Emulsions stabilized by multi-layer interfaces

Identification

Key words multi-layer, emulsion, stability, charge, mass transfer, interface, shelf life
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How does it work?

Primary objective The method combines stabilization and structure formation processes with the aim of increasing the shelf life and improving product quality
Working principle Formation of multi-layer interfaces by self assembly or alternating adsorption of food grade poly-anions and poly-cations; physico-chemical interactions, i.e. formation of an electrical potential caused by changing charges.
Images
Additional effects • Improvement of emulsion stability with respect to coalescence and chemical reactions by maximum reduction of mass transfer (i.e. oxygen, metal ions, …)
• Incorporation of substances with unpleasant taste so that this is no longer perceived
• Control of bio-availability of incorporated substances
Important process parameters pH-value, temperature, separation conditions
Important product parameters charge, charge density, solubility, viscosity of continuous phase

What can it be used for?

Products oil-in-water emulsions (o/w)
Operations Emulsification – encapsulation of sensitive food ingredients (vitamins, probiotics, secondary plant products)
Solutions for short comings The method answers potential industrial needs like “production of emulsion systems with extremely reduced mass transfer between dispersed phase and ambience”

What can it NOT be used for?

Products Organic food products containing no additives (E-numbers)
Operations Conventional coating / encapsulation
Other limitations Substances for formation of multi-layer interfaces have to be food grade
Risks or hazards Not known
Implementation

Maturity
Multi-layer formation is state of the art in lab-scale. For scaling up to industrial scale innovative techniques have to be developed. Lab-scale procedures can not meet the requirements of industrial production.

Modularity/Implementation
Multi-layer technique should be inserted into existing production lines, but special process steps including technical realization have to be developed.

Consumer aspects
Food grade materials will have no problems with respect to consumer acceptance. Use of additives (E-numbers) may be more critical

Legal aspects
Used substances have to be permitted

Environmental aspects
No information, no problems expected

Facilities that might be interesting for you

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<th>Title</th>
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<tr>
<td>Auditorium IRTA</td>
<td>IRTA</td>
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<td>Clean room – Histocell</td>
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<td>Video observation system for market research and product development tasks - Keki</td>
<td>NAIK EKI</td>
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Further Information

Institutes
- Max Planck Institute of Colloids and Interfaces, IUT Dijon, University of Massachusetts Amherst, Iowa State University, DIL

Companies
- Nichirei Corporation, Mitsui Chemicals Inc., CENTIV

References
Source: