Functional Food Ingredients: enzymatic synthesis of levan and FOS using the levansucrase of \emph{Pseudomonas syringae} pv. tomato

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The project ‘Design and application of novel levansucrase catalysts for the production of functional food ingredients (Functional Food Ingredients; acronym FFI)’ with planned duration from 01.10.2012 to 31.08.2015 joins knowledge and expertise of several Estonian research groups. The project was applied by T. Alamäe’s group (Institute of Molecular and Cell Biology, University of Tartu) and the collaborating partners of the project are 1) Laboratory of Environmental Toxicology, National Institute of Chemical Physics and Biophysics (Tallinn), 2) Department of Food Processing, Tallinn University of Technology, 3) Competence Center of Food and Fermentation Technologies (Tallinn) and 4) Premia TKH AS (Tallinn). The application was based on bacterial protein, levansucrase Lsc3 of \emph{Pseudomonas syringae} pv. tomato \cite{1,2} that produces from sucrose novel potentially prebiotic $\beta$-2,6-linked fructans – levan and fructooligosaccharides (FOS).

In the ongoing project 1) fructan species of varied chain length produced from sucrose by purified Lsc3 preparation were identified and quantified with the major contribution from the partner from National Institute of Chemical Physics and Biophysics; 2) conditions for cost-efficient enzymatic synthesis of levan and FOS were determined; 3) feasible methods for the isolation of levan and FOS fractions were elaborated; 4) treatment of the FOS mixture with invertase-negative yeast was introduced to largely reduce the glucose content of the FOS mixture. The $\beta$-2,6-linked fructans enzymatically synthesized by the group of University of Tartu are tested for their biological effects (including potential prebiotic and immune stimulating properties) and applicability as ingredients for functional food by the applicant and other consortium partners. Additionally, structure-function studies of the Lsc3 protein are continued through site-specific mutation of the protein and biochemical characterization of the mutants.

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\textbf{References}
