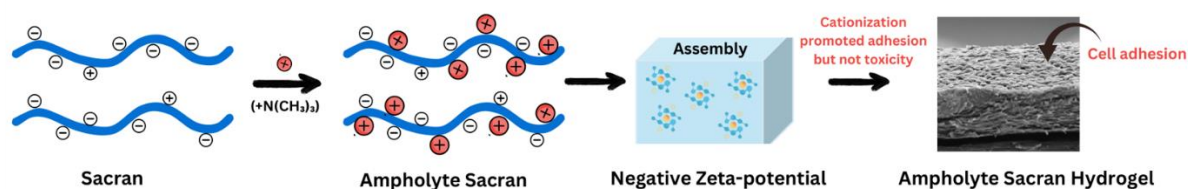


Abstract



Graphical abstract

Sacran is a cyanobacterial supergiant polysaccharide with carboxylate and sulfate groups and shows anti-allergic and anti-inflammatory properties, while too high anionic functions restrict cell compatibility. Here quaternary ammonium groups were substituted to form sacran ampholytes and cell-compatibility of the cationized sacran hydrogels was evaluated. The cationized process involved using N-(3-chloro-2-hydroxypropyl) trimethylammonium chloride reacting with the primary amine or hydroxyl group of sacran. The degree of cationization ranged from 32 % to 87 % for sugar residues. Hydrogels of sacran ampholyte were made by annealing their dried sheet by thermal cross-linking and exhibited anisotropic swelling properties. The water contact angle on the hydrogels decreased from 26.5° to 15.3° with an increase in cationization degree, enhancing the hydrophilicity. IC₅₀ values of sacran ampholytes were reduced with an increased cationization degree to decrease cytotoxicity towards the L929 mouse fibroblast cell line, which is associated with an increased cell proliferation density after 3 days of incubation. SEM images show fibroblast intercellular connections. Thus, sacran ampholyte hydrogel showed increased hydrophilicity and cell compatibility, which can lead to various biomedical applications.

Keywords: Ampholyte Hydrogels, Sulfated Polysaccharide, Sacran, Anisotropic Hydrogels