

Soil stabilization to prevent erosion and nutrient leaks

Betulium

BSAP-2021-150

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Executive summary of the project

Most important results:

- The results from the soil model tests were at best modest. Most likely the reason is the high sodium content of the tested Fibry products.
- The adjustment of the Fibry product composition to decrease sodium concentration would have implied remarkable changes in production process with high cost implications.
- Unfortunately, simultaneously with the current project, Betulium experienced technical and commercial backlashes in other application areas and consequently, was not able to continue the development of agricultural product line using its own capital.

Microfibrillar cellulose (MFC) products are acknowledged to form gel-like structures when mixed in suitable concentration with a range of other compounds from water to both inorganic and organic compounds. Prior to this work, Betulium "Fibry" products which represent different kinds microfibrillar cellulose were known to stabilize structures in various applications, such as increasing the strength and technical properties of composite structures and improving the compactness of feed pellets.

Considering the prior art, a natural next step was to test how amendment of MFC to fields affects soil structure, water balance and circulation of nutrients. It was anticipated that MFC amendment not only improves soil stability, aggregation of soil particles, water balance and bioavailability of nutrients but also prevents erosion and nutrient leakage to pristine waters. Such effects would radically decrease the environmental burden caused by agriculture in Baltic Sea region.

To test these hypotheses and to measure the environmental benefits of Fibry, a series of laboratory studies were conducted by Betulium in cooperation with the Natural Resources Institute of Finland (Luke) in 2021-2022.

In addition to the laboratory testing, the original aim was also to conduct field experiments and to construct a business model for the usage in large scale. In the commercial phase, a private company called Soilfood Oy was planned to act as a project partner for Betulium in addition to Luke. However, the grant only covered ~50% of the original budget, implying that field testing and business model development could not be carried out within the current grant.