THYME Project

Teesside, Hull and York - Mobilising Bioeconomy Knowledge Exchange

Novel encapsulation methods for improving nutrients

A collaboration between Starbons Ltd (Starbons), the Biorenewables Development Centre (BDC), the University of York and Teesside University has enabled Starbons Ltd to optimise their multi kilogram pilot operations to help increase the shelf life of food products.

Originally a University of York spin-out, and now an independent entity, Starbons manufactures mesoporous carbons from biorenewable raw materials. A Starbon® material is like a solid sponge. The hole sizes and "stickiness" of the "sponge" allow different sized species to pass through or stick to the Starbon®. Varying the "stickiness" means that substances can be captured in many ways, so the company can design technical solutions tailored to the customer's specific needs and end use application.

The problem

Starbons have been working with the BDC to produce mesoporous carbons from polysaccharides; alginic acid, pectin and food grade starch. Vitamins are vulnerable to environmental elements, particularly heat and water as many of their properties are lost in food processing. It is then difficult to add these properties back as most thermally processed foods are sealed in packages to avoid spoilage. Starch based Starbon® materials have shown interesting properties in relation to preserving vitamins in food production and preparation.

A novel encapsulation solution

To overcome this challenge Starbons has developed a novel coating for vitamins that will help to preserve vitamins in long life products, thus providing more nutritious foodstuffs, reducing consumer food waste and combating malnutrition.

By using THYME proof of concept funding, starch based Starbon® gels were tested at lab and pilot scale for their ability to encapsulate vitamins. The team developed a method to create microcapsules to protect vitamins and functional compounds from harsh processing conditions, which in turn allows fortification of these nutrients in thermal processes before sealing the packages.

The material developed can cope with high temperatures and pressure, whilst being degradable by human digestive enzymes, they are also odourless, colourless, and easily soluble in water. The team has also developed a scalable manufacturing technique that introduces as little heat as possible thus minimising energy cost and carbon footprint.

Susan Brench, Starbons CEO explains;

"Without the technical team and the assets housed at the BDC, and with the expertise of the two universities, Starbons Ltd would have struggled to scale from lab to pilot as there are very few such facilities in the UK. The BDC and the innovation cluster BioVale has been incredibly effective at signposting us not only to funding opportunities but also to like-minded organisations, including potential suppliers and customers."

Next steps

Following on from these results the project partners applied the knowledge developed to other polysaccharides and assessed their suitability in pilot scale manufacture. This has provided a broader portfolio of materials and methods to further commercialise for the food sector as well as to explore new applications for pharmaceuticals and medical devices. Going forward the consortium partners are looking at future funding opportunities. The Biorenewables Development Centre are also supporting Starbons with their production of supplying materials to new customers.

For more information please visit:
www.thyme.biovale.org

This project is supported by Research England's Connecting Capability Fund.