ABSTRACT InducTomE aims at utilizing residual leaf biomass from tomato greenhouse production at the end of the annual production cycle by inducing the valuable secondary metabolites rutin (flavonoid) and solanesol (terpenoid) by abiotic stress. We were able to identify stress treatments leading to 10- and 12-fold induction of rutin and solanesol, respectively. These stress conditions were transferred and adapted to production-like greenhouses. Phenotyping experiments based on leaf colour and FLAV index measurements confirmed the reproducibility of stress treatments. In addition, extraction processes for both target metabolites were developed. After a solvent screening, analysis of different extraction methods (percolation, immersion), optimal process parameters and options for further purification steps were determined and confirmed by scale-up experiments. A market analysis revealed a high potential for rutin in the cosmetic, pharmaceutical and biocide sectors, while for solanesol pharmaceutical applications and Q10 biosynthesis are proposed. The analysis of market entry chances and barriers as well as of acceptance along the value chain was performed to determine the market potential of the InducTomE model process. Additionally, transcriptome analysis and metabolite profiling identified additional valuable secondary metabolites in tomato leaf biomass. InducTomE thus reveals the potential for added value in horticultural food production and contributes to bioeconomy.

Suitable stress treatments induce target metabolites up to 12-fold

Developed extraction process achieves high yields for solanesol and rutin

Image based monitoring of metabolite accumulation

Up-scaling experiments: production of target compounds in commercial-like greenhouse

Patent lifecycles for potential sectors (rutin)

Follow-up projects: TaReCa

Research areas/Cross-cutting topics

Consortium

Publications: