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A novel method for preparation of Solid Lipid Nanoparticles intended for drug delivery

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Background and Aims: Nanoparticles based on solid lipids are among the most promising nanostructures exploited extensively in recent years for their drug delivery potential. The possibility of fabrication of small nanosized carriers with high capacity for being loaded by lipophilic drugs as well as the potential for overcoming biological barriers and, finally, the easy while robust preparation methods are among the profound advantages.
Methods: Stearic acid (lipid) was dissolved in ethanol as an organic solvent. The surfactant was also dissolved in ethanol in the certain concentration, too. Parameters such as addition time, volume ratio, stearic acid and surfactant concentration, temperature, and mixing rate were optimized to obtain the smallest and narrowly distributed particles.
Results: The optimum condition for solid lipid nanoparticles preparation was as follows: stearic acid concentration (2% (w/v)), surfactant concentration (1%(w/v)), volume ratio(0.1), Temperature (60ºC) , addition time of stearic acid solution to aqueous solution (12 min) and mixing rate (1000rpm).
By this method we could obtain nanoparticles with the size of about 220 nm and PDI of about 0.25.
Conclusion: By investigation of some effective factors, an optimized set of method variables were determined and validated for the new SLN preparation method.

Keywords: SLN (solid lipid nanoparticles); Stearic acid; Nanoparticles