

Springer Series on Polymer and Composite Materials

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# Functional Biopolymers

 Springer

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## Chapter 2

# Functionalization of Tamarind Gum for Drug Delivery

Amit Kumar Nayak and Dilipkumar Pal

**Abstract** Tamarind gum is a plant polysaccharide extracted from seed endosperm of the plant, *Tamarindus indica* Linn. (Family: Fabaceae). It is a neutral, nonionic, and branched polysaccharide having water solubility, hydrophilic, gel-forming, and mucoadhesive properties. In addition, tamarind gum is biodegradable, biocompatible, noncarcinogenic, and nonirritant. Tamarind gum is employed as a potential biopolymer in the fields of pharmaceutical, cosmetic, and food applications. In the recent years, it is widely tested and employed in various drug delivery applications as effective pharmaceutical excipients. Tamarind gum is being exploited in the formulation of oral, colon, ocular, buccal, and nasal drug delivery systems. Though tamarind gum is extensively used in various drug delivery formulations, it has some potential drawbacks such as unpleasant odor, dull color, poor solubility in water, tendency of fast degradability in aqueous environment. To overcome these restrictions, tamarind gum has been functionally derivatized through chemical treatment with a variety of functional groups such as carboxymethyl, acetal, hydroxyl alkyl, thiol, polymer grafting, etc. Recently, various functionally derivatized tamarind gums hold a great promise as potential pharmaceutical excipients in different kinds of improved drug delivery systems mainly because of its improved stability (lower degradability). These functionally derivatized tamarind gums hold enhanced mechanical behavior as well as competence in prolonged period-controlling drug releases. The present chapter contends with a broad review of different kinds of functionalizations of tamarind gum for their use in the development of various improved drug delivery systems. The first part includes sources, compositions, properties and uses of tamarind gum. Then, the latter part contains a comprehensive review of different functionalizations of tamarind gum in drug delivery.

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