

EFFECT OF CATIONIZATION ON THE FUNCTIONAL PROPERTIES OF STARCH

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ABSTRACT

Native starch exhibits significant limitations in its application in the chemical, food, and pharmaceutical industries due to unfavourable properties such as low solubility, retrogradation, syneresis, thermal degradation, and high viscosity after gelatinization. To improve its functional properties and broaden its range of applications, native starch requires modification. There are numerous methods of modification, most often classified into three categories: physical, chemical, and enzymatic. Chemical modification techniques enable a wide range of functionalization without degrading the polymer chain. Cationization, as a type of chemical modification, is considered one of the most effective methods for improving starch properties. It enhances swelling power and solubility, increases water absorption capacity, improves emulsion stability, resistance to syneresis, and stability at high pH values, while reducing retrogradation tendency and gelatinization temperature. This study investigates the effect of starch cationization on swelling power (g/g), water absorption capacity (g/g), and solubility (%) of modified starch compared to native starch. The results show that even at a very low degree of cationization, these properties determined at room temperature can be improved. The swelling power of cationic starch synthesized at a temperature of 50 °C for 2.5 h can be increased up to 16.5 times, and the water absorption capacity about 25.5 times. Solubility also changes significantly. After modification, about one quarter of the starch mass became water-soluble, whereas the native starch before modification contained only 1.66% of water-soluble components.

Keywords: native starch, cationization, swelling power, water absorption, solubility.