Instituto de Síntesis Química y Catálisis Homogénea

Instituto de Síntesis Química y Catálisis Homogénea

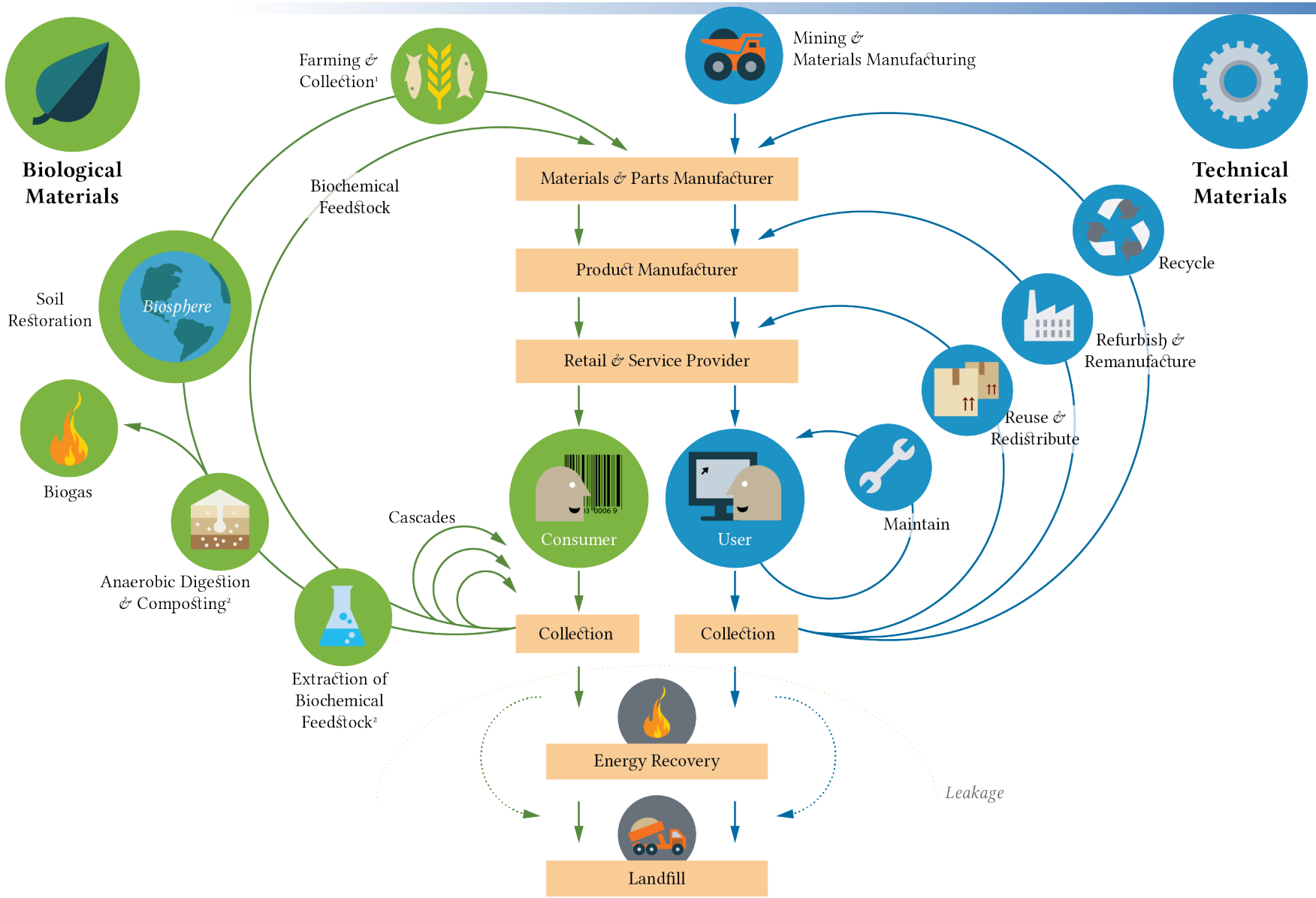
Aplicaciones de la Química en Economía Circular

José Mª Fraile

26 de noviembre de 2021

(Bio)Economía Circular

(Bio)Economía Circular



Technical Materials

Reciclado de materiales

EurJIC
European Journal of Inorganic Chemistry

Full Paper
doi.org/10.1002/ejic.202000261

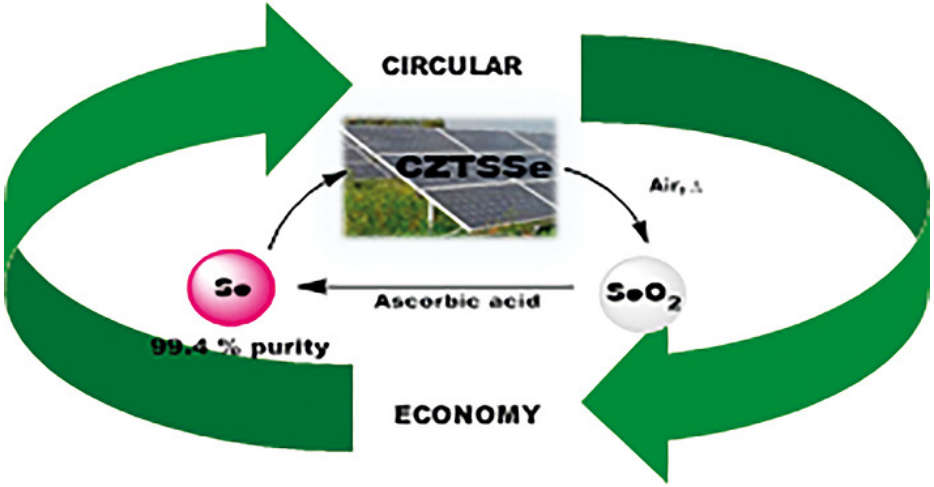
Europe
European Chemical Societies Publishing

Selenium Recovery

High Recovery of Selenium from Kesterite-Based Photovoltaic Cells

Cu-Zn-Sn-Se

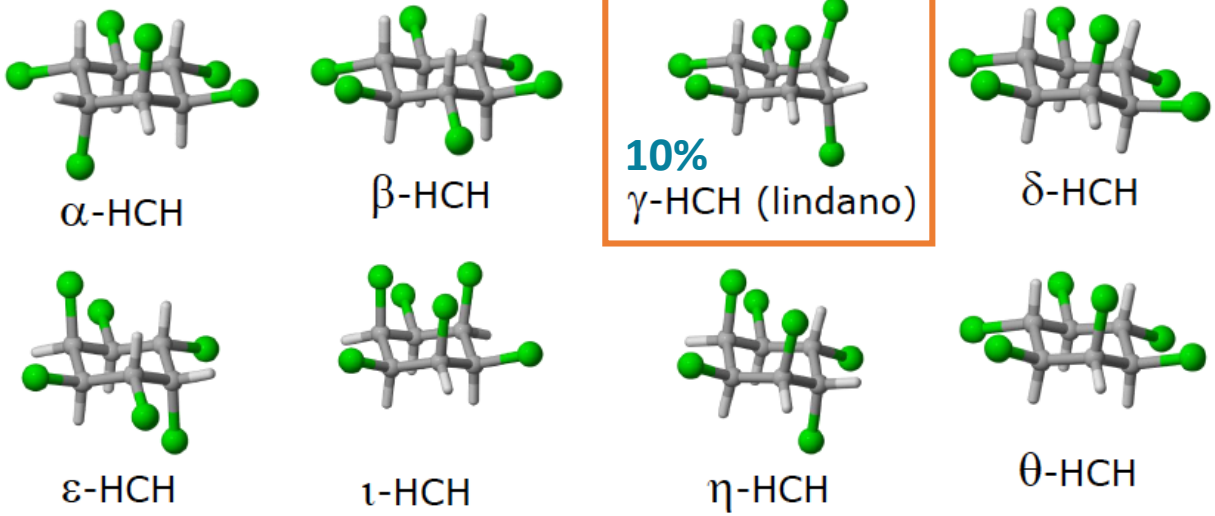
Maria Pilar Asensio,[a,b] Elisa Abás,[a] Jose Luis Pinilla,[c] and Mariano Laguna*[a]

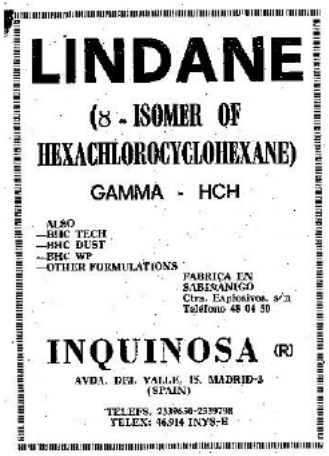


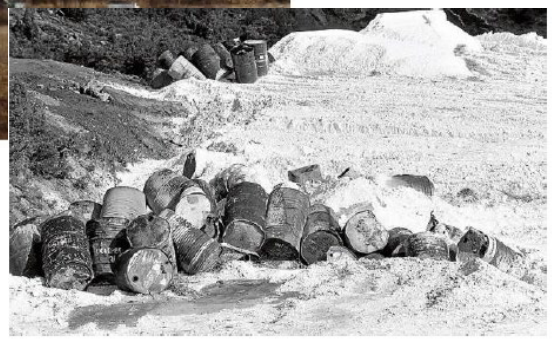
Recuperación de más del 90% del selenio, con una pureza del 99,4%, mediante un proceso simple de oxidación y reducción sucesivas.

Residuos de lindano

Hexachlorocyclohexanes (HCH)



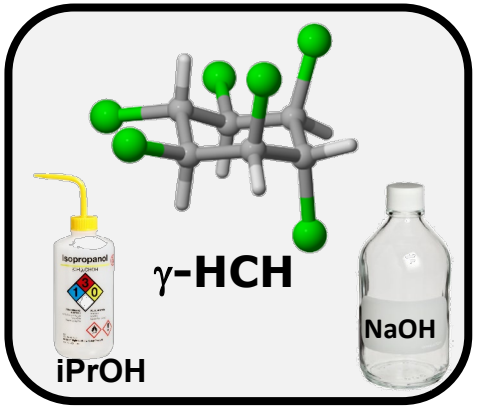

LINDANE
(γ - ISOMER OF HEXACHLOROCYCLOHEXANE)
GAMMA - HCH
ALSO
—BHC TECH
—BHC DUST
—BHC WP
—OTHER FORMULATIONS
FABRICA EN SABERANGO
Ctra. Explosivos, s/n
Teléfono 48 04 50
INQUINOSA (R)
AVDA. DEL VALLE, 15. MADRID-3 (SPAIN)
TELEFS. 2339630-2339798
TELEX: 46.914 INYS-E



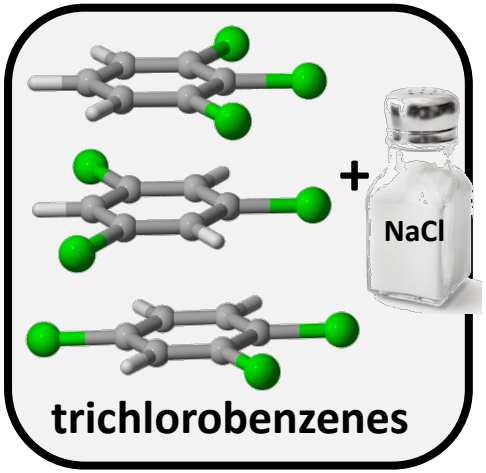
Solid HCH waste: 150 000 t

Residuos de lindano

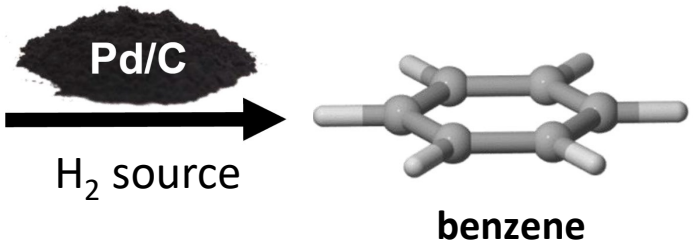
GOBIERNO DE ARAGON
Departamento de Desarrollo Rural y Sostenibilidad



100 %



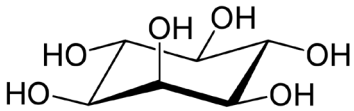
ONE-POT?



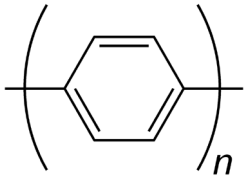
Dehydrochlorination

Hydrodechlorination

Nucleophilic substitutions?

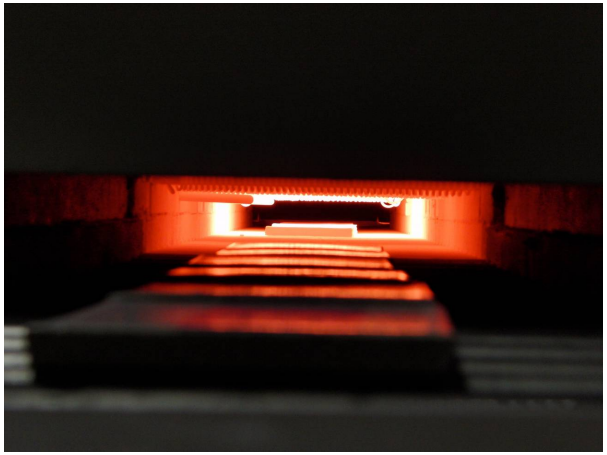


Homocoupling?



INMA
INSTITUTO DE NANOCIENCIA Y MATERIALES DE ARAGÓN

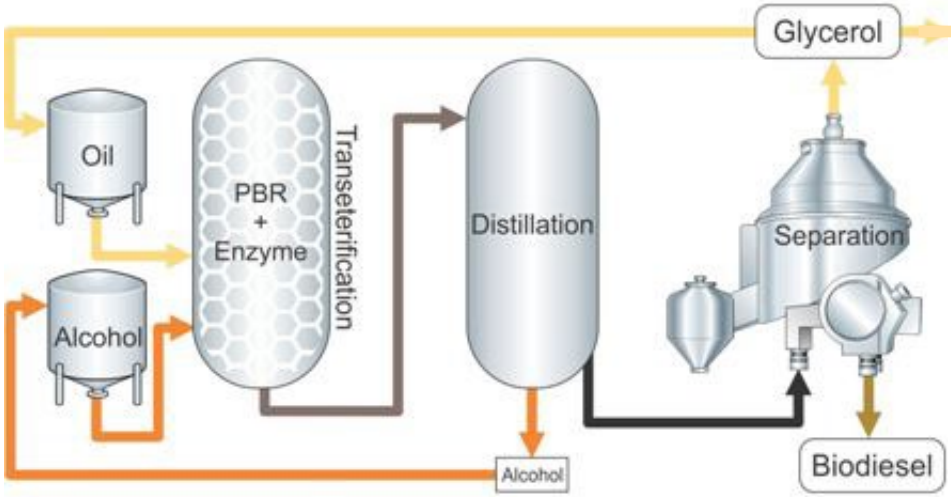
Tratamiento de residuos de lindano con láser

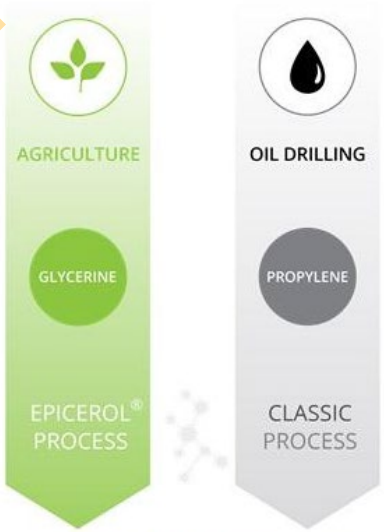


- ¿Condiciones?
- ¿Papel de aditivos?
- ¿Tipos de reacciones?

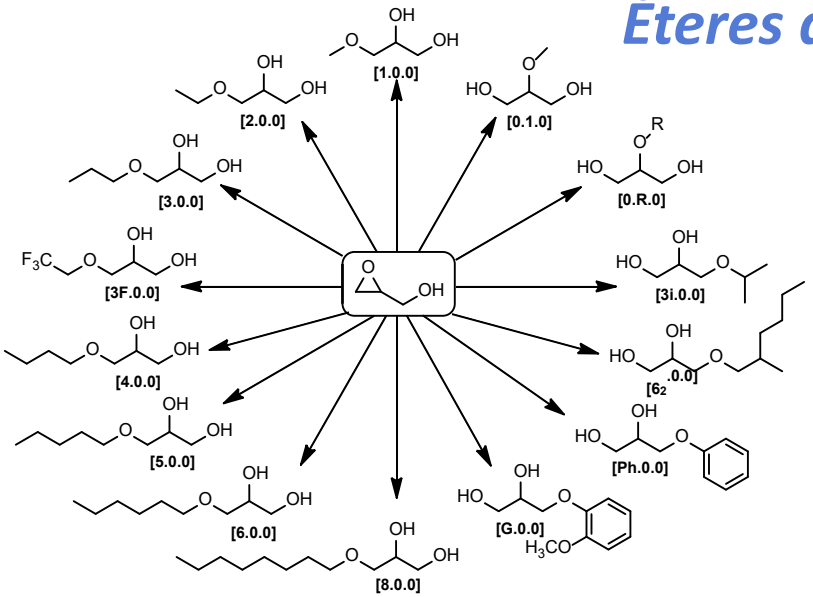
Biological Materials

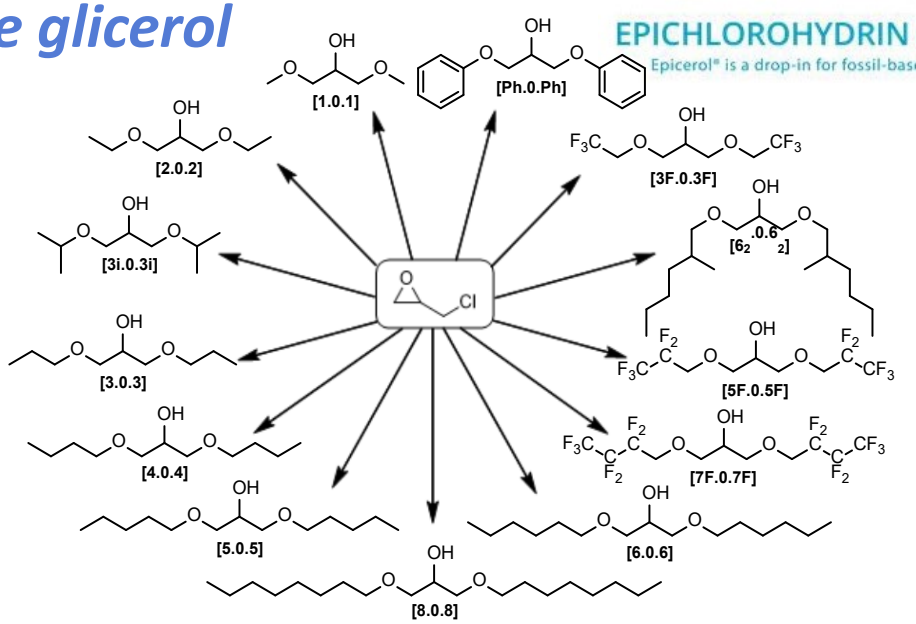
Glicerol



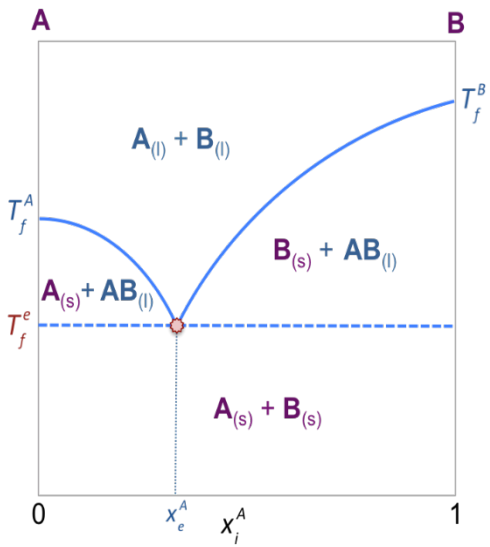


Éteres de glicerol

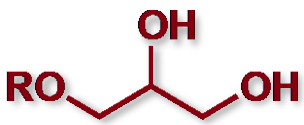


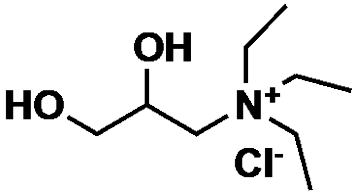


Greener alternatives to synthetic IONIC LIQUIDS:



Bio-based Deep Eutectic Solvents (DES)…

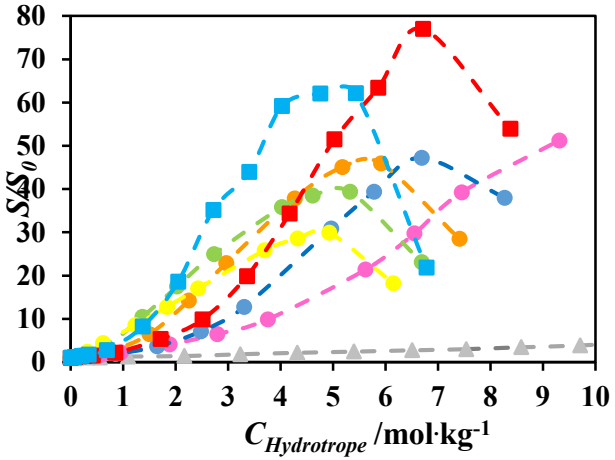




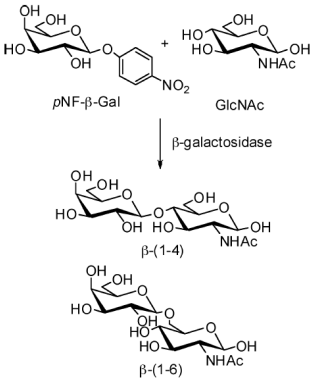
Glyceryl monoethers provided DES with N00Cl

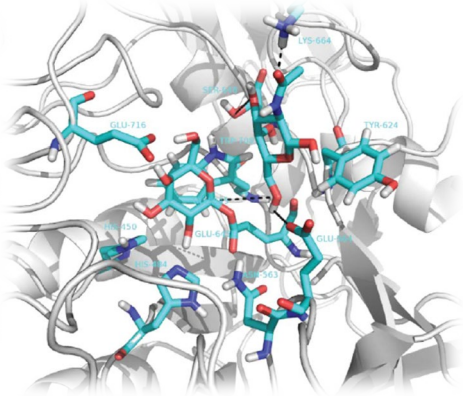
…and Ionic Liquids!

Glyceryl monoethers as hydrotropes

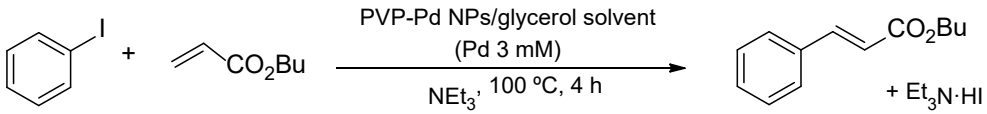


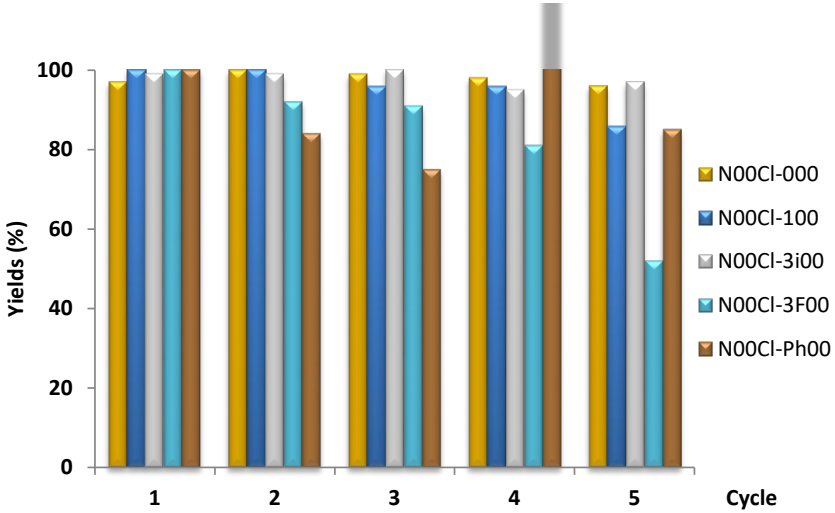
Glyceryl monoethers as reaction media and as substrates in enzymatic catalysis





Glyceryl monoethers and related DES for the design of recoverable homogeneous catalytic systems





Ácidos grasos

Solutex
Delivering TailorMade Value

Refined oil
Triglycerides, phospholipids

Trans-esterification

15-30% ethylesters

Molecular/fractional distillation

Chromatography Varicol®

EPA/DHA mixture >85% purity

Chromatography Varicol®

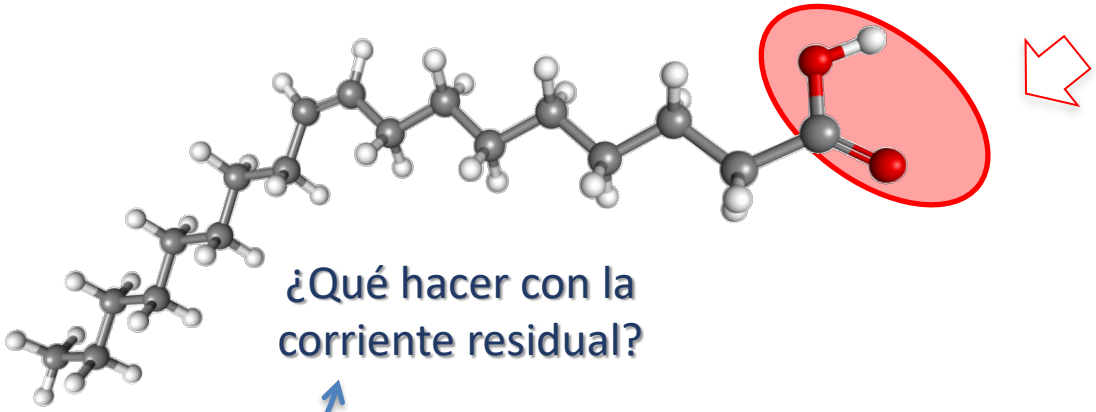
>85% purity

Chromatography single-column

>90% purity

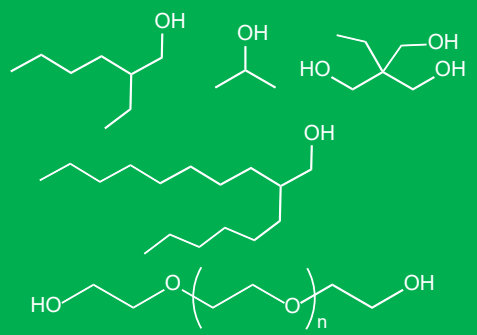
Chromatography single-column

Single omega-3 >95% purity



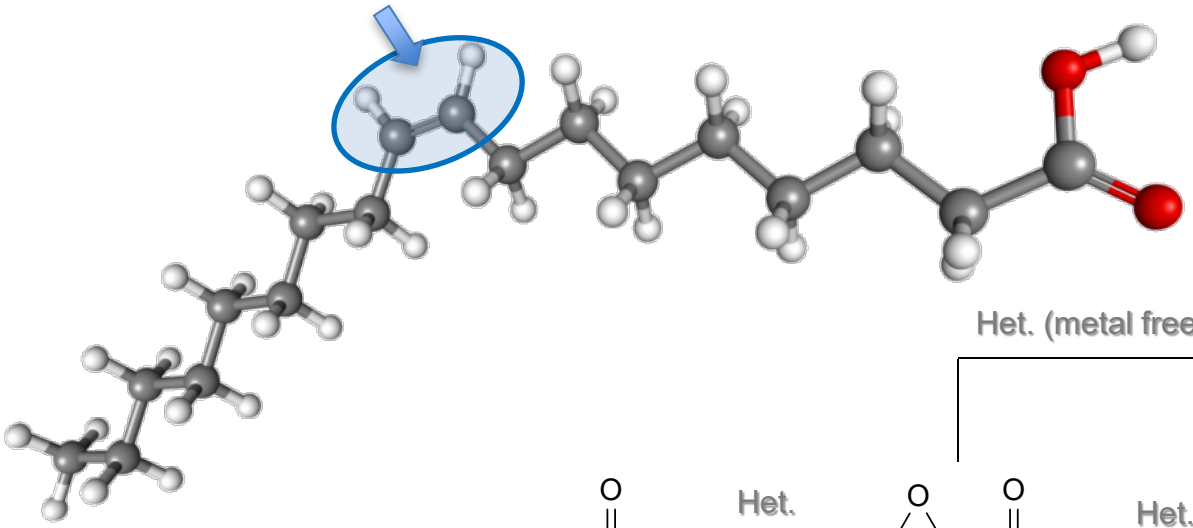
¿Qué hacer con la corriente residual?

ROH =

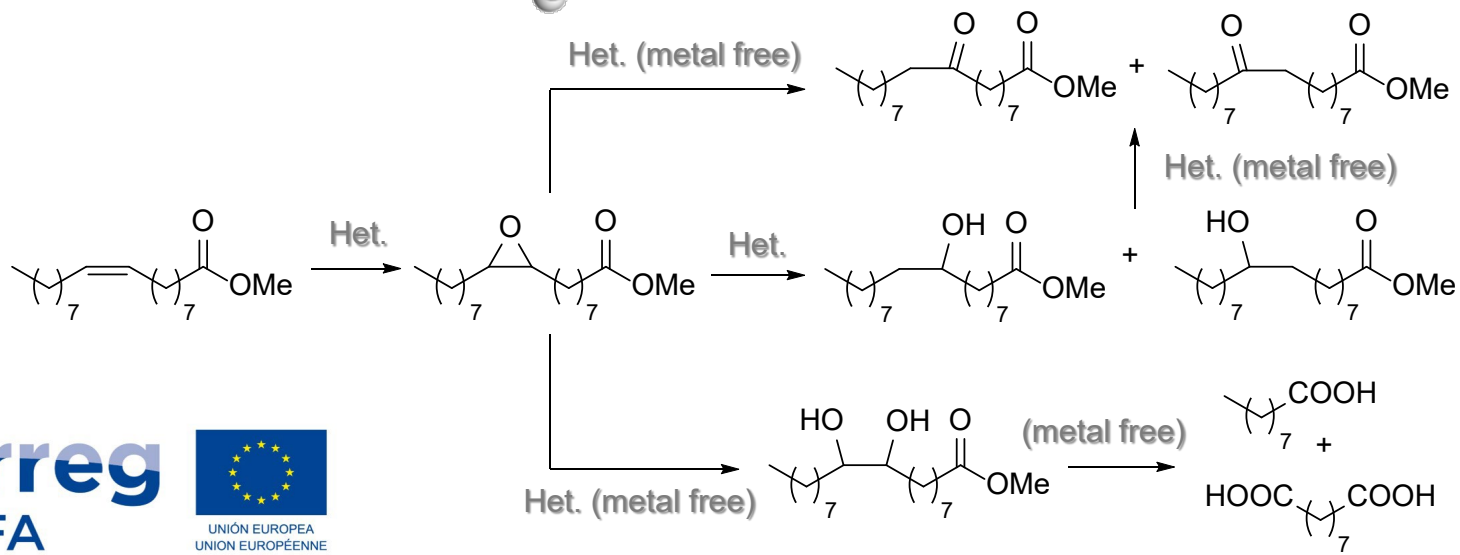


Propiedades como biolubricantes y/o biosurfactantes

Ácidos grasos

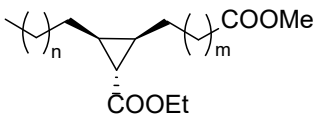


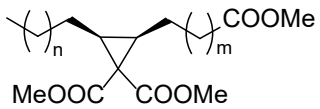
Tandem processes

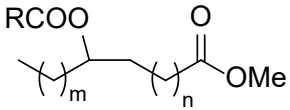


Interreg POCTEFA TRIPyr

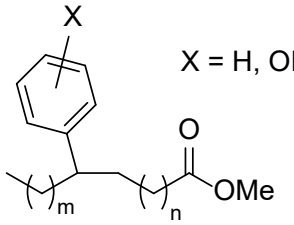
UNIÓN EUROPEA
UNION EUROPÉENNE





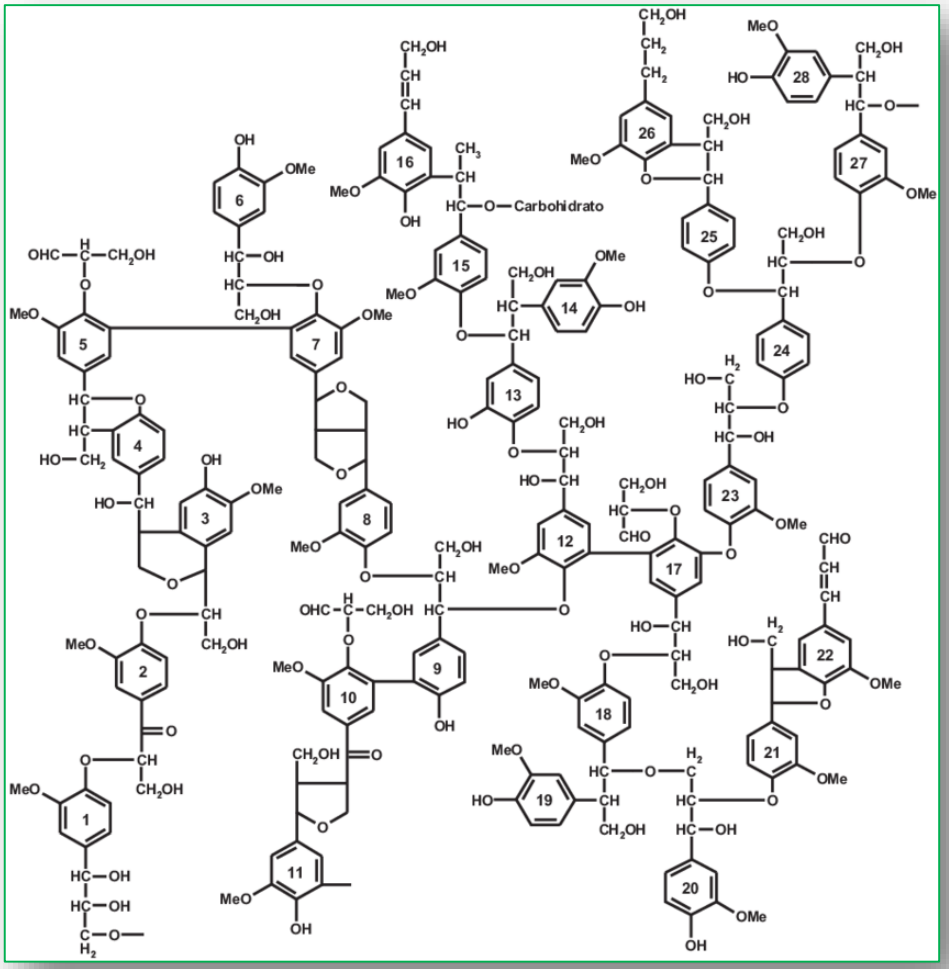


R = H, CH_3, nPr, iPr, Ph, CF_3



X = H, OH, OMe

Derivados de lignina



- **Uso de derivados de lignina procedentes de residuos**

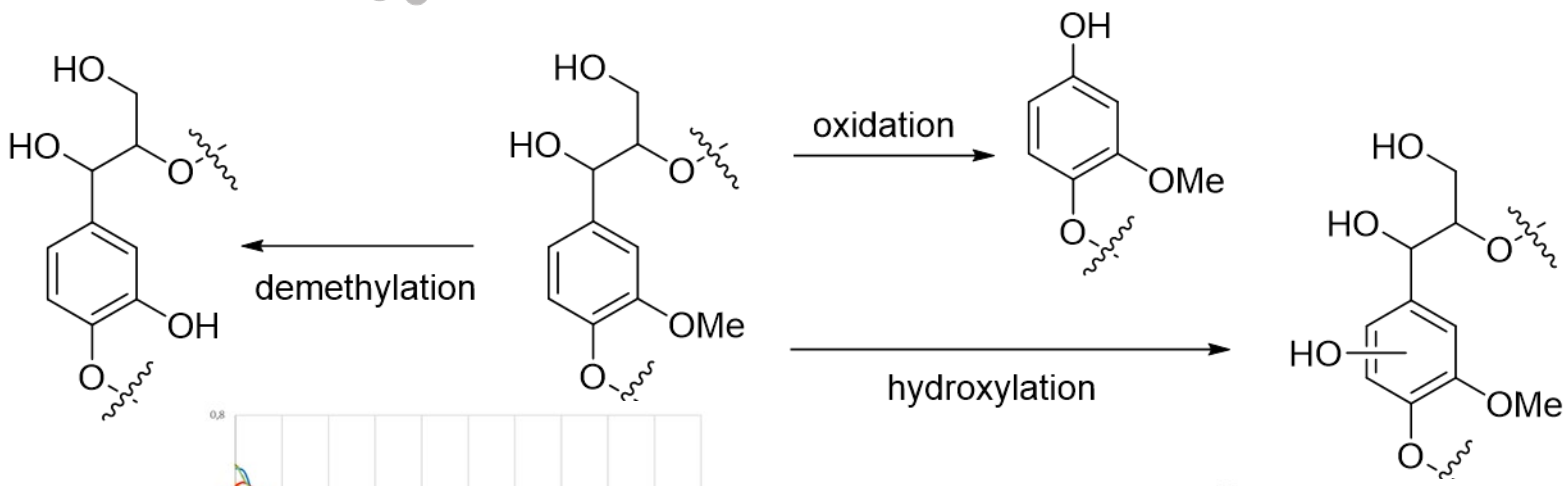
  ¡caracterización!

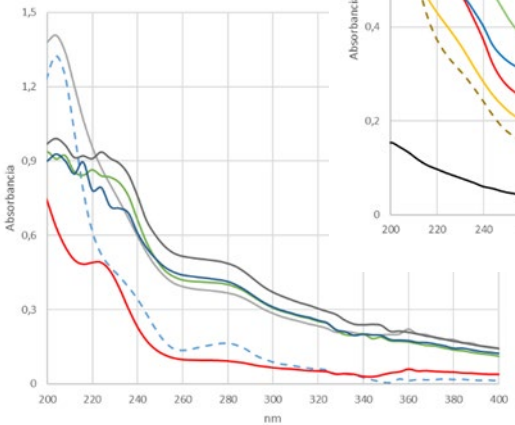
- **Modificaciones para obtener compuestos de propiedades mejoradas**

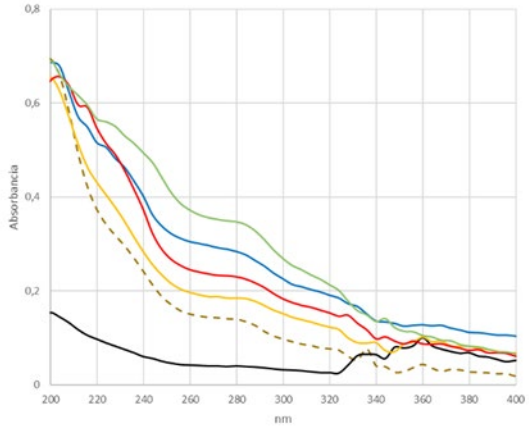
  - Antioxidante
  - Absorción UV
  - Antibacteriano
  - Antifúngico
  - Coordinación e intercambio iónico

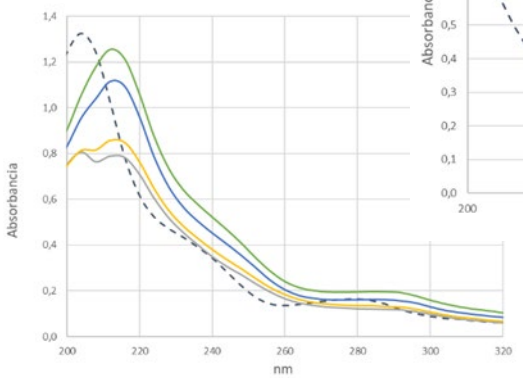
Derivados de lignina

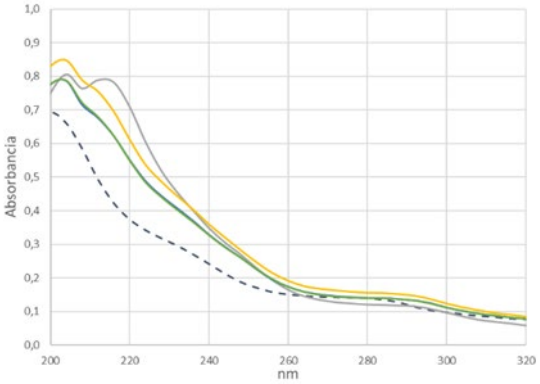
FERTINAGRO BIOTECH





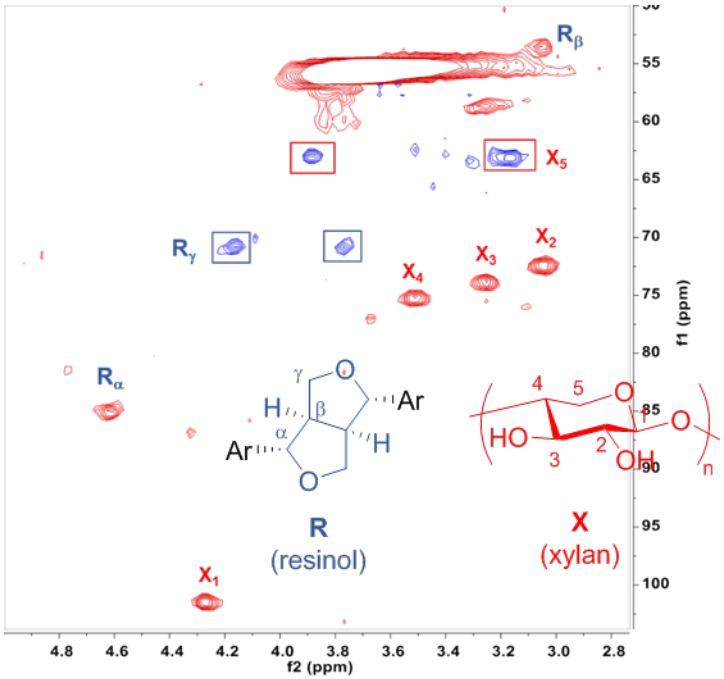


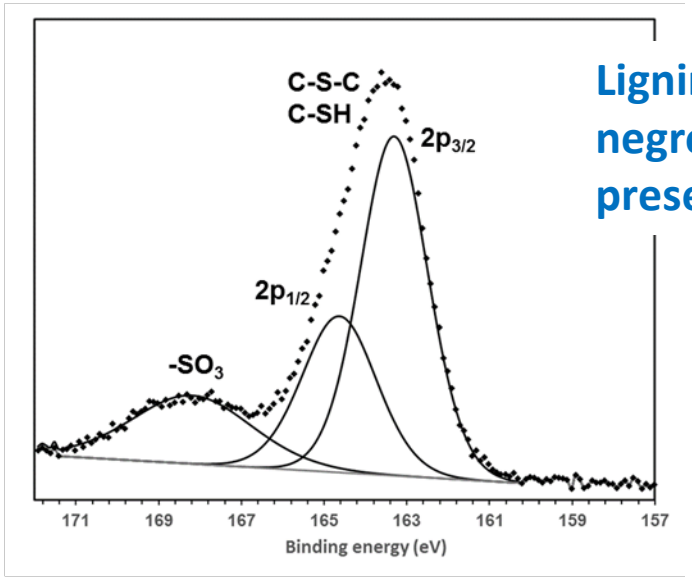




Derivados de lignina

TORRASPAPEL → FERTINAGRO BIOTECH



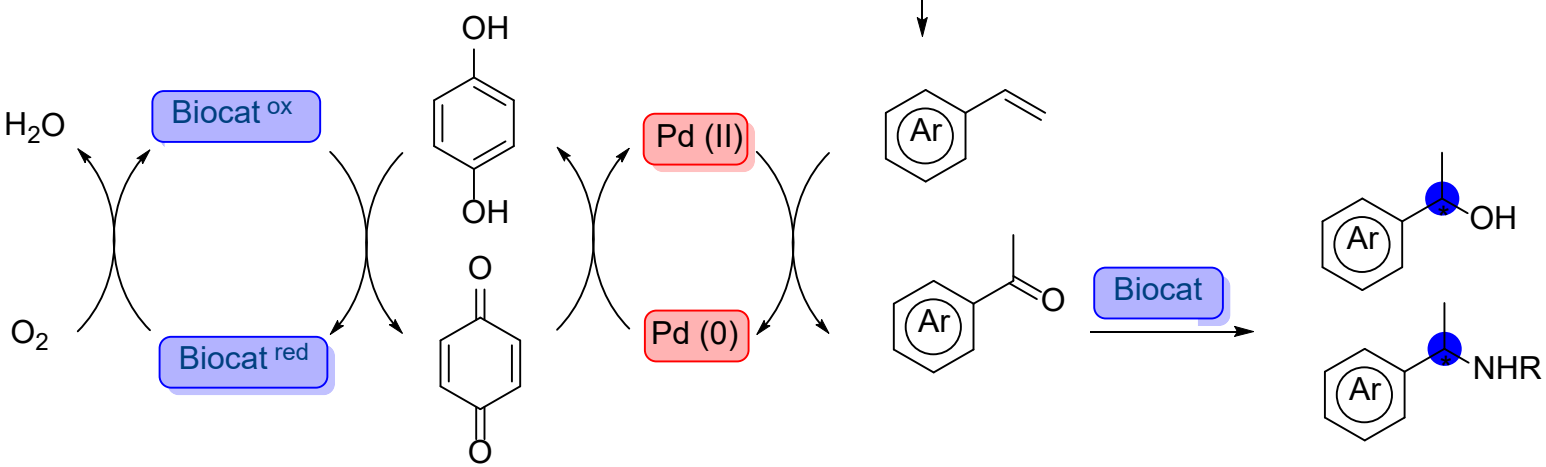


Lignina Kraft de licor negro de papelera: presencia de azufre

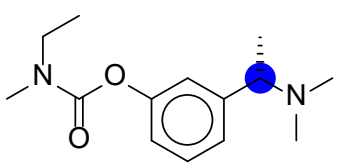
Transformación en lignosulfonato de uso en fertilizantes

Novel multicatalytic cascades for the production of chiral compounds

Alternative to Wacker oxidation

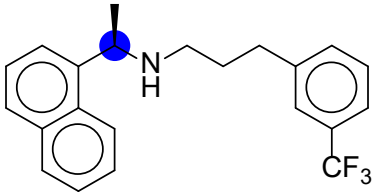


Sustainable routes to pharmaceuticals from lignocellulose



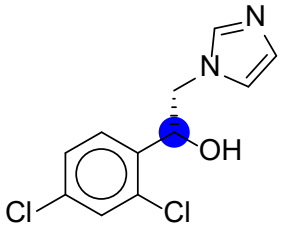
rivastigmine

Alzheimer's and Parkinson's diseases



cinacalcet

secondary hyperparathyroidism

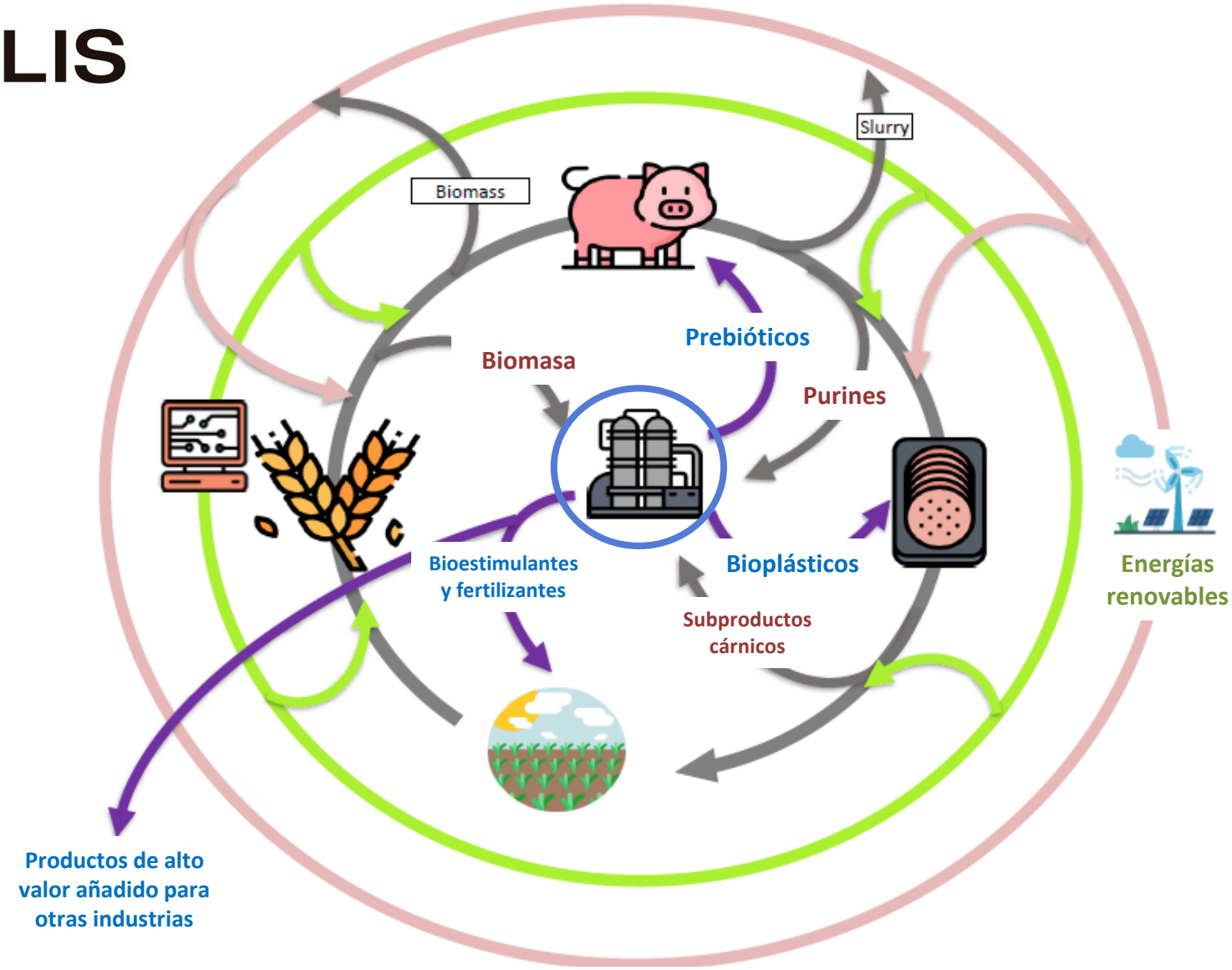


miconazole

candidiasis

Juan Mangas-Sanchez. Investigador ARAID en el ISQCH.
juan.mangas@unizar.es

Circularización del sector porcino



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26 de noviembre de 2021