Plant roots (Source: Colourbox)

Digital Tools for Codon Optimisation: Exploring Biotechnology's Potential for Negative Emission Technologies

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This project proposes to develop, study and apply mathematical models to optimise the protein production of a gene originating from one organism in another organism. These models will take into account both the cost of nonsense errors and the ribosomal overhead costs in the cell's mRNA translation process. The focus will be specifically on genes involved in the biosynthesis of suberin. Suberin is a high-carbon, rot-resistant biopolyester found primarily in the epidermis of plant roots or in the bark of trees. Due to its chemical properties, suberin can support the long-term storage of carbon in the soil and thus serve as a soil carbon sequestration enhancer (SCS). SCS is a widely studied negative emission technology (NET). NETs are technologies that actively remove greenhouse gases from the atmosphere and play an important role in scientific models. NETs, if deployed on a large scale, can contribute to climate stabilisation in line with the Paris Climate Agreement. ■

Softscope – Automatic evaluation of microscopy images

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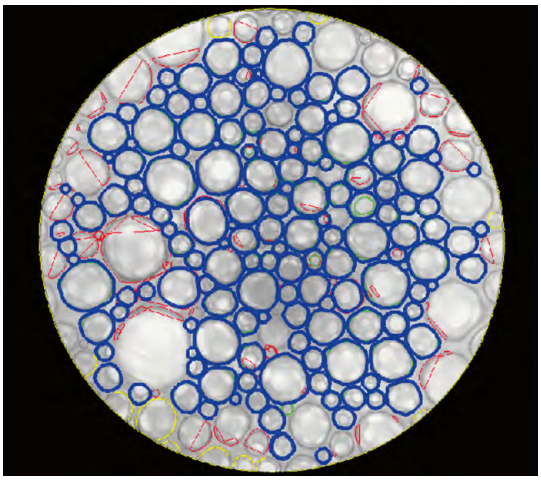
Digital, high-resolution microscopy images serve as an important analytical data basis in many areas of the life sciences. Most of the evaluations are still carried out manually. Shapes and structures of the objects to be examined are recorded and measured by hand. This is not only difficult to reproduce, but due to the ever-increasing number of images, it is also practically impossible to do in terms of time. In the Softscope project, the Data Management & Visualization Research Group of the Institute of Computational Life Sciences, in collaboration with the Food Technology Research Group of the Institute of Food and Beverage Innovation, has developed software for the automatic evaluation of microscopy images. An image processing pipeline provides a generic approach for the qualitative processing of the images, for the recognition of objects and the determination of shape parameters. By configuring a large number of process parameters, the evaluation can be optimised specifically for particular applications – such as the analysis of foams and emulsions in food research. ■



Food foam, magnified 4 times © ZHAW LSFM