

Sustained Release Aquosome for Fibrinolytic Protein Therapy

Technology Domain: Pharmaceutical

Patent Application Number: 202341088358

Status (Patent/TRL): Patent Pending / TRL 4

Technology Summary:

This invention introduces a novel aquosome formulation for sustained delivery of fibrinolytic proteins, like nattokinase, to treat thrombosis. The key technical solution involves a multi-component nanocarrier: ceramic nanoparticles (e.g., hydroxyapatite) form a core, coated with a carbohydrate layer (e.g., cellobiose), encapsulating the protein.

The key inventive feature is the precise component ratio (1:3:0.00004 core:carbohydrate:protein) and unique coating/encapsulation, ensuring a slow and continuous release over 48 hours post-injection. This sustained release prolongs the protein's circulation, enhancing clot interaction while minimizing excessive bleeding risks.

Results show optimal particle size (392.6 ± 1.9 nm), high stability (-44.0 mV zeta potential, 90-day stability at 4°C), and significant retained enzymatic activity ($20.79 \pm 0.62\%$). The use of this injectable aquosome offers a safer, more effective, and bioavailable treatment for thrombosis and cardiovascular conditions, bypassing oral limitations and reducing drug dosage.

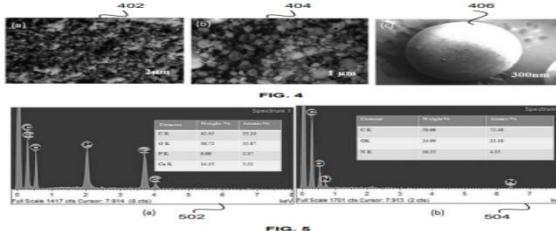


FIG. 4

(a) (b)

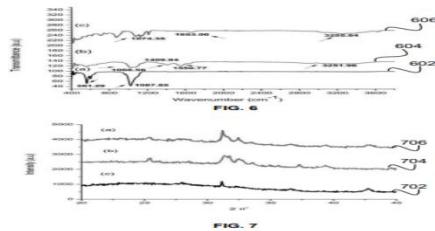


FIG. 6

FIG. 7



FIG. 8A

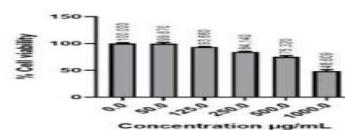


FIG. 8B



FIG. 9