

Process and system for separation of organic charged compounds



Technology

The ability to produce functional food ingredients from natural sources becomes increasingly attractive to the food industry. There is a need for an efficient, low cost solution to select and purify the desired extract

Until now, organic charged compounds and more specifically peptide fractions or peptides obtained from protein hydrolysis, whatever the source, have been purified using expensive and sophisticated analytical procedures such as HPLC, ion-exchange and/or gel-filtration chromatography. For the further purification of organic charged compounds or bio-active charged molecules from complex mixtures, membrane filtration techniques have commonly been used. However, when the mixtures contain different molecules of similar molecular weight, these approaches exhibited low selectivity or the need for many steps of fractionation. Electrofiltration, a process combining a pressure gradient and an electrical potential gradient as driving forces could be used but pressure gradient modules produce the accumulation of molecules on the filtration membrane surface and then modified the membrane transport selectivity

Electrodialysis with filtration membrane (EDFM), according to the membrane configuration used allowed the simultaneous separation of neutral and charged organic compounds from a solution or composition using anionic and cationic membranes in combination with UF membrane stacked in an electrofiltration cell EDUF separates molecules according to their charge (driving force = electric field) and molecular weight (membrane cut-off). Since no pressure is applied, EDUF minimizes the accumulation of molecules at the membrane surface. It can be used as a batch recirculation process and could overcome the low selectivity of membrane filtration process and be less expensive than chromatography.

Applications

- Peptides separation from different source
- Protein separation
- High-added value charged molecules
- Organic acid
- Oligosaccharides
- Polyphenols

Competitive advantages

- Clean process, no solvent is required.
- Simultaneous separation of acid, basic and neutral compounds.
- Lower cost than chromatography
- Purified or semi-purified extract
- No pressure process therefore less fouling problem at the membrane interface.
- Separation of multiple compounds in the same time or step

State of development

- Demonstration prototype is operating at Université Laval.
- Proof of concept on ACE-inhibitor peptide fraction from b-Ig hydrolysate
- Proof of concept on oligomers from chitosan
- Proof of concept on organic acids

Business opportunity

Université Laval is seeking partners to develop and commercialize this technology.

Intellectual property

Patent Pending
 US:10/591,238, EP:05714579.9, CA: 2,558,164
 Process and system for separation of organic charged compounds
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