

A NEW APPROACH FOR NATURAL ACTIVE PRINCIPLES CONCENTRATION - SUPPORTED LIQUID MEMBRANE EXTRACTION TECHNIQUE

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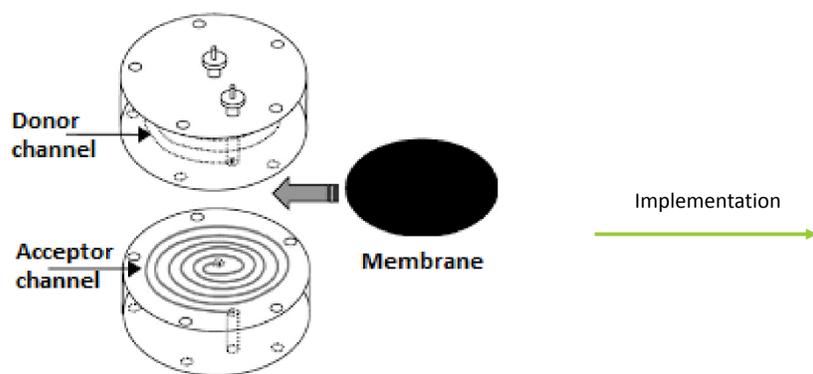
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Introduction

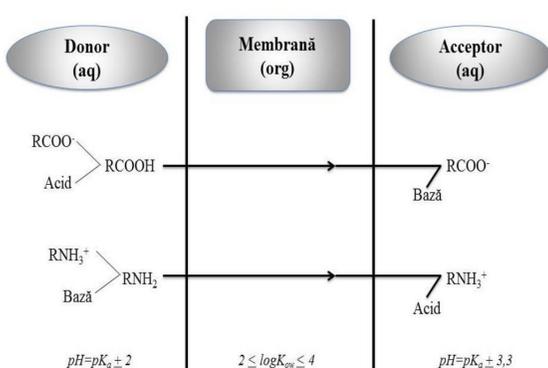
In the past years, as a consequence of the customers request for food with natural ingredients, the industrial-specialized companies are looking to replace the synthetic flavours with natural ones. Extracting natural active principles from the biomass can be done using techniques such as fractional distillation, steam distillation or supercritical fluid extraction. A high selectivity environmentally friendly extraction technique has been proposed, namely the Supported Liquid Membrane (SLM) extraction. The flavours proposed for extraction are pyrazines, which are a class of privileged compounds containing N-heterocyclic moieties, are important components of aroma fragrances, flavours in foods and widely used as agro-chemicals (aromas of many fruits, vegetables and wines). We are proposing to extract and to enrich the pyrazine mixtures from the raw material named fusel oil as by-products of wastes from agriculture production (i.e from sugarcane and sugar beets, fruits, cereals, etc.).

Results and discussions

The principle of the SLM extraction used



- 3 phases system – an organic phase (membrane) between 2 aqueous phases – donor and acceptor
- The cellulose porous membrane is impregnated with a solvent mixture (dihexyl ether, divinyl ether, etc)
- The aqueous phases are circulating through spiraled channels contained in units made of inert materials (PTFE in this case)
- The donor phase contains the sample, the active principles diffuse through the membrane towards the acceptor phase

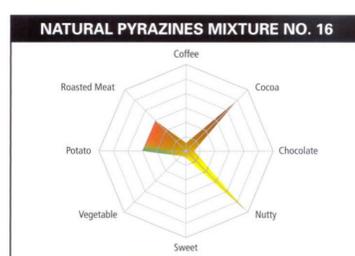


The SLM system used for the extraction and concentration of pyrazines



Extraction parameters:

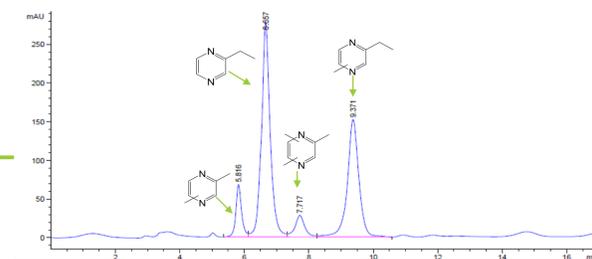
- PTFE units dimension: 15 cm diameter, 2 cm height
- Donor and acceptor channels volume: 1 mL
- Time of extraction: 5 – 24 h
- Donor phase flow rate: 0.1 – 0.5 mL/min



Dimethylpyrazine: 69.8 - 79%
Trimethylpyrazine: 3.6 - 5.1%
Ethylmethylpyrazine: 16.2 - 22.8%
Roasted nut, can be used in nut and cocoa flavours

* the flavour mixture presented above was purchased from Axxence Slovakia s.r.o

Sensory analysis



HPLC Agilent 1200 series chromatograph at 40 °C using H₂O/ACN 30/70 (vol.) mobile phase on a Zorbax SB-C18 column (250 x 4.6 mm) at flow rate of 0.6 mL·min⁻¹

Conclusions

- A new technology for extracting natural compounds have been proposed
- Pyrazines with flavouring properties have been extracted from fusel oil using the new SLM technology
- The method parameters have been optimized
- The extract concentrated in pyrazines has been analysed using a HPLC method
- The sensory analysis of the extract has showed that its flavour is similar with a commercially available pyrazine mixture

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