

# ONE-STEP PAIRED ELECTROCHEMICAL SYNTHESIS OF L-CYSTEIC ACID AND L-CYSTEINE



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### ABSTRACT

The group of Applied Electrochemistry and Electrocatalysis of the University of Alicante has developed a paired electrochemical method for the synthesis of L-cysteic and L-cysteine from L-cystine. The synthesis of both compounds at the same time improves notably the economic parameters of the synthesis. Cysteic acid is an intermediate for different synthesis and normally used in cosmetic.

This technology could be of interest for pharmaceutical and fine chemical industries because of the high material yield and the low cost of the coupled synthesis of L-cysteic acid and L-cysteine. Companies producing intermediates and final chemical products interested in development of new processes or in improving the traditional ones are sought. The Group also has a pilot plant fully equipped with the necessary infrastructure in order to develop the pre-industrial phase and scaling-up of the processes.

### TECHNOLOGY ADVANTAGES AND INNOVATIVE ASPECTS

#### MAIN ADVANTAGES OF THE TECHNOLOGY

- The reagent used, electricity, is not stored and it is provided in the degree that it is demanded.
- It has a low cost (electric cost is around 0.5 - 1 kWh/kg)
- It avoids the pollution taken place by the other reagents involved in traditional chemical synthesis. It may be considered as a green method.
- High yield for the process. Two products synthesized, at the same time that may be complementary for the same industry.

#### INNOVATIVE ASPECTS

- Two interesting compounds, L-cysteic acid and L-cysteine are obtained at the same time using a divided filter press electrochemical cell and starting from L-cystine.
- The cost of the synthesis (energy, manpower, reactors etc.) is substantially decreased in comparison with the cost of the synthesis of only one product.

### MARKET APPLICATIONS

The technology could be of interest for companies belonging to the sectors of Fine chemicals, Pharmaceuticals and Cosmetics.

### COLLABORATION SOUGHT

The group of Applied Electrochemistry and Electrocatalysis is seeking for:

- Partners willing to scale up the synthesis in order to introduce this product in their portfolio of compounds.
  - R&D departments of any company interested in carrying out feasibility studies on the industrial application of this technology.
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