

REVIEW ARTICLE

EXPLORING MULTIFACETED ROLE OF LIGNIN AS A NATURAL EXCIPIENT IN PHARMACEUTICALS AND COSMETICS

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ABSTRACT

Lignin a biopolymer originating from lignocellulosic biomass has drawn interest in pharmaceuticals and biomedicine because of its biocompatibility, low toxicity, biodegradability, antioxidant, UV-protective and antimicrobial characteristics. It acts as a sustainable substitute for synthetic materials, with uses in drug delivery, tissue engineering, wound care and medical devices. Its chemical structure facilitates pH-responsive drug release and targeted delivery, which is essential for effective administration. The combination of lignin with excipients such as microcrystalline cellulose has shown promise in tablet formulations, providing controlled drug release and adhering to pharmacopeial standards. Innovations like Aquasolv lignin improve dissolution rates and therapeutic effectiveness, further highlighting its multi-functional capacity. Though challenges such as optimizing extraction and ensuring performance consistency persist, lignin's distinctive properties position it as a crucial material for eco-friendly, cost-effective pharmaceutical and biomedical solutions, leading to sustainable progress in these sectors.