



ERIFORE

European Research Infrastructure
for Circular Forest Bioeconomy



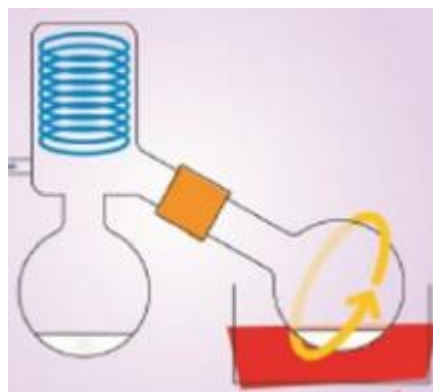
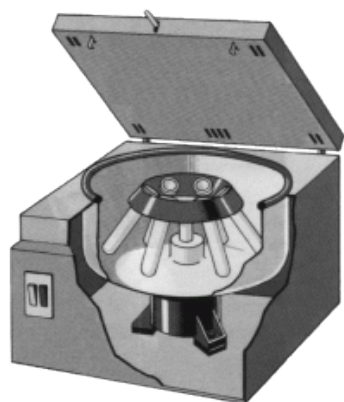
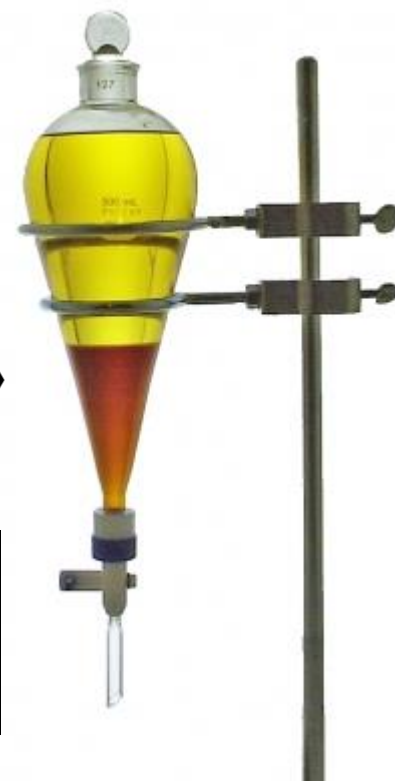
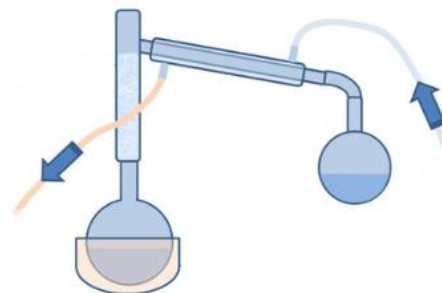
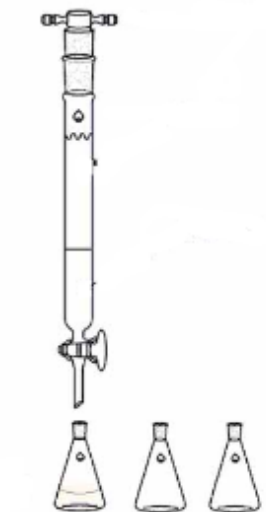
This project is funded by
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Effective downstream processing

William Mackintosh, SP Process Development

ERIFORE Workshop 6.9.2016 | Leuna, Germany

Expertise areas and capabilities



Expertise areas and capabilities



Special separation technologies expertise are heavily concentrated in locations where there are strong industries.

Universities specialised in separation technologies develops separation and downstream processes mainly in laboratory scale and by computational methods.



Expertise areas and capabilities

Fraunhofer CBP	(DE)	ERIFORE
Bio Base Europe Pilot Plant	(BE)	ERIFORE
Bioprocess Pilot Facility B.V.	(ND)	
CPI – Industrial Biotechnology and Biorefining	(UK)	
NREL Bioprocessing Pilot Plant	(US)	
Innventia	(SWE)	
SP Biorefinery Demo Plant / SP Processum	(SWE)	ERIFORE
VTT - Bioruukki	(FI)	ERIFORE
NGP2	(DE)	Under construction
NREL – Biomass Conversion Pilot Plants	(US)	

Research facilities

Name of the organisation (Country)	Technology	Filtration and membranes	Evaporation	Pervaporation	Extraction	Reactive extraction	High pressure extraction	Distillation	Azeotropic distillation	Extractive distillation	Reactive distillation	Adsorption	Absorption	Chromatography	Crystallization	Flocculation	Electrodialysis	Freeze drying	In-situ product recovery (ISPP)	
All identified organisations		D	D	S	P	P	P	D	P	S	D	P	P	P	P	P	P	P	P	D
VTT (FI)		D	P		S	S	S					L	L		S	P	L	P		
Fraunhofer IGB (DE)													P				P			
Fraunhofer ICT (DE)		P	S		S		P	S							L					
Fraunhofer CBP (DE)		D	P		P	S	P	P	S	S	S	L	L	P	P			L	D	
SP (SWE)		D	D					D												
SP Processum (SWE)		P	S		P	L	L	P	P	S	S	S	S		L				S	
BBEPP (BE)		D	D	S	P	P					D	P		P	P	L		L		
SP Process Development (SWE)		L	P		L		L	L	L	L	L	L	L	L	S	L		L		
TU Dortmund (DE)		L		L	L						P		P							
Universität Oldenburg (DE)											P									
Innventia (SWE)		L	L		P		L					L	L	L	L	P				
MoRe Research (SWE)		P	S									L	L			L				
Lund University (SWE)		P					P													



Co-operation networks

- No networks dedicated to downstream processing were identified within the ERIFORE partners
- Bodies like ISTP, EFCE and The UNIFAC Consortium were identified as networks that had clusters with focus on separation techniques
- Bio refinery downstream networks were not identified outside of the ERIFORE consortium either



Initial thoughts about Research needs

- Special separation tools in current pilot plants
- Downstream Networks beneficial
- Downstream processing is important!
 - Often the biggest economic impact
 - Reduce costs of subsequent steps
 - Enables a more diverse valorisation chain
- Modular systems an option



Conclusion and discussion

- Availability is good spread across Europe
- Special modern techniques are not available at large scale
- Collaboration a way to improve utilisation
- Downstream network could be beneficial
- Modular systems an alternative
- Awareness of open downstream facilities are low
- Finances for using the downstream facilities are low



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Consortium:

