

# New Horizons

# For the Bioindustry

■ Bioeconomy could bring new companies and business opportunities to the biotech sector in Finland, but it requires clarification of the ambiguous concept and collaboration between different industry sectors.

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Various reports and studies published in Finland and worldwide have many interpretations for the term bioeconomy. In some cases bioeconomy is a synonym for forest industry, in some for biofuels, and in others it means a whole range of industry sectors.

In the latest Finnish report *Sustainable Bioeconomy* published in March 2011 by Sitra bioeconomy is seen as the key to fossil fuel replacement while ensuring sustainable food production.

Since at present no companies in Finland are entirely dedicated to bioeconomy, the development of a bio-based economy involves collaboration between companies from different industries not accustomed to working together.

According to the report, creating a functioning bioeconomic solution requires the different forms of earning

logic being fitted together and the local value chain being integrated and operated in order for the technical solution to function.

In the OECD report *The Bioeconomy to 2030* biotechnology has a prominent role. In the past it has provided a motor for environmentally sustainable production and development of a diverse range of innovative products. Commercialisation of these products could lead to the development of a bioeconomy, where a substantial share of economic output partly depends on the development and use of biological raw materials.

In the OECD study, bioeconomy is divided into three main sectors, agriculture (green biotech), health (red biotech), and industrial (white biotech).

The basic idea behind bio-based economy is the replacement of non-renewable resources with renewable bioresources such as agro-biomass, forest biomass, marine biomass, and waste.

The concept of bioeconomy is gaining popularity in the developed world.

One challenge for the bioeconomy healthcare sector is preparing the society for a costly but beneficial revolution. The use of expensive health biotechnologies will be difficult to justify without showing its true benefits for the health outcomes.

The Pharma industry is undergoing remarkable changes. The era of blockbuster drugs is ending and new ways of discovering, producing, and consuming drugs is emerging. Personal and preventive medicine will change healthcare. In the future consumers will more actively take part in the decision making concerning their own health and wellbeing.

Some clear signs relating to customisation of healthcare already exist in Finland. The first company providing gene tests for consumers, Genecodebook Ltd, was established last year in Oulu. Genecodebook Ltd presently provides two

kinds of tests, one for lactose intolerance and one for thrombosis susceptibility. The tests are easy to perform, and results are available on a website (geenitesti.fi) via personal user names and passwords.

Several diagnostic tests designed for consumers are also already available for purchase in pharmacies without a prescription.

As part of preventive medicine, a growing number of biosensor based diagnostic tests, beneficial to both consumers and healthcare professionals, will be available.

Basically personalised medicine is individually tailored decisions for a patient's healthcare usually based on genetic information to optimise preventive and therapeutic care.

The Finnish company Oncos Therapeutics Ltd, based in Helsinki, is an example of a biotech company specialising in tailored therapeutic care. The lead product of Oncos Therapeutics is the oncolytic virus CGTG-102, a possible anti-cancer drug of the future. Its unique experimental Advanced Therapy Access Programme (ATAP) also provides tailored virotherapy to cancer patients. Oncos Therapeutics Ltd received the 2011 BioFinland prize.

### **Biorefineries in the pipeline**

How about the agriculture and industrial sectors of bioeconomy, are there any new

innovations, business opportunities, or companies in Finland?

At the moment no companies in Finland are dedicated purely to industrial bioeconomy. Although the Finnish forest company UPM was declared a Biofore company, a term combining biotech and forestry. StoraEnso and Neste Oil have also shown a growing interest in bioeconomy, especially in biofuels.

Several biorefinery projects focusing on the production of biodiesel, bio-oil, bioethanol, and nanocellulose based products are in the pipeline in Finland. Traditional industrial biotech companies like Roal Ltd and Genencor Ltd also produce industrial enzymes.

In the agriculture sector one solution for challenges climate change, plant pathogens, dryness, and coldness cause to plant production is genetic modification. In Finland, collaboration exists between MTT Agrifood Research Finland, Boreal Plant Breeding Ltd, Raisio Feed Ltd, and Neste Oil to cultivate GM turnip rape rich in oil and protein as raw material for biodiesel production.

So, will there be new opportunities for Finnish biotech industry in bioeconomy? The simple answer is yes. In Finland, the lack of big pharma companies, which could offer partnerships and know-how for small start-ups and create spin-offs and new business ideas, has always been the healthcare sector problem.

Biomarkers and diagnostics will certainly have a good chance of be-

coming an important sector in health care in Finland. A number of well-established diagnostic companies (Medix Biochemica, Orion Diagnostica, Hytest) and a growing number of new companies already exist. The implementation of the biobank law by the new parliament will also open opportunities for new companies specialising in biomarkers and diagnostics.

In the industrial sector the big chemical, forest, and energy companies could give rise to new SMEs and spin-offs, particularly ones specialising in environmental technologies and biofuels.

To meet these challenges of bioeconomy development both strategic thinking by government and companies and citizens support is needed. Biotechnology will have an important role in different biomass refining processes, but accomplishing a well-functioning bioeconomy has to be a multidisciplinary effort combining biochemical, chemical, energy and forest technologies, and a versatile use of different raw materials.

Finland could be Europe's forerunner in bioeconomy, we have the necessary raw material, in addition to that we need collaboration between different industry sectors and favourable governmental policy to support it. □

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