

## Nanomicelle carriers for delivery of alfa-tocopherol: formulation and characterization

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**Background and Aims:** Intravenous administration of lipid soluble antioxidants such as vit E ( $\alpha$ -tocopherol) for effective treatment of stroke is an important challenge in neurology-related science topics. In this study the nanomicellar vit E which could be administered through i.v. route, was formulated and characterized.

**Methods:** Water soluble chitosan was grafted to stearic acid (SA) chains via 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide mediated coupling reaction. The chemical structure of depolymerized chitosan (DC)-SA copolymers and degree of amino substitution was determined by <sup>1</sup>H NMR. Vit E was dissolved in organic solvent and was added dropwise to DC-SA solutions under magnetic stirring. Dynamic light scattering and fluorescence spectroscopy methods were used for physicochemical properties evaluation and study on the formation of polymeric micelles. Cytotoxicity of the formulations against PC12 cell line was evaluated by MTT assay.

**Results:**  $\alpha$ -tocopherol nanomicelles had Z-average diameter less than 250 nm with high encapsulation efficiency. Nanomicelles possessed positive charges and IC<sub>50</sub> of vit E nanomicelles showed low toxicity in comparison to free drug. Transmission electron microscopy (TEM) revealed the spherical shape of prepared nanomicelles.

**Conclusions:** DC-SA micellar formulations could be a suitable choice for blood brain barrier transport of vit E after i.v. administration.

**Keywords:** Nanomicelle; Chitosan; Vitamin E