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## Valorisation of industrial brines into value-added products (acids and bases) through selectrodialysis and bipolar membrane electrodialysis: A step towards circular economy approach

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High salinity waste water effluents originated from different industrial processes are normally considered as last-resort sources because their high contents of ions make necessary the use of complex and costly treatment systems. For this reason, generated brines have traditionally been discharged into natural water bodies, although this method is not environmentally friendly and represents a loss of potential resources (salts and water). Undoubtedly the selective recovery and revalorisation of salts contained in brines would permit their reusability as well as a reduction of the environmental impact caused by their disposal, contributing to the development of circular economy. Within this framework, the present study intended to treat an industrial brine rich in NaCl and $Na_2SO_4$ through a combination of membrane-based technologies to convert its ions into valuable chemical products. The involved technologies consisted in 1) electrodialysis (SED) to separate NaCl from $Na_2SO_4$, and 2) electrodyalisis with bipolar membranes (EDBM) to produce HCl and NaOH from NaCl, and $H_2SO_4$ and NaOH from $Na_2SO_4$. Experiments were performed under different Cl- and $SO_4^{2-}$ concentrations in feed solution and carrier solutions to be enriched in Cl- and $SO_4^{2-}$. Results indicated that it was possible to separate Cl− and $SO_4^{2-}$ by SED (purities up to 98%) and to produce pure NaOH and HCl and $H_2SO_4$ by EDBM. Optimal operation conditions were also determined with regard to energy consumption.

### Speaker Biography

Oriol Gibert is an environmental chemist at Technical University of Catalonia (UPC) with more than 10 year's experience in the field of contaminated land and groundwater and of process separation (adsorption, membranes) applied to water treatment. He has 50 ISI-indexed publications and his publication H-index is 18.

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