Poultry gelatin: Characteristics, developments, challenges, and future outlooks as a sustainable alternative for mammalian gelatin

ABSTRACT

Background: Studies indicate a 30% increase in demand for all types of food and non-food grade gelatins in the world. The largest volume of gelatin production comes from mammal sources (cows and pigs). Nowadays, health, cultural, and religious concerns have arisen due to consumption of mammalian gelatin. This has prompted scientists to look for non-mammal sources that closely resembles the desirable physicochemical, functional, and sensory characteristics of mammalian gelatins. Non-mammalian gelatin from poultry and fish by-products are also gaining importance in food industry. Over the past decade, poultry production has increased by about 37.34%. Poultry by-products have good potential for replacing mammalian sources for gelatin extraction. Scope and approach: This paper reviews in detail the fundamental properties of poultry gelatins (PG), including rheological, functional and physicochemical properties. This study provides a perspective on their potential food, pharmaceutical, medical and industrial applications. Key findings and conclusions: The highest quality PG was extracted through acid treatments. PG extracted in this way exhibited favorable rheological, fat replacement, film formation, foaming, emulsifying and sensory properties, and nutritional quality. PG films showed better barrier properties than mammal-origin gelatin, making them ideal for food and medical applications. The amino acids composition of PG, especially the imino acid and hydrophobic amino acids, which determine the physicochemical and functional properties of gelatin, are higher than gelatin obtained from mammals and fish that classifies them in the upper Bloom category.