Gelatin controversies in food, pharmaceuticals, and personal care products: Authentication methods, current status, and future challenges

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ABSTRACT

Gelatin is a highly purified animal protein of pig, cow, and fish origins and is extensively used in food, pharmaceuticals, and personal care products. However, the acceptability of gelatin products greatly depends on the animal sources of the gelatin. Porcine and bovine gelatins have attractive features but limited acceptance because of religious prohibitions and potential zoonotic threats, whereas fish gelatin is welcomed...
in all religions and cultures. Thus, source authentication is a must for gelatin products but it is greatly challenging due to the breakdown of both protein and DNA biomarkers in processed gelatins. Therefore, several methods have been proposed for gelatin identification, but a comprehensive and systematic document that includes all of the techniques does not exist. This up-to-date review addresses this research gap and presents, in an accessible format, the major gelatin source authentication techniques, which are primarily nucleic acid and protein based. Instead of presenting these methods in paragraph form which needs much attention in reading, the major methods are schematically depicted, and their comparative features are tabulated. Future technologies are forecasted, and challenges are outlined. Overall, this review paper has the merit to serve as a reference guide for the production and application of gelatin in academia and industry and will act as a platform for the development of improved methods for gelatin authentication.

KEYWORDS: Gelatin source authentication, protein- and nucleic acid-based techniques, biomarkers, multiplex platforms, pharmaceutical and personal care products
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