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Alginate and alginate composites for biomedical applications
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Abstract
Alginate is an edible heteropolysaccharide that abundantly available in the brown seaweed and the capsule of bacteria such as Azotobacter sp. and Pseudomonas sp. Owing to alginate gel forming capability, it is widely used in food, textile and paper industries; and to a lesser extent in biomedical applications as biomaterial to promote wound healing and tissue regeneration. This is evident from the rising use of alginate-based dressing for heavily exuding wound and their mass availability in the market nowadays. However, alginate also has limitation. When in contact with physiological environment, alginate could gelate into softer structure, consequently limits its potential in the soft tissue regeneration and becomes inappropriate for the usage related to load bearing body parts. To cater this problem, wide range of materials have been added to alginate structure, producing sturdy composite materials. For instance, the incorporation of adhesive peptide and natural polymer or synthetic polymer to alginate moieties creates an improved composite material, which not only possesses better mechanical properties compared to native alginate, but also grants additional healing capability and promote better tissue regeneration. In addition, drug release kinetic and cell viability can be further improved when alginate composite is used as encapsulating agent. In this review, preparation of alginate and alginate composite in various forms (fibre, bead, hydrogel, and 3D-printed matrices) used for biomedical application is described first, followed by the discussion of latest trend related to alginate composite utilization in wound dressing, drug delivery, and tissue engineering applications. © 2021

Author Keywords
Alginate; Alginate composite; Drug delivery; Tissue engineering; Wound dressing

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