

Continuous low-energy process for production

KEYWORDS

- ☐ LIPOSOMES
- ☐ PROCESS INTENSIFICATION
- ☐ SPINNING DISK REACTOR
- ☐ DRUG DELIVERY
- ☐ DRUG PROTECTION

AREA

- ☐ NANOTECHNOLOGIES & MATERIALS

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Patent Type

Patent for invention

Ownership

Sapienza University of Rome 60%, The First Hospital of China Medical University 40%

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Industrial & Commercial Reference

Industrial sectors of environment, cosmetics, pharmaceutical, nutraceutical, biomedical, catalysis, food.

Time to Market

Methodology and experimental work accomplished, consolidated technology – TRL 5.

Availability

Licensing, Research, Development, Experimentation, Collaboration and Start-up.



Fig. 1 Sample containing liposomes.

Abstract

The present invention refers to an industrial production process by means of a SDR (Spinning Disk Reactor) equipment that allow to produce by chemical synthesis unilamellar liposomes SUV, LUV and GUV with controlled size, characterized by low energy requirements and without the need for further post-treatment processes.

The size of the unilamellar liposomes appears to be most important for possible applications, such as in the dermatological field.



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Technical Description

In a preferred form of implementation, the procedure includes the following steps:

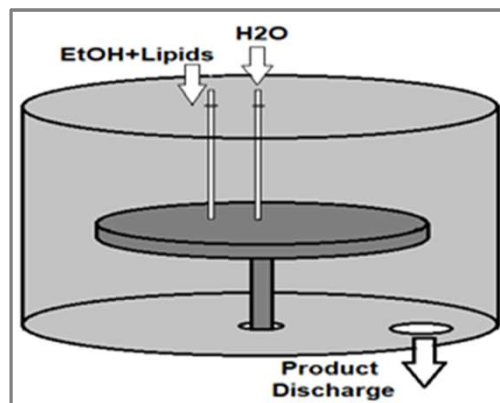
- preparation of a first aqueous solution A and a second solution B containing lipids dissolved in an organic solvent;
- ignition of the SDR with rotation of the rotating disc;
- injection of reagent A to the center of the disc for the generation of a liquid film on the rotating disc
- injection of solution B on the surface of the disc, injected at a radial distance from the centre of the disc surface, in particular between 1 cm and 10 cm, preferably between 2 cm and 4 cm;
- maintenance in rotation of the disc to determine the mixing of the reacting solutions in the liquid film and a continuous production of a synthetic product of unilamellar liposomes SUV, LUV and GUV;
- collection of the reaction product.

It is also the subject of the present invention a process of production of unilamellar liposomes SUV, LUV and GUV characterized by a high size control.

Technologies & Advantages

Industrial production process of unilamellar liposomes SUV, LUV and GUV with controlled size, including a chemical synthesis implemented by means of a spinning disk reactor SDR (Spinning Disk Reactor) to obtain unilamellar liposomes SUV, LUV and GUV at controlled size; the production process characterized by implementation without the need of post processing, by a continuous production process and by low energy production requirements if compared to other production methods in use.

Fig. 2 Spinning Disk Reactor schematic.



Applications

The unilamellar liposomes SUV, LUV and GUV with controlled size are compatible with their use in dermatology, cosmetics, biomedical, therapeutic, nutraceutical fields. They are carriers for other substances contained, such as antibiotics, proteins, DNA, vitamins, anticancer, stabilizers and antioxidants. By way of example, they can be used for the topical administration of dermatological active agents and to improve the stability of formulations that contain easily degradable substances, including, for example, antibiotics, proteins, DNA, vitamins, anticancer, stabilizers and antioxidants.

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