

MODIFICATION OF CORN STARCH VIA SUCCINYLATION AND ACETYLATION

Muhammad Nasif¹, Ayodeji Amobonye¹, Joana Bendoraitiene¹, Laura Peciulyte¹, Remo Merijs Meri², Shu-Kai Yeh³, Ramune Rutkaite¹

¹Department of Polymer Chemistry and Technology, Kaunas University of Technology, Lithuania

²Institute of Chemistry and Chemical Technology, Riga Technical University, Latvia

³Department of Materials Science and Engineering, National Taiwan University of Science and Technology, Taiwan
muhammad.nasif@ktu.edu

For the replacement of conventional plastics, the bioplastics based on renewable biopolymers such as natural polysaccharides are receiving increasing attention. In order to impart thermoplastic properties to polysaccharides such as starch, they should be chemically modified. Therefore, in this work the double modification of starch with organic anhydrides was investigated and the influence of the degree of substitution (DS) on the properties of modified starches was studied. In this study, we report the double modification of corn starch via succinylation and acetylation. The initial modification was carried out with dodecylsuccinic anhydride to synthesize the modified starches with three different degrees of substitution of dodecylsuccinate groups which were further modified with acetic anhydride, and acetylation reaction conditions were optimized to get highest degree of substitution of acetyl groups. The results show that starches with high degree of substitution have improved thermoplastic behavior and glass transition temperature as compared to those with low degree of substitution which show poor thermal stability. This dual modification method significantly increases the properties and functionality of starches making them promising materials for sustainable plastic alternatives.

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