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Synthesis of PEGylated Fatty Acids as Solid Lipid Nanoparticle (SLN) Carrier for Targeted Lipospheres

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Abstract

Objective(s)
Several anticancer agents have been encapsulated in lipid nanoparticles, and their *in vitro* and *in vivo* efficacy has been evaluated by suitable studies. It is possible to pegylate fatty acids which are present in the lipid phase of parenteral fat emulsions (e.g., C14-C18) to fabricate SLN with high biocompatibility.
Material and Methods
In this project we synthesized pegylated fatty acids (stearic and palmitic) as possible carriers for anticancer drugs. PEGs (500 to 1500) (0.15 mole) and boric acid (0.049 mole) were heated in a flask in an oil bath at 110 °C for 2 hr at 5 mm Hg. After cooling the borate to room temperature, palmitic or stearic acid (0.14 mole) and PTS (1% on the weight of the reactants) were added and again heated as above for 3 hr. The borate ester was selectively hydrolyzed by heating with water (10 ml) on a steam bath. To remove free PEG, the product and saturated brine solution (150 ml) were shaken while being kept in an oven (95 °C) for 30 min. The treatment was repeated three times.
Results
The analytical characteristics of various purified PEG monoesters were reported. The products acid and saponification values were found to be 4.6 and 29.4 for palmitic acid and 3.2 and 28.3 for stearic acid. The yields were 61 and 68%.
Conclusion
These pruducts, being low foamers and good emulsifiers, may be used as carrier for targeted lipospheres for anticancer drugs.

Keywords: Fatty acids, Pegylated, Solid lipid nanoparticle

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