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Nanoparticles Production from Microfluidics and Membrane Devices

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The control at micro- and nano-levels of particles for unique final products has been a subject of intense research for major part of past decades. The use of conventional methods to achieve the level of control became inadequate and novel techniques were discovered to further enhance the production of microparticles, and latterly, nanoparticles. The synthesis of nanoparticles moved to the forefront of researches in different industries such as food, pharmaceutical, cosmetics and lots more, to develop products such as the controlled-drug delivery in nanomedicine [1–3].

The importance of particle size in nanoparticles, in pharmaceutical industry has encouraged the variation and modification of techniques, to obtain products such as in the encapsulation of active ingredients, in a safe, controlled-release of poor water-soluble drugs[4] [5] during production of the nanoparticles in microfluidic devices. Other challenges such uniformly-sized droplets and products on a micro- and nano-scale also led to novel methods being developed for production of these products. Nanoparticles offer improved performance of active ingredients, as well as stability, controlled-delivery, increased comfort and reduction in overall drug content in other industries such as food, cosmetics and other nanotechnology applications.

Drugs such as Hydrocortisone and Rapamycin poses as the exact amount of the active ingredient to be delivered most need of these drugs in the body [6]. Novel techniques were developed with existing models to these drugs using the fabricated microfluidic devices [7]. Niosomes were produced to encapsulate these drug nanosuspensions, and various parameters were studied to in these nanoparticles.

Figure 1 Production of nanosuspension in the microfluidic captured by the high speed camera.

The release rates of the drugs, encapsulation efficiency, nanoparticles diameter and stability were among the observed.

Keywords: nanoparticles, microfluidics, liposomes, niosomes, encapsulation.

REFERENCES


