Patent Background

**Japanese Patent (US 20030143267 A1)**

<http://www.freepatentsonline.com/y2003/0143267.html>

Abstract:

The present invention provides a sugar-modified liposome having a sugar chain bonded to its membrane surface, preferably through a linker protein, and having excellent absorption qualities, particularly in the intestine. The molecular structure and quantity of the sugar chain is selectively varied to allow the liposome to be delivered in a targeted manner to selected cells and tissues. The liposome is applicable to medicinal drugs, cosmetics and other various products in the medical/pharmaceutical fields, and it is especially useful in a therapeutic drug delivery system that recognizes target cells and tissues, such as cancer cells, and in the delivery of drugs or genes locally to a selected region, or in a diagnostic cell/tissue sensing probe.

THERE IS REFERENCE ON HOW TO MODIFY AND UTILIZE THE LIPOSOME FOR DRUG DELIVERY. THERE IS NO REFERENCE AS TO HOW TO CREATE (MANUFACTURE) THE LIPOSOME

**Potential Competition**

[**http://sonomechanics.com/applications/pharmaceutical/drug-carrier\_liposomes\_and\_nanoemulsions/**](http://sonomechanics.com/applications/pharmaceutical/drug-carrier_liposomes_and_nanoemulsions/)

[**https://www.hielscher.com/ultrasonic-liposome-preparation.htm**](https://www.hielscher.com/ultrasonic-liposome-preparation.htm)

WAIT FOR RUSSIAN RESPONSE!

INTERNET SEARCH

**[4:22:52 PM] Richard Illi: You know this outfit? https://www.hielscher.com/ultrasonic-liposome-preparation.htm**

**[5:30:24 PM] Miodrag Prokic: Yes, this is old, classical or traditional fixed frequency sonicator that is also known to Innomedica. They tested it and it was not working efficiently and fast. In fact, after they contached Hielscher, and made some joint work, I think that Hielscher used a chance to create publicity material and make profit of it.**

**[5:32:45 PM] Miodrag Prokic: Anyway, here we see that Hielscher well described the application and its background, and this is instructive for us to use the same terminology and to direct our patent into desired direction.**

**[5:33:49 PM] Miodrag Prokic: Anyway, I do not know how far Hielscher advanced in the meantime and if Innomedica could use this situation as some negotiating argument...**

**[5:34:53 PM] Miodrag Prokic: I only see by the design (on the picture), that such ultrasonic system is not creating vortices and shear waves, and that this will be long and inneficient process, as Florian from Innomedica explained to me.**

**[5:36:05 PM] Miodrag Prokic: Innomedica tested all of such and similar equipment from different suppliers and it is know that they get some results, after long time of processing (several hours), but they told me that they have not been satisfied...**

**[5:38:26 PM] Miodrag Prokic: Innomedica found the company Sonomechanics: http://sonomechanics.com/ and they had much better results compared to using Hielscher sonicator, but also after many hours of processing, and with metal particles contamination, and with critical damage of the generator and sonotrode.**

**[5:39:19 PM] Miodrag Prokic: Presently Innomedica has only Sonomechanics sonicator... but this is far from what they need... still producing results good for making publicity and laboratory research.**

**[5:45:06 PM] Miodrag Prokic: See here: http://sonomechanics.com/applications/pharmaceutical/drug-carrier\_liposomes\_and\_nanoemulsions/**

**[5:45:28 PM] Miodrag Prokic: This is the same application and similar equipment like Hielscher, but stronger.**

**[5:45:52 PM] Miodrag Prokic: Anyway, technology description could help us to use proper terminology.**

**[5:46:13 PM] Miodrag Prokic: Innomedica is not satisfied with sonomechanics sonicator.**

**[5:48:52 PM] Miodrag Prokic: High intensity, continuous and constant or fixed frequency sonicators (what belong to old technology), are not at all efficient and good for producing modified liposomes, but good enough for laboratory research and for creating scientific papers.**

**[5:49:52 PM] Miodrag Prokic: Florian from Innomedica told me that they are not at all satisfied with such high intensity ultrasonic processing. No vortices, no shear waves...**

**[5:50:03 PM] Miodrag Prokic: Only brutal ultrasonic streaming.**

**[5:50:50 PM] Miodrag Prokic: We should probably mention the diffrence between our MMM-Sonicator and Hielscher and Sonomechanics ones.**

**[5:53:25 PM] Miodrag Prokic: Japanese professor also used similar equipment for his research and he found a way to introduce chemotherapy liquid into liposomes...**

**[5:54:36 PM] Miodrag Prokic: Nobody can make stable and mass production based on such fixed frequency equipment, but still this is kind of marketing and publicity material on Internet that could confuse clients...**

**Patent Draft**

**Abstract**

Particles and droplets within the micrometer scale are present in many industrial products and processes. It is often the case that they need to be separated in order to be further utilized for product formulations (e.g. starch particles of specific size or oil from enhanced recovery emulsions) or that they have to be discarded as waste (such as cleaning liquids that contain small oil droplets or other particulates). In large scale operation, attention is still primarily directed toward the overall throughput (and efficiency) of a system, and dimensions of production lines / equipment are generally many orders of magnitude different from that of the particles or droplets. Whereas the overall flow behaviour in large-scale operation is well understood, that of particles/droplets on micro/nano-meter scale is just coming of age, with many new developments in microfluidics and membrane separation adding to the knowledge base.

**Claims:**

What is claimed is:

1. The present invention provides for a new innovative method for the extremely fast and efficient production of micro and/or nano sized beads, particles or hollow sphere.
2. The production method, as defined in claim 1, can be run in both batch and continuous modes.
3. Liposomes (formed from lipids in non-organic suspensions) are a good example of a “hollow sphere” produced by the method described in claim 1.
4. The novel production method described in claim 1. utilizes proprietary Ultrasonic Technology developed by the companies MP-Interconsulting and Ultrasonic World Limited.
5. The Ultrasonic Technology described in claim 4. consists of an ultrasonic generator based on proprietary Multi-frequency, Multimode, Modulated Sonic & Ultrasonic Vibrations” (also known as MMM) in combination with innovative mechanical resonator designs.
6. The innovative mechanical resonator designs, as referred to in claim 5, relate to a cylindrical or rectangular bar shaped ultrasonic resonator, or solid-state body that has (at the same time mutually coupled and synchronized) combined axial, radial and different lateral modes resonances, produced by specific geometry of the same resonant body with axial and perpendicular resonating holes and channels.

**Description:**

1. Field of Invention:

The present invention relates to a novel and highly efficient separation of micro/nano sized particles or droplets from a liquid emulsion via Ultrasonic Processing. Compared to all other methods, including other known state of art ultrasonics, the production time is many factors faster than standard processes such as extrusion, high-pressure homogenization / ultrasonication, and microfluidic chambers. This method of separation is in parallel capable of forming the said particles or droplets into micro or nano sized beads or hollow spheres.

1. Background of Invention
2. Summary of Invention
3. Brief Description of Drawings
4. Detailed Description of the Invention
5. Examples of application fields

- Human Drug Delivery

- Animal Drug Delivery

- Cosmetics (active ingredient encapsulation)

- Food Industry (vitamin and trace elements encapsulation)

- Agricultural Herbicides / pesticides (encapsulation)

- Industrial wastes (trace oils and contaminant separation)