

ABSTRACT

Natural polymers are gaining importance in the pharmaceutical excipient field because of their biocompatibility, biodegradability, and availability from renewable sources. They include cellulose derivatives; starch; chitosan; alginate; and gums, which serve as critical components in drug formulation and delivery. Natural polymers serve as binders, disintegrants, controlled-release agents, film formers, and stabilizers, improving both the physical and chemical properties of the pharmaceutical products. Some unique properties of these materials such as mucoadhesion, gel formation, and bioactivity contribute to increased drug bioavailability and therapeutic efficacy. Natural polymers also provide safety values with fewer side effects compared to their synthetic counterparts. Advancements in extraction, modification, and characterization techniques have widened the scope of utility of these polymers in novel drug delivery systems-such as hydrogels, nanoparticles, and transdermal patches. Current research is mainly directed toward addressing the challenges of variability, stability, and scalability to tap the full potential of natural polymers in pharmaceutical formulations.