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## **Fabrication of aqueous nanodispersion from natural DNA and chitosan as eminent carriers for water-insoluble bioactives**

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### **Abstract**

For high-valued application of natural DNA as raw materials, we prepared nanocarriers by using salmon sperm DNA and chitosan to encapsulate water-insoluble bioactives. Here, water dispersible astaxanthin/DNA/chitosan nano-aggregates (ADC-NAs) were prepared by co-assemble evaporation method. The key point for preparing well formed ADC-NAs was specifically discussed. The resultant ADC-NAs were spherical with 100-300 nm diameter measured by dynamic light scattering (DLS) and transmission electron microscopy (TEM), and their homogeneous dispersions were sufficiently stable at room temperature. One important feature of these nanocarriers is enormously high loading amount of cargo (about 40 wt.-%). According to the UV-vis spectra of the nanosuspension, we deduced that astaxanthin is encapsulated as uniquely structured J-aggregates. Fourier transform infra-red (FTIR) spectroscopy proved fabrication was successfully and astaxanthin was embedding in DNA/chitosan nanocarriers. Cytotoxicity was examined in vitro using cell culture in L929 cell lines. When necessary, these nano-aggregates can be degraded by DNase I. Homogeneous dispersions of other non-charged guest molecules are also prepared by using DNA/chitosan nanocarriers. These dispersions are cheaply and easily obtainable from naturally occurring DNA and chitosan, and should be useful for versatile applications.

**Key words:** DNA, chitosan, polyion complex, nanoparticles, water dispersion, astaxanthin

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