

Seaweeds as renewable sources for biopolymers and its composites: a review

ABSTRACT

Background: The rising environmental awareness has driven efforts for the development of renewable materials for various end-use applications. The trend of using biopolymer in combination with organic or non-organic filler has increased rapidly in recent years. Seaweed is a versatile organism that produces various kinds of polysaccharides i.e. agar, carrageenan and alginate that are extensively used in the development of biopolymer. Biopolymers derived from seaweed polysaccharides possess promising features as they are renewable, biodegradable, biocompatible, and environment-friendly. The aims of this paper are to review research related to the seaweed and its biopolymers for various applications. **Methods:** Research articles related to the seaweed and its biopolymers are reviewed. The summary of seaweed composites and seaweed biopolymers modification are provided. **Results:** Seaweed has been used for various applications ranging from food, thickening agent, natural medicine, biofuel, biosorbent material, etc. Seaweed was also used as reinforcement to improve the mechanical properties of polymer composites. Various modifications have been done on seaweed biopolymer to improve the properties of the materials such as blending with other polymers, the addition of compatibilizer, and reinforcement with other materials. The potential of seaweed polymers i.e. agar, carrageenan, and alginate in various applications such as packaging and pharmaceutical show promising characteristics for applications. **Conclusion:** Seaweed is a highly potential source for renewable biopolymers. These biopolymers have shown great characteristics for various applications due to their unique film-forming ability and excellent mechanical properties. These properties can be further improved following various modification techniques i.e. reinforcement and blending. The potential of seaweed as filler in polymer composites provides evidence to improve the thermal, physical, and mechanical properties of the synthetic polymer matrix. It can be concluded that seaweed is a highly potential renewable resource for the development of biocompatible and environmentally friendly materials.

Keyword: Seaweed; Agar; Carrageenan; Alginate; Biopolymer; Biocomposite