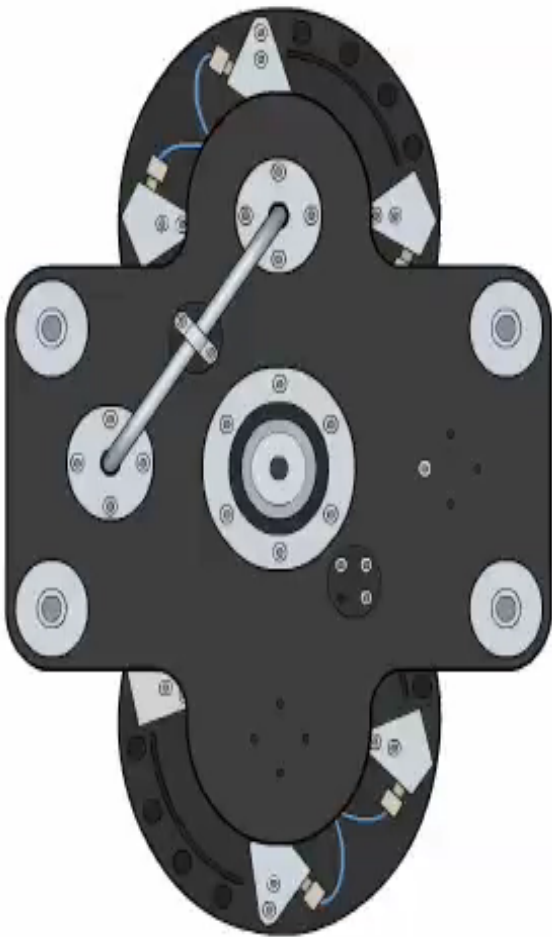




Members' Showcase 22nd May, Cardiff

D*yna***Mic** **Extractions**®

Dr David J. Rooke



Dynamic Extractions Ltd

Who are we?

The screenshot shows a web browser window displaying the website for Dynamic Extractions Ltd. The browser's address bar shows the URL www.dynamicextractions.com/. The website has a dark blue header with the company logo on the left, the number '1440' in the center, and four icons on the right: a person at a whiteboard, a gear, a grid of people, and a speech bubble. Below the header is a navigation menu with the following items: HOME, PROCESSORS, SERVICES, CONTACT, ABOUT US (highlighted in orange), NEWS AND EVENTS, COMPANY TIMELINE, and REFERENCES. The main content area is titled 'About Us' and contains the following text:

Dynamic Extractions Ltd is a successful spin out company of Brunel University which was set up to commercialise the unique and world leading Hydrodynamic Counter Current Chromatography (HdCCC) technology developed by the Brunel Institute of Bioengineering (BIB) team led by Professor Ian Sutherland.

The technology was an innovation of the J type planetary centrifuge which at the time was already being used in the field of Counter Current Chromatography (CCC) but the technique, despite its potential advantages as a processing tool was restricted in application by its mechanical limitations.

It was the innovative engineering developments of the Sutherland team that created the breakthrough and this enabled HdCCC to have the potential to become mainstream processing technology.

For the first time CCC processing times could be measured in minutes as opposed to hours and this made possible the potential for high throughput screening for discovery and process development and ultimately for large scale commercial use.

This significant step forward in processing times led to the Brunel based HdCCC technology being designated as "High Performance" and hence the technology became known internationally as "High Performance Counter Current Chromatography" (HPCCC). These HPCCC innovations and unique engineering developments are protected by international patents.

At the bottom of the page, there is an orange button labeled 'Core Skills & Strengths'.

Dynamic Extractions[®]

Dynamic Extractions Limited

World-class High Performance CCC

t: +44 (0) 1495 726626
t: +44 (0) 1403 268404
e: info@dynamicextractions.com

Dynamic Extractions Laboratories

Unit 30, Tafarnaubach Industrial Estate
Tredegar, Blaenau Gwent NP22 3AA

www.dynamicextractions.com



What do we do?

Provide innovative solutions for the preparation of high value products

Develop technologies and techniques to extract, separate and purify functional compounds for a wide range of applications from discovery to industrial scale commercial production

Design and develop our unique High Performance (hydrodynamic) Counter Current Chromatography [HPCCC] technology and systems

Prepare of a range of customised high purity target compounds for commercial use

Exploit our knowledge and technology to explore and expand its applications

Commercialise the science and its applications

Commercialise the technology



How do we achieve this?

- **Core strengths in science, engineering and its management:**
 - Knowledge, understanding and the people are key
- **Science**
 - Scientific knowledge at the forefront of HdCCC research and development, application and use
 - Academic and research partners also at the leading edge of the science
- **Technology**
 - Unique technology and strong IP position
 - Engineering knowledge at the forefront of hydrodynamic CCC technology
 - Founding university is stakeholder and academic partner
 - Engineering partner SDS Precision Engineering partner (based in Swansea)
- **Unique exploitation and selling points:**
 - Innovation in CCC application and use (investment in research with academic partners)
 - Innovation in CCC engineering and technologies (investment in research with academic partners)
 - Concentrating on core strengths
 - Outsourcing non-core activities
 - Partnering for high added value opportunities
 - A range of products across the science and technology
 - Global market capabilities
 - Key agents/distributors/other partners as stakeholders in an integrated sales and marketing strategy

Core Technology

DynaMic
Extractions®

What is High Performance Counter Current Chromatography? (HPCCC)



Mechanism

- HPLCCC is Liquid-liquid extraction & liquid-liquid chromatography technique
 - Liquid Mobile Phase (MP)
 - Liquid Stationary Phase (SP)
- No solid support–Therefore completely different to conventional chromatography
- The liquid stationary phase is immobilised within the column by centrifugal and centripetal forces
- Column is a long tube (PTFE, FEP, PFA, SS)
- The energy is developed hydrodynamically

Active
Stationary
Phase



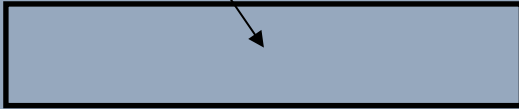
Active
Mobile
Phase

 **Dyna**Mic
Extractions®

Mechanism 2

The HdCCC process

coil volume, V_C

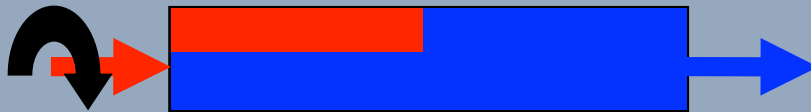


empty coil



coil filled with stationary phase

mobile phase



partial stationary phase displacement

V_m stationary phase



equilibrium

V_s

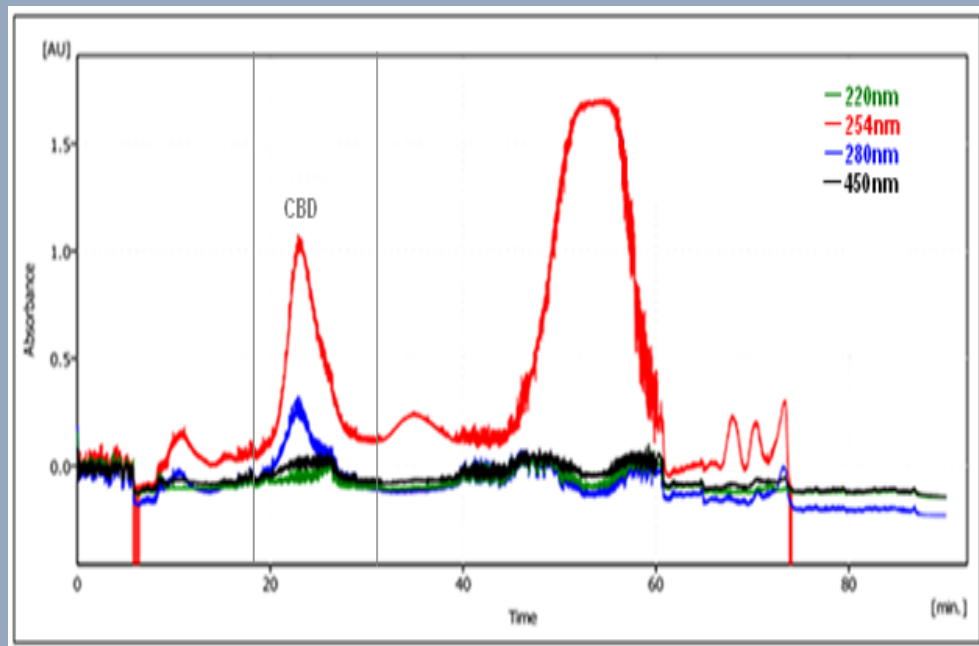


injection

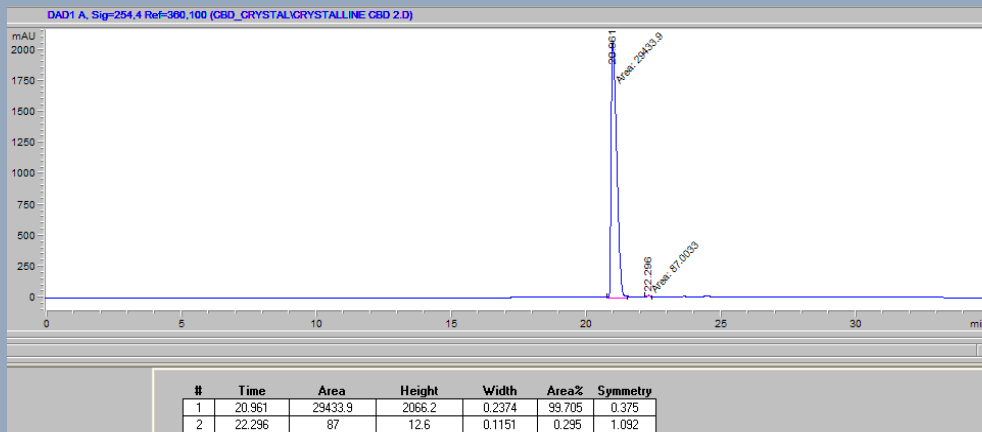
sample

Examples 1: CBD extraction/purification from whole hemp oil

HPCCC Separation of whole hemp oil



HPLC analysis of isolated CBD

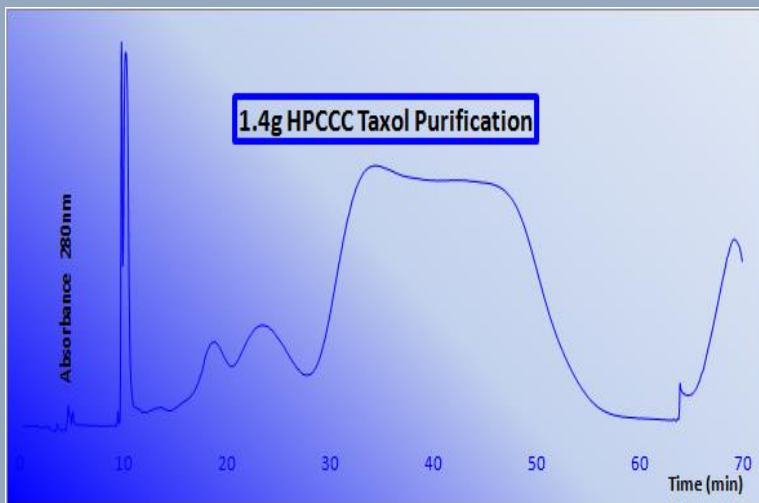
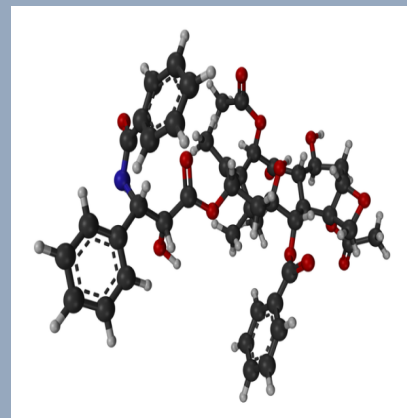


Example 2

HPCCC for Taxol Purification

Paclitaxel (Taxol)

Extract from Pacific yew *Taxus brevifolia*



Experimental Conditions:

Dynamic Extractions Spectrum, Semi-Prep Column
Normal phase mode
Hexane/Ethyl Acetate/Methanol/Water (HEMWat) :: 10:11:10:11 v/v
1.4g in 20ml LP, 6ml/min, 240g, 280nm.

68% recovery @ >99% purity

98% recovery @ >97% purity

DynaMic
Extractions®

Research projects and collaborators



Based on biomass from the halotolerant microalga *Dunaliella salina*, the D-factory will set a world benchmark for a sustainable CO₂ algae biorefinery.

SOLUTIONS for present and future emerging pollutants in land and water resources management.



Innovate UK



Key technology and commercial partners



HPCCC PROCESSORS, SCIENCE AND SOLUTIONS

Tel: +44(0) 1495 726626 email: info@dynamicextractions.com www.dynamicextractions.com

World-class High Performance CCC

Unit 30, Tafarnbach Industrial Estate, Tredegar, Blaenau Gwent, NP22 3AA

Some of our project collaborators and customers past and present

Some of our technology



How to contact us



Dynamic Extractions Limited

World-class High Performance CCC

t: +44 (0) 1495 726626

t: +44 (0) 1403 268404

e: info@dynamicextractions.com

Dynamic Extractions Laboratories

Unit 30, Tafarnaubach Industrial Estate
Tredegar, Blaenau Gwent NP22 3AA

www.dynamicextractions.com

Diolch: Thank you

