material. At this point Walther Trowal became involved: For many years periplast has been using Trowal mass finishing equipment for surface finishing of metal components. Through this connection the two partners came to talk about the coating issue for the ice cream spoons ... for Walther Trowal a brand-new application for its Rotamat coating equipment.
Based on processing trials in the TTC Test & Training Center at Walther Trowal in Haan a coating material was developed consisting of a multi-component ceramic solution. This forms a silicon dioxide structure on the surface of the spoons, which is not only stable for a long time but is also tasteless. The standard version of the Rotamat R 80 coater immediately met all the periplast requirements so that no technical modifications were needed.
The thickness of the ceramic coating is such that it remains absolutely stable during use. However, after a few hours the coating is infiltrated by water, for example, through the edges of the spoon. This causes the base material to expand so that the coating, basically consisting of sand, is split off: The dissolution process begins!

The result

It was highly beneficial for the project that the coating aims were achieved with a standard machine from Walther Trowal that required

Besides ice cream spoons periplast also produces small forks for French fries and golf tees.



Coated ice cream spoons are discharged from the Rotamat system.

no technical modifications. At the moment periplast is using the R 80 Rotamat coater for processing batches consisting of around 4,000 spoons. The weight of this batch size allows the manual loading/unloading of the drum without undue stress for the operator.

The actual coating operation runs fully automatically. The people who operate the injection moulding machines are also loading/unloading the Rotamat coater and monitor the entire process. This means that no additional personnel was required for the coating operation. The machine was commissioned in 2023 and has been working with no problems whatsoever. Maintenance work is limited to the occasional cleaning of the drum and the periodic exchange of the air filters.

The future

Besides ice cream spoons complete throwaway cutlery sets made from periamyl are now also available. During the introduction phase these are supplied in lot sizes of 10,000 pieces. Like ice cream spoons, they also receive a protective ceramic film in the Rotamat coater. Besides their ecological compatibility and sustainability, they offer the additional benefit that the ceramic coating and resulting sharp edges easily allow cutting a steak.

Another item with a huge market potential are golf tees. In Europe alone every year around 1.4 billion pieces are used and thrown away. If only 10 % of the plastic tees are discharged into the environment, over just a few decades huge amounts of plastic will contaminate the soil of golf courses. On the other hand, tees made from periamyl will have dissolved quickly.

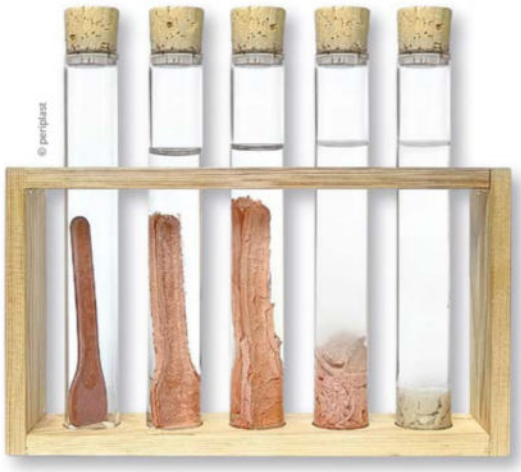
The Rotamat coater

The Rotamat system represents an economical solution for coating mass-produced small parts, such as O-rings, handles, springs and screws. It allows the treatment of a broad spectrum of parts made from metal, wood, rubber and all kinds of plastic materials.

This includes parts for the automobile and cosmetic industry, components for writing utensils, toys, parts for the textile industry as well as seals and attenuators (dampening elements). The coating materials can be water- as well as solvent-based.

Rotamat systems are used for decorative coatings with numerous water- and solvent-based ornamental and functional lacquers. But they are also employed for coating with anti-friction lacquers, bonding agents, corrosion protection materials or insulation lacquers.

In Rotamat systems batches of small parts are coated in a rotating, closed spraying chamber (drum). Automatic spray guns are evenly applying the coating material onto the work pieces, which



If exposed to water, after six weeks the spoons are nearly completely dissolved.

are continuously tumbling over each other. This results in precisely coated surfaces with an even coating thickness and an excellent life expectancy of the applied coating material.
Even geometrically complex or very delicate parts are discharged from the machine with a highly homogeneous coating, completely dry and without sticking to each other. After leaving the Rotamat the work pieces can be immediately processed in downstream manufacturing or assembly operations.
The coating process runs fully automatically. The operator must only load new batches of raw parts and unload the batches with finished parts. The costly and time-consuming placement of the parts on special racks – required with conventional coating systems – is completely eliminated.

About periplast

Since 1978 the periplast GmbH & Co. KG company in Wuppertal (Germany) has specialized in the production of highly precise injection moulded plastic components. Ever since it was founded, the family-owned mid-size company produces reels for yarns and wire. A few years ago a second manufacturing location was established in Romania to better serve the customers in this country.
Since 2010 – at its Wuppertal headquarters – periplast has been developing products from bio plastics that can be produced without the need for any fossil materials and which are quickly bio-degradable. The managing director, Dr. Timo Porsch, graduated in Chemistry and has been working for the company since 2015.