

Biodegradable paper covers as a replacement for plastics opens up the bio-economy market for horticulture

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Global vegetable production currently depends on plastics: approximately 15 million hectares of agricultural land are covered under black horticultural plastics. While alternatives to the plastic cover have been under development for several years, it is only now that a new biodegradable cover, suitable for both professional and subsistence farms, is entering the market.

The use of plastic covers in vegetable production is not only ecologically unsustainable; removing them from a field after the growing season is over is a laborious and expensive undertaking. Based on a method jointly developed by MTT Agrifood Research Finland and Stora Enso, a new paper-based biodegradable cover offers the market a real alternative to plastic covers.

Reflecting Finland's bio-economic goals, the development of this cover and its introduction into practical farming is one of the first concrete steps towards a society based on the bio-economy. This project is underpinned by research and cross-enterprise collaboration dating back several years in which MTT has been engaged.

"We develop bio-economic solutions in collaboration with various enterprises. The innovations we develop will not be left collecting dust in cupboards. Our aim is that development and productisation will be carried out in a market-driven fashion from the very beginning. Both

Stora Enso and MTT play key roles in in the development of biodegradable cover material dating back several years," says Anu Harkki, MTT's Research Director.

Wood fibres and a pyrolysis liquid are the key

This developed biodegradable cover is manufactured from renewable materials. The first paper-based cover materials, developed at Stora Enso's Research Centres in collaboration with MTT, VTT and University of Helsinki, were introduced into practical farming in the summer of 2014.

"As such, paper is not sufficiently durable a material for horticulture. However, if a paper cover is treated with a birch distillate, obtainable from dry distillation, its decomposition time will be extended and its capability of being spread will be enhanced. Now evidence is available that this underlying concept works in practice," says Kari Tiilikkala, Professor at MTT.

Using biodegradable cover material, the water economy of the soil can be managed, and the growth of weeds, including couch grass, can be prevented. Paper is also superior to plastics from the viewpoint of plant gas metabolism.

This cover has given its best performance in tunnel cultivation and when used in combination with horticultural gauze and insect nets.

"Using this cover, domestic products can be produced for consumers using less or even no pesticides. This material is also highly suitable for organic horticulture," says Kari Tiilikkala.

High expectations in the industry

For the paper industry, the bio-cover material opens up an interesting and new field of application that goes beyond traditional paper products. It has a huge potential market with the clientele round the globe.

"From the environmental point of view, this product has significant potential, as the material is based on renewable wood fibre. This is a major step forward, with positive experiences being reported by production horticulture. However, investments in R&D will still be required. Our goal is to bring the product to the test marketing phase in the next growth season," says Raino Kauppinen, R&D Manager at Stora Enso

The horticulturist is a firm believer in the new product

Farmer and commercial horticulturist Esko Holma from Salo has participated in the development of several different bio-cover materials. He has used these materials over the past two years, and this summer his gherkins are growing on top of a cover. As a farmer, he says, he sees the importance of an environmentally friendly production method.

"A plastic cover sheet, stained with soil, cannot be recycled; it will end up in a landfill, ultimately finding its way to waterways and the nutrient circulation cycle. Plastics simply have no future. Bio-covers, by contrast, will be needed, growing in importance as pesticides are being removed from the market," he says.

"A paper cover has potential, but its development requires further investment and expertise. This product will have a huge market, as new covers need to be purchased for fields every summer," he adds.

Further development is performed across the globe

The development of biodegradable cover material will continue through tests performed on various paper types in combination with different garden plants and soils, and by modifying the degradation time of these paper sorts.

The development of cover materials for various perennial berry-producing plants and different soils continues in Finland and Egypt, where MTT has gained research experience on the management of water economy of dry soil and other similar projects. Stora Enso currently has development projects underway in Sweden, Germany and Spain.

Provided by MTT Agrifood Research Finland

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