

Design and Synthesis of Natural Polymer Derived From Wheat Starch

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ABSTRACT

This reaction, first part of the synthesis starch octenyl succinic anhydride were synthesised by addition of 2-octenyl succinic anhydride aqueous solution to suspension modified wheat starch. After this part a certain amount of aluminum sulfate was added to starch octenyl succinic anhydride slurry. The results of SEM and FT-IR,²⁷AL-NMR, HNMR confirmed the formation of ester group and the cross-link with AL³⁺. Aluminum octenyl succinic anhydride (ASO) with starch. ASO is a unique, hydrophobically modified natural polymer, used in cosmetics and food industry.

Keywords: Starch, Aluminum Starch Octenyl Succinate, 2-Octenyl Succinic Anhydride

1. INTRODUCTION

Starch, is the major food reserve material of plants and the main nutritional source for human begins (1). starch is cheap and ubiquitous. It can be isolated from different plants, such as cereal grains (corn, rice and wheat), tubers and roots (potato, tapioca and arrowroot), fruits (green banana), stem-pitch (sago palm) and other seeds (beans, peas, lentils) (2).

Starch is a macromolecular complex of two polymeric components, amylose molecule is essentially a linear polymer with primary α -1, 4 linkage molecule contains 4-5% α -1, 6 linked branch points (3). amylose and amylopectin are packed in a starch granule. (4) Modified starch, Four types of modifications can be used to modify starch. They are chemical reactions, enzymatic modifications, physical modifications and combinations of the above methods. The modified starch derivatives are the products of either glucosidic bond cleavage or formatting new functional groups, or substitution of free available hydroxyl groups, or bridging of molecular chains by cross-linking reagent. (5) Chemical modification include crosslinking, substitution or conversion. In most cases, starch is reacted with a small amount of chemical reagents. Physical modifications apply heat, shear stress and moisture to change properties of native starch. (6)

Various physical or chemical the flowability and hydrophobicity of starch granules. Starches are, generally, chemical modified by treatment with reagents, such as anhydride (7), and organic acid (8), which introduces a substituent via reaction with the hydroxyl in the starch molecules. (9) Octenyl succinate (OS), starches are widely used as emulsifiers in food, pharmaceutical, and cosmetic industry. OS-starch is usually prepared by an alkaline catalyzed reaction of alkenyl succinic anhydride with granular starch in an aqueous suspension. The most attractive characteristic of OS-starch is its emulsification property, resulting from the addition of bi-functional groups that are both hydrophilic and hydrophobic. (10) Aluminum starch octenyl succinate (ASO), aluminum salt of the reaction