

Bovidae-based gelatin: Extractions method, physicochemical and functional properties, applications, and future trends

ABSTRACT

Gelatin is one of the most important multifunctional biopolymers and is widely used as an essential ingredient in food, pharmaceutical, and cosmetics. Porcine gelatin is regarded as the leading source of gelatin globally then followed by bovine gelatin. Porcine sources are favored over other sources since they are less expensive. However, porcine gelatin is religiously prohibited to be consumed by Muslims and the Jewish community. It is predicted that the global demand for gelatin will increase significantly in the future. Therefore, a sustainable source of gelatin with efficient production and free of disease transmission must be developed. The highest quality of Bovidae-based gelatin (BG) was acquired through alkaline pretreatment, which displayed excellent physicochemical and rheological properties. The utilization of mammalian- and plant-based enzyme significantly increased the gelatin yield. The emulsifying and foaming properties of BG also showed good stability when incorporated into food and pharmaceutical products. Manipulation of extraction conditions has enabled the development of custom-made gelatin with desired properties. This review highlighted the various modifications of extraction and processing methods to improve the physicochemical and functional properties of Bovidae-based gelatin. An in-depth analysis of the crucial stage of collagen breakdown is also discussed, which involved acid, alkaline, and enzyme pretreatment, respectively. In addition, the unique characteristics and primary qualities of BG including protein content, amphoteric property, gel strength, emulsifying and viscosity properties, and foaming ability were presented. Finally, the applications and prospects of BG as the preferred gelatin source globally were outlined.