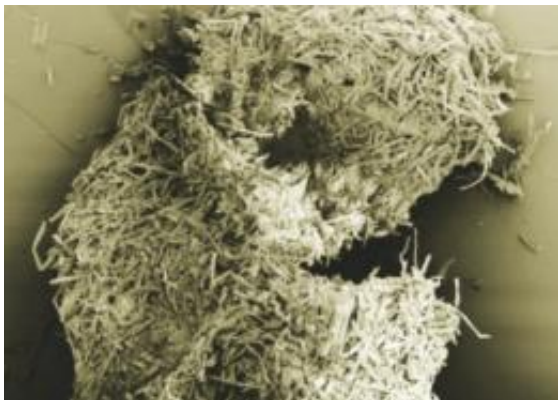


Scientists are preparing for change from fossil-fuel to bio-based economy

1 February 2013, by Alexander Hellemans



Increasingly, many of the plastic products we use every day are no longer based on petroleum raw material. Instead, they are made from biomass such as starch, sugar, corn and other sources that also happen to be food products. These compete directly with the food supply. They also push food prices up. Scientists at the EU funded [BioConSept](#) project are now seeking alternative sources of plastics' raw material based on biomass.

"We are looking for more [sustainable solutions](#), trying to find [feedstocks](#) that are not in direct competition with [food chains](#)", says Dirk Verdoes, a researcher at TNO (Netherlands Organisation for Applied Scientific Research), in Delft, who is the project coordinator. He adds: "we are preparing ourselves, and Europe in particular, for a change from a fossil-fuel based economy to a bio-based one." To do so, "we are focussing on the so-called second-generation feedstocks, which include materials like cellulose from wood, non-edible oils and fats, and plant residues," says Verdoes.

An additional opportunity stems from the fact that some industrial or agricultural by-products that have traditionally been incinerated can also be used as a source of raw material, according to

industry expert Christoph Heß, research and development director at sustainable bioplastics company BIOTEC GmbH & Co in Emmerich, Germany. "There are huge quantities of cellulose and starches that are discarded in the paper or [food](#) industry," says Heß. For example, "we are currently running trials with sidestream cellulose from the paper industry which is more or less a pure [raw] material," he adds.

The irony is that what could be considered at latest technology is actually not so new. "Many of these technologies are old technologies that are now being rediscovered, as we start to realise that we need to use renewables, and not just one-use materials like fossil fuel stocks," comments Tony Longdon, technical director at naturally sourced polymer company Biome Bioplastics in Southampton, UK.

A key question is whether the new technologies will be cheap enough to compete with the current production processes. The answer may lie in finding economy of scale, according to project partner, Stephen Rupp scientist at the Fraunhofer Institute for Interfacial Engineering and Biotechnology in Stuttgart, Germany. His team is testing a process to turn [raw materials](#) made of wood component lignocellulose into precursors of plastics that can be compared to brewing beer to produce large quantities—up to a tonne—in large fermenters. "We can produce amounts for real product and quality testing, which allows industries to validate the products, and see if it fits the product lines," Rupp tells [youris.com](#).

Yet, industry experts believe that the field has some way to go before reaching maturity. Longdon sees the use of feed stocks that do not compete with the food chain as commercially viable in the long term. "We are interested in [cellulose](#). It is very widely available, it exists in areas where growing food is difficult and most of the large forests are environmentally managed," Longdon tells

youris.com. "Some technology such as enzymatic purification of the feedstocks has to be developed, but these things will happen," he adds.

For now, the lack of adequate purification technology appears to hold back further development of the sector. For example, BIOTEC found that contamination with proteins is a problem when investigating the use starch discarded by the potato chips industry. "Proteins, even small amounts, create a terrific smell in a few days or weeks, and for most applications this is not acceptable," says Heß. He is optimistic that the development of purification technologies, such as the use of enzymes, will change things. He concludes: "I see big opportunities in the sidestream materials."

Provided by Youris.com

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