Novel new packaging products for a circular economy

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The EU DIBBIOPACK project has developed a series of multifunctional packaging products that are bio-based, compostable and biodegradable, and will contribute to the growth of a truly circular economy.

The project has created its innovative packaging from polymers with three sectors in mind – pharmaceuticals, cosmetics and the food industry. These polymers are labelled as 'smart' due to bioplastic materials presenting new characteristics that turn them into real actors for product preservation. They do this by increasing product durability, maintaining quality, and reporting to the consumer on content preservation conditions.

Solutions for a circular economy

The materials used to create the packaging products are environmentally-friendly and produced from renewable sources. They are sustainable and contribute to the creation of a circular economy, which is currently a major European ambition following an ambitious package put forward by the European Commission in December 2015.

Currently an average of 200 plastic bags per person per year are used in Europe. The majority of these bags fall under the category of lighter plastic, thus being the least reused and the most difficult to recycle. The same can be said of thousands of bottles and packaging units, of any kind, made from petroleum products. Half of these will be dumped and will take centuries to degrade.

To address the need to reduce Europe's usage of these environmentally damaging products, the DIBBIOPACK project has aimed to help companies and consumers in the transition to a more efficient economy by providing solutions for a reduction in petroleum-based packaging. In the longer-term, more sectors other than the three specifically focused on by the project – such as waste packing and disposal – may also benefit from the project's novel packaging applications.

Eco-design innovations

When designing its products, the project has specifically employed nanofibers as these provide the packaging with durability and mechanical properties similar to those found in conventional plastics. These nanofibers do not come into direct contact with the product being packaged.

To keep the content apart, biodegradable labels are used. Additionally, these labels incorporate antimicrobial agents that are released in the event of humidity, thus checking bacteria emergence.

The packaging designs also incorporate sensors that change their colour according to the amount of oxygen present within the packaging. This is to provide more information about the products and the processes of the packaging value chain that increase the safety and quality of the products throughout the supply chain. As a result, this improves the shelf-life of the packaged products.

With the incorporation of these sensors, any valuable information on content condition is readily available without the need for any actual content contact due to the use of an RFID antenna integrated in a mobile phone or Tablet. This leads to more convenience for traceability and access to information records.

Finally, the packaging also uses biodegradable films with enhanced barrier properties, due to a three-coating solution that combines biodegradable organic-coating materials with other plasma-applied inorganic ones.

Next steps

The DIBBIOPACK consortium is now in the process of defining not only the rules necessary to exploit their results on a commercial scale, but also the required intellectual property protection for the processes involved.

The project partners believe that some of their products have reached a stage of development that would allow industries to introduce them onto the market. Others will require further research and development following the project's formal end in February 2016.

More information: For more information please see the DIBBIOPACK project website: www.dibbiopack.eu/

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