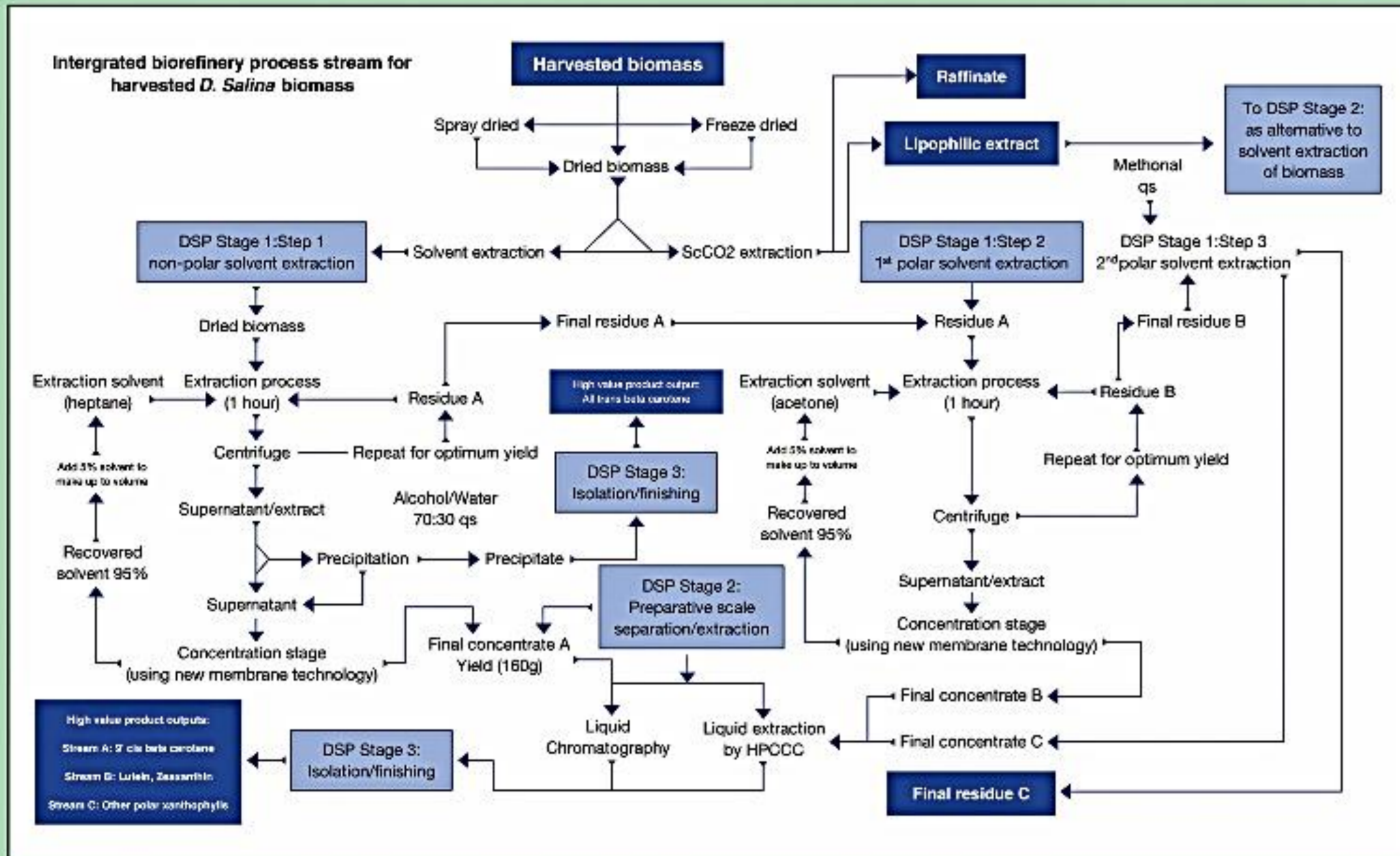


Introduction

The output from biomass production is rich in high value products from the biomass itself, extracted concentrates and pure individual target compounds. To produce any of these high value products there needs to be a series of processing stages following the initial harvest of the biomass, these are collectively referred to as "down-stream processing" or DSP.

The complexity of the DSP depends upon the products but for maximum flexibility and efficiency the "toolkit" needs itself to be comprehensive. In the D-Factory project we have developed a new and emerging technology in the field of commercial scale processing which has enabled an effective, versatile process tool to meet the needs of sustainable, high efficiency and low environmental impact processing for the future.



Integrated biorefinery process stream for harvested *D. Salina* biomass

The integrated technologies

Initial extraction of the harvested and dried biomass can go via two routes: Supercritical CO₂ or organic solvent extraction depending upon the output and target products required. The integrated process streams and technologies ensure all process outputs have value. Waste is minimized or eliminated by recycling internally and energy/carbon footprint minimized through the new and high efficiency process technology developments.



DynaMic Extractions

HPCCC Processing



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NATECO₂

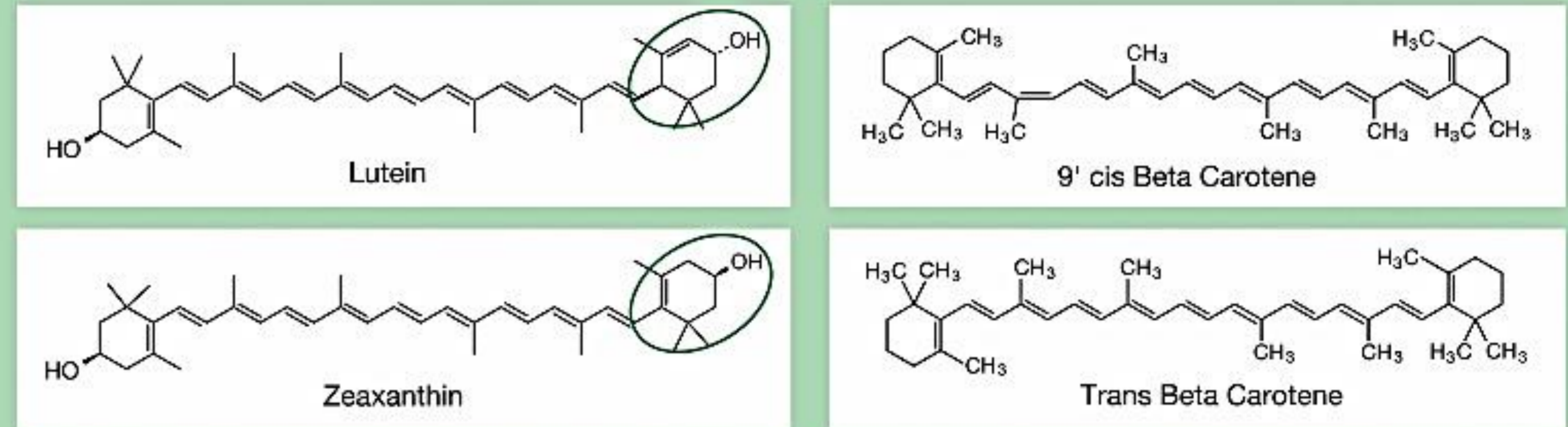
ScCO₂ Processing

IBET

Membrane Separation

Down Stream Processing: Extraction and Purification Technologies

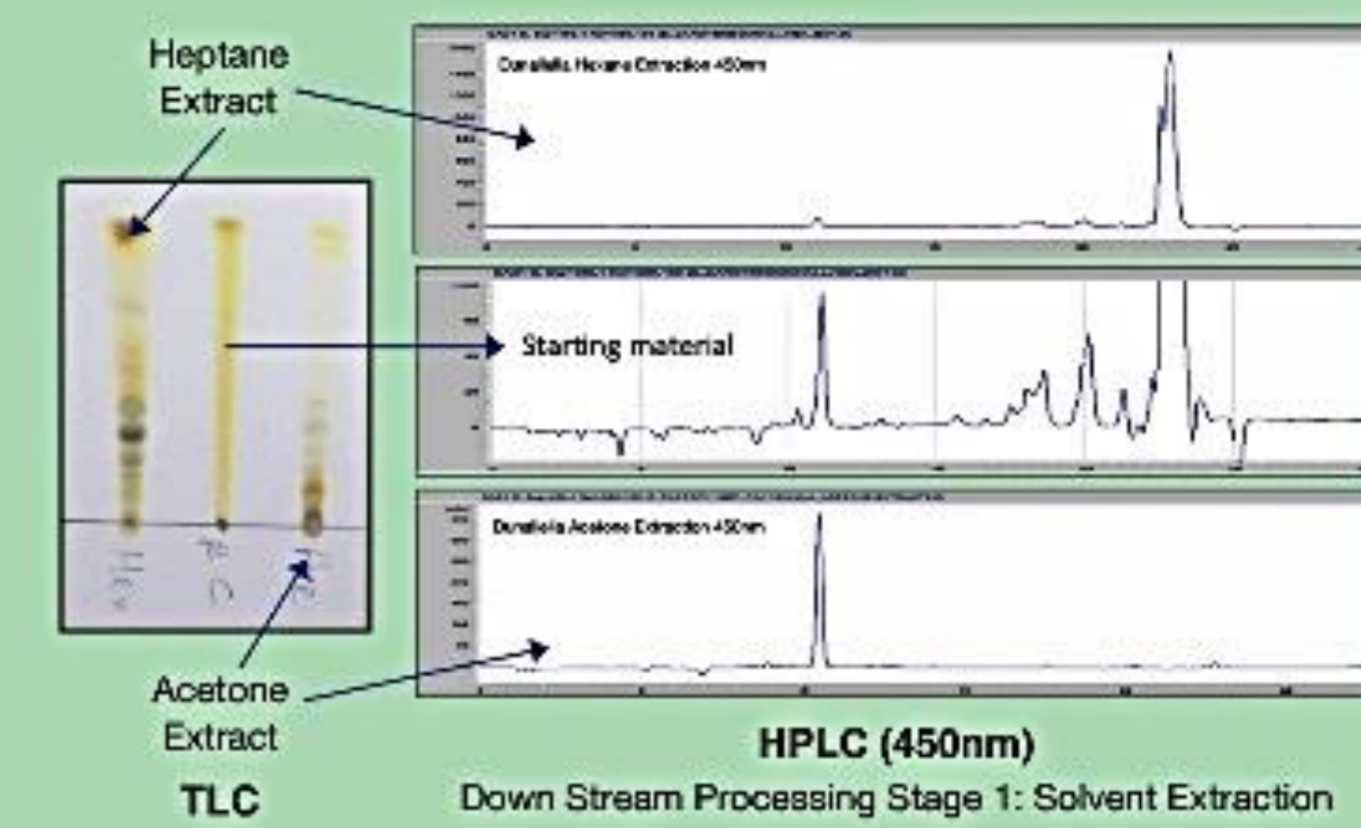
High Value Target Compounds *D. Salina*



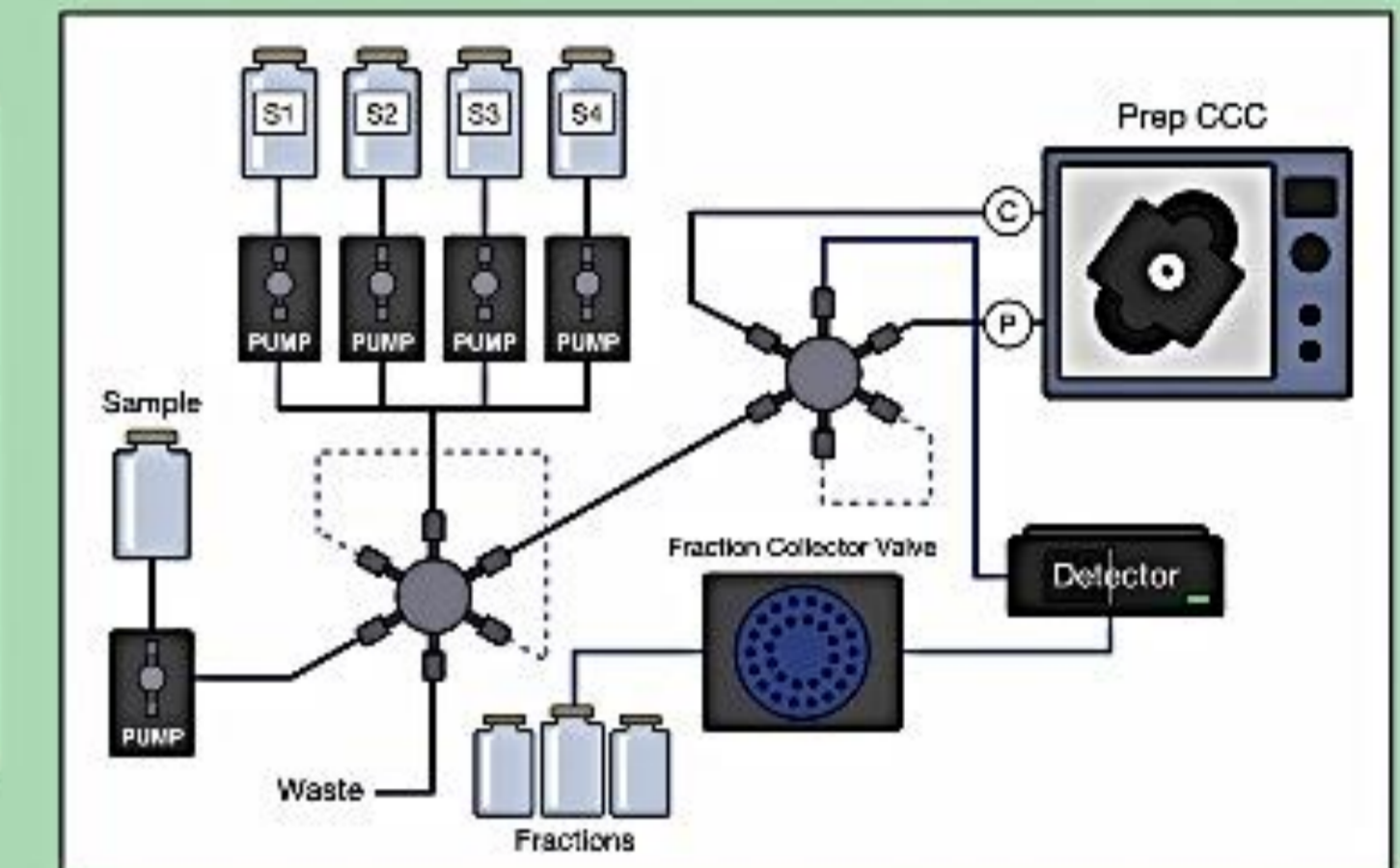
High Value Xanthophyll Targets

High Value Carotene Targets

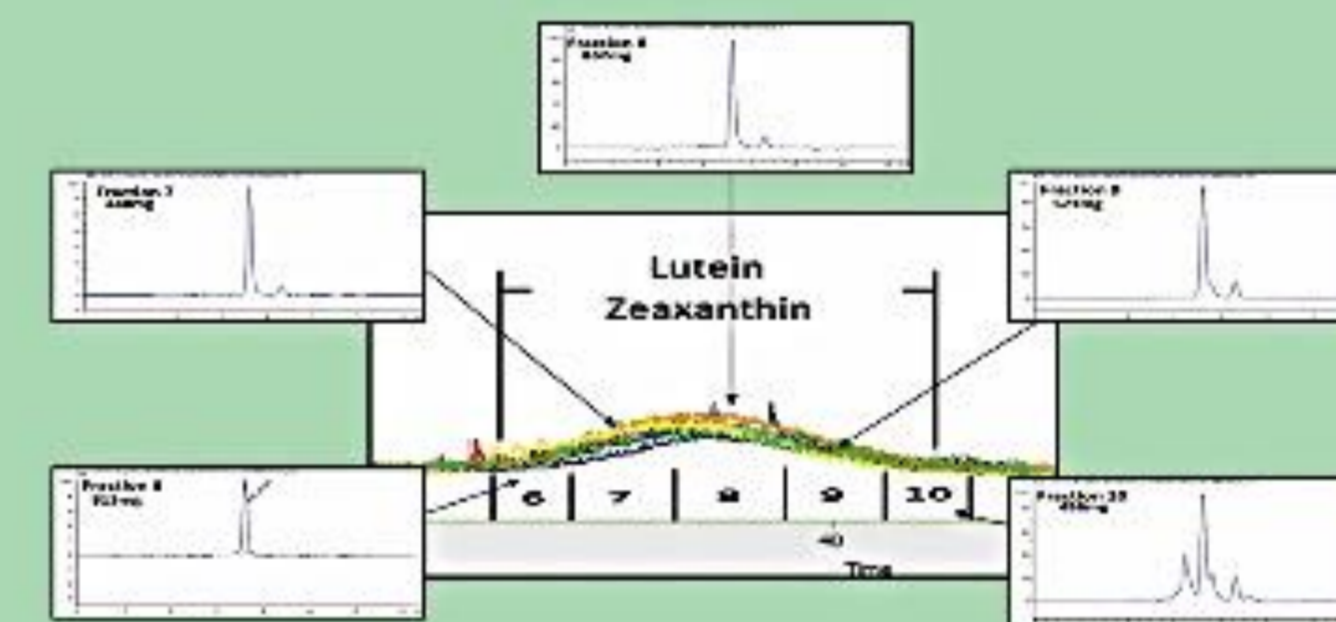
DSP Stage 1: Solvent Extraction System Development Data



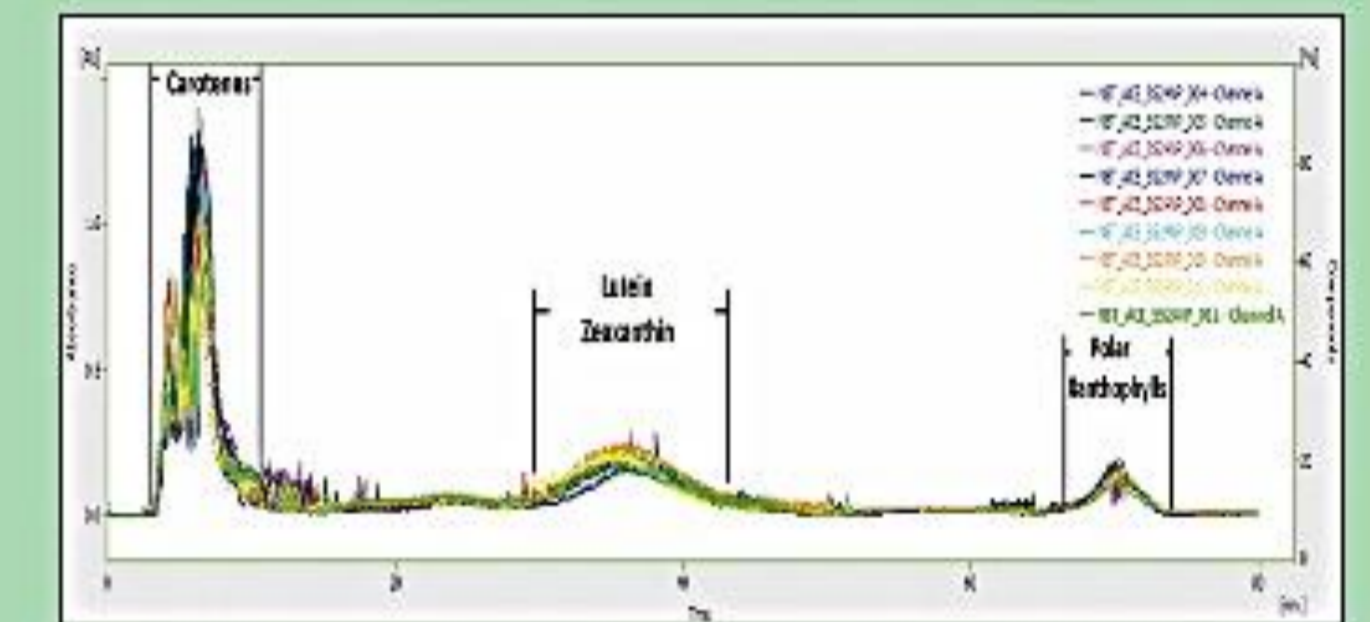
DSP Stage 2: HPCCC (Hydro Dynamic Liquid/Liquid Separation Technology)



DSP Stage 2: HPCCC Preparative Scale Processing from Polar Solvent Extract

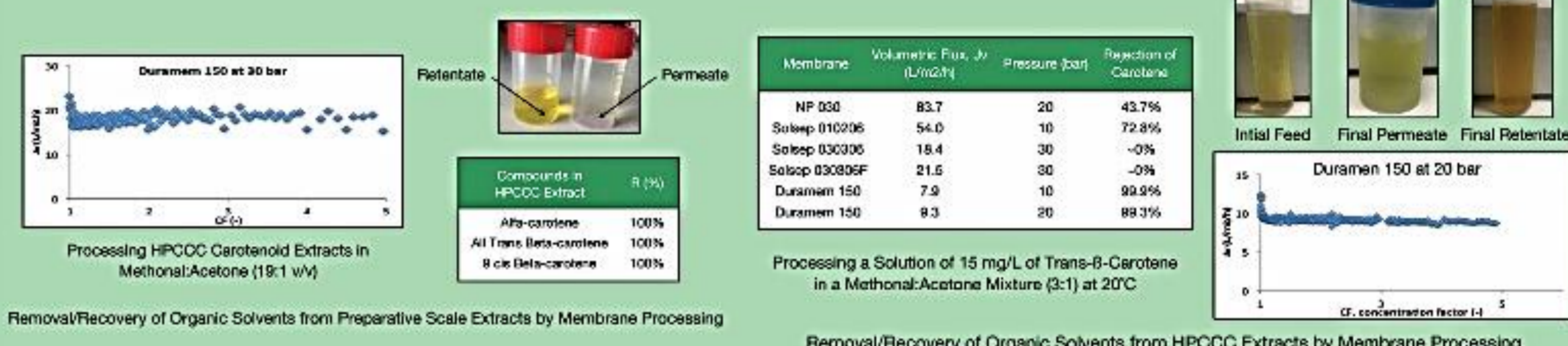


Down Stream Processing Stage 2: Preparative Scale Separation/Extraction Separation of Lutein/Zeaxanthin/other Xanthophylls



Down Stream Processing Stage 2: Preparative Scale Automated HPCCC: Overlaid Chromatograms Demonstrating Reproducibility of Continuous Automated Process

DSP Stage 2: Solvent Recovery/recycling using Membrane System-data



DSP Stage 3: Isolation/finishing



The integration of these two technology developments enables a compact, flexible and portable processing system for the extraction and purification of high value target compounds from biomass source.

UNIVERSITY of GREENWICH
 Algaefuel SA PORTUGAL
 Dynamic Extractions WALES UK
 EVODOS Raamsdonkveer THE NETHERLANDS
 HI Hafren Investments Ltd LONDON
 IBET Instituto de Biologia Experimental e Tecnológica PORTUGAL
 ifeu Institut für Energie- und Umweltforschung Heidelberg GERMANY

University of Greenwich UK
 Algaefuel SA PORTUGAL
 Dynamic Extractions WALES UK
 Evodos Raamsdonkveer THE NETHERLANDS
 Hafren Investments Ltd LONDON
 Instituto de Biologia Experimental e Tecnológica PORTUGAL
 Institut für Energie- und Umweltforschung Heidelberg GERMANY

In Srl, Udine ITALY
 The Marine Biological Association (MBA) UK
 NATECO GmbH & Co. GERMANY
 NATECO
 National Technical University of Athens GREECE
 Nature Beta Technologies Ltd (NBT) ISRAEL
 RISE Research Institute of Sweden SWEDEN
 Monzon Biotech SPAIN

D-Factory Partners
 P Harvey, P Lucas, V Verdelho, L Costa, D Fonseca, D Rooke, C Bright, F Jacobs, P Goacher, J Crespo, C Brazinha, G Reinhardt, H Keller, L Martinelli, D Schroeder, N Igl, A Kokossis, M Psycha, A Ben-Amotz, K Persson, L Briva, I Mira, D. Pen-aloza, C Casanovas, D Arroyo

Contact details:
 david.rooke@dynamicextractions.com
 Institution: Dynamic Extractions Ltd
 Country: UK