

Chitosan for food packaging applications: a patent landscape analysis

Chitosan is a biopolymer synthesized by deacetylation of chitin, a polysaccharide that can be obtained from various renewable resources, mainly waste from marine food production.

Its excellent properties, including antimicrobial activity, non-toxicity, biocompatibility, and biodegradability, have made chitosan a successful material in food packaging technology.

The objective of this study is to provide a patent landscape of the use of chitosan in food packaging applications.

The reference database used was Espacenet(), a free patent database provided by the European Patent Office (EPO).

The final patent results were obtained using both classification symbols [IPC (International Patent Classification) and CPC (Cooperative Patent Classification)] and keywords in the full text, title, abstract, and claims search fields.

A total of 2737 patent documents were obtained.

After filtering the data by the earliest priority date (2003-2023), 2556 results were retrieved.

China had the highest number of patents with 2154, followed by the USA with 261 and Europe with 173.

The International Patent System (PCT) is frequently used by applicants and ranks second with 288 patent applications.

A total of 2316 patents/patent applications were filed between 2012 and 2022.

Upon analysis of the data, it was observed that many of the applications were based on chitosan blends. The most commonly claimed biopolymer blends were starch and cellulose, while the most commonly claimed synthetic polymer blends were PLA and PVA.

The data analysis indicates that the following materials are used: polyhydroxy alcohols, nanostructured additives, quaternary ammonium chitosan, TiO₂ and oxides/hydroxides of zinc as compounding ingredients, heterocyclic compounds with a six-membered ring containing one oxygen atom in the ring, and phenolic acids, mainly gallic, ferulic, and salicylic acid.