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Biorefinery sorts the chaff from the wheat

Among the vineyards and wheat fields of north-eastern France, a revolution in chemical manufacturing is quietly gathering momentum. Here, biomass is turned into valuable components and energy.

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Set at the back of a small village near Reims, in the Champagne-Ardenne region, a metal-clad building hums incongruously. Inside is what could be the shape of things to come in a world where soaring oil prices mean that manufacturers are desperate for any sustainable alternatives.

Oil is a key ingredient for making plastic, however technicians inside the plant are making a replacement using straw from wheat and sugar beet. They are fermenting it to make bio-succinic acid, a chemical that can be used instead of oil to make plastics, fibres and phthalate-free plasticisers, which are used to make children's toys.

'The Sohettes bio-industrial site incorporates wheat and sugar-beet processing, an energy cogeneration unit, two bioethanol plants for biofuel production, and a cosmetic bio-ingredients plant,' explains Christophe Luguel, Head of International Affairs for the IAR (Industries and Agro-Resources) cluster. 'It is an initiative of local farmers and it involves biomass producers from the beginning,' he adds.

As a result, the partners of this cluster have developed a fully integrated industrial biorefinery. ‘It takes advantage of the biomass, based on traditional agro-industries, for new applications of agro-resources to be used in the local area,’ says Luguel. ‘But also, it relies on researchers.’

Bio-renewable chemicals

An innovative element of this complex is the Biodemo demonstration plant. With 350 000-litre fermenters, it is the largest open pilot facility in Europe for industrial biotechnology. Biodemo is fully integrated into the Sohettes biorefinery, supplying the plant with glucose, carbon dioxide, steam, ammonia and process water. The novel process on show at Biodemo promotes the use of renewable feedstocks and minimises the carbon footprint. Its technology provides higher purity at a lower cost than the traditional petrochemical route, while at the same time sequestering CO_2.

What is biorefining?

The sustainable processing of biomass into a spectrum of marketable products and energy (source: European Biorefinery 2030 Vision).

European Biorefinery 2030 Vision

One company currently uses Biodemo as an industrial bio-succinic acid plant. The chemical industry increasingly recognises the potential of bio-renewable chemicals and particularly the importance of succinic acid as a building block for different specialty and commodity chemicals.

Bio-succinic acid offers an alternative source for a number of chemical ingredients derived from fossil fuels. These include 1,4-butanediol, which can be used in the manufacture of plastics, fibres and polyurethanes, and phthalate-free plasticisers.

The Sohettes site also includes several other companies, such as Soliance, a producer of cosmetic ingredients from plants, microorganisms and algae; Procethol 2G, which is developing a second generation ethanol pilot plant; and Chamtor, which is, among other activities, producing glucose 24 hours per day.

Of course, all these initiatives follow an integrated approach, mixing industrial partners, local farmers and research partners.

This cluster has shown the way to what a more global bioeconomy in Europe might look like in the future. No wonder that it has been at the forefront in the development of the European bioeconomy roadmap.

IAR: a one billion euro initiative

The companies that are part of the Sohettes site all belong to the Industries and Agro-Resources (IAR) biocluster, dedicated to bio-based products and biorefinery.

IAR members include 35 industrial groups and 90 small and medium-sized enterprises (SMEs), as well as agricultural cooperatives and academics.

Its strategy is to make use of locally sourced biomass to provide a range of bio-based products in four fields: bio-energy, including biofuels; bio-materials – biocomposites and biopolymers; bio-chemicals; and bio-ingredients.

Over the past seven years, its members have developed more than 100 research and innovation projects with a budget of more than EUR 1 billion.

More info

Industries and Agro-Ressources (IAR) competitiveness cluster