

## **Structure and pasting properties of alkaline-treated phosphorylated cross-linked waxy maize starches**

### **ABSTRACT**

The objectives of this study were to determine the stability of cross-linked bonds of starch at different pH values and their effects on the pasting property of waxy maize starch cross-linked by 0.05% and 3% sodium trimetaphosphate/sodium tripolyphosphate. The cross-linked waxy maize starch (CLWMS) was slurried (40%, w/w) and subjected to alkali treatments of pH 9, 10, 11, and 12 at 40 °C for 4 h. The phosphorus in 3% CLWMS decreased with increasing pH and remained unchanged in 0.05% CLWMS for all pH treatments. Decreased settling volumes indicated the reduction of swelling power for the alkali-treated CLWMS at pH 11 and 12. The <sup>31</sup>P NMR spectra of 3% CLWMS at pH 12 showed decreased cyclic monostarch phosphate, monostarch monophosphate, and monostarch diphosphate, but significantly increased distarch monophosphate. Alkali treatments of phosphorylated cross-linked starches offer a way to manipulate the rheological properties of cross-linked starch for desired food applications.

**Keyword:** Cross-linked waxy maize starch; Starch phosphates; Structural property; Pasting property

