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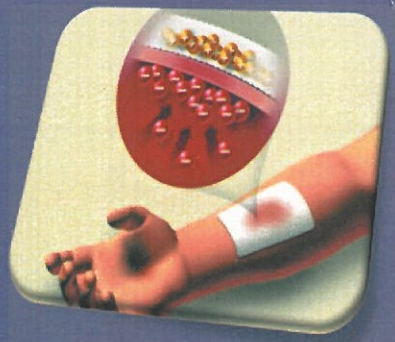
Chitosan Sponge



Chitin, chitosan and its derivatives possess a high degree of availability, biodegradability, and biocompatibility and therefore are widely applied in cosmetics, food and health supplements, agriculture, and the biotechnology and pharmaceutical industries.

Commercially, chitosan is prepared by purification and then N-deacetylation of chitin with an aqueous solution of sodium hydroxide. Chitin is one of the most abundant organic materials in nature and can be easily prepared from the shells of crab, shrimp, and squid pens. Products made from chitosan are variously useful, and are safe to human beings. Hence, many pharmaceutical applications have been focused on chitosan since its structure is cellulose-like, and the free amino groups on this polymeric chain contribute the reactive nature that permits modifications.

The applications of chitosan and its derivatives in the field of tissue engineering have been progressed and recognized. Mumbai Research centre of CIFT has developed a bioactive chitosan sponge, which can be used for pharmaceutical and food applications. The structural strength and flexibility of chitosan sponge has been enhanced by introducing cross links by chemical reactions.

Potential applications of chitosan sponge

Tissue engineering

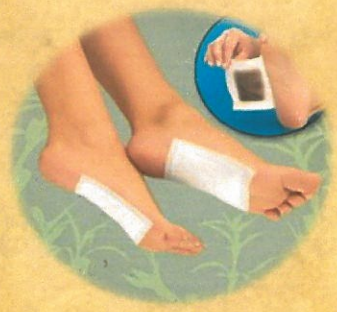
Chitosan sponge can be used as tissue engineering scaffolds for bone formation and the development of artificial skin equivalents.

Haemostatic material

Nowadays chitosan sponge has been used in many surgeries, such as femoral arterial or radial arterial hemostasis after cardiac catheterization. The amino group (-NH3+) on chitosan structure is positively charged, which accelerates aggregation of negatively charged platelets, thus facilitates blood coagulation. These sponges can transform to gel after absorption to provide fast and efficient bleeding control.

Active localised drug delivery systems

Open orthopaedic fractures are ideal sites for infection. Preventing infection in these fracture sites is critical for reducing patient morbidity and mortality, controlling antimicrobial resistance and lowering the cost of treatment. Chitosan sponges may provide a potential local drug delivery device for selected antibiotics at the point of care and there-by prevents musculoskeletal infections.



Wound dressing

Chitosan possess tissue cell growth functions, by acting as a favorable scaffold for cell attachment and proliferation. This promotes rapid dermal regeneration at the wound site. Sponges based on chitosan are in demand because of their low toxicity, favourable mechanical properties, and capacity for bioresorption of constituent materials.

Active packaging of food products

The chitosan pad can be used as an antibacterial, drip absorbent and off flavour scavenging pad, especially in chilled muscle food packs.