NEW TECHNOLOGIES FOR THE VALORISATION OF LIGNIN AND PRODUCTION OF VANILLIN OR VANILLIC ACID

CONTACT DETAILS:

Research Results Transfer Office-OTRI
University of Alicante
Tel.: +34 96 590 99 59
Email: areaempresas@ua.es
http://innoua.ua.es

ABSTRACT

Researchers at the **University Institute of Electrochemistry** at the University of Alicante have developed devices and methods for the **recovery of lignin** using photocatalysts and continuous electrocatalysts, respectively. The aim is to obtain **high added-value chemical compounds** such as vanillin or vanillic acid from lignin, which is present in plant biomass, in a more sustainable and economical way than nowadays.

The group is looking for companies in the emerging **biorefinery** sector with an interest in the valorisation of lignin or the use of bio-derived compounds such as vanillin or vanillic acid in the formulation of **pharmaceuticals, cosmetics and fragrances**.

ADVANTAGES AND INNOVATIVE ASPECTS

MAIN ADVANTAGES OF THE TECHNOLOGY

- **Lignin is not degraded** and therefore the intrinsic structures that can be useful to industry are not lost, unlike traditional valorisation methods, but is **selectively fragmented** to release high **value-added aromatic compounds** such as vanillin and vanillic acid.
- The materials used as photocatalyst or electrocatalyst are **low cost**.
- **Additional catalyst recovery steps are eliminated**.
- The use of a photocatalytic method or electrocatalysts for the production of vanillin or vanillic acid makes the **production of these compounds cheaper** compared to the extraction of natural vanillin or its production from biotechnological processes.

INNOVATIVE ASPECTS

- The photocatalytic valorisation of lignin **occurs continuously**, i.e. the photocatalyst is neither dissolved nor dispersed in the liquid in which the lignin is found, which also allows the process to be scaled up.
- These photocatalytic systems work under ambient conditions and use only **solar energy** to activate the process, i.e. no oil.
- The electrochemical system allows the lignin to be electro-oxidised and vanillic acid to be generated as the main product at **high industry-relevant working currents**.

MARKET APPLICATIONS

Its most direct application is in the emerging **biorefinery** sector where the aim is to valorise lignocellulosic biomass. Currently, although strategies are available to recover the carbohydrate fraction contained in lignocellulosic biomass, the lignin fraction is ruled out due to the lack of a technology that allows it to be depolymerised in a controlled and economically competitive manner.

Vanillin and vanillic acid are among the most attractive products of lignin fragmentation due to their field of application. Thus, both compounds are an essential component in the formulation of **pharmaceuticals, cosmetics and fragrances**.

COLLABORATION SOUGHT

We are looking for companies interested in acquiring this technology for **commercial exploitation** through patent licensing agreements or for the development of the technology and its adaptation to the specific needs of their activity.