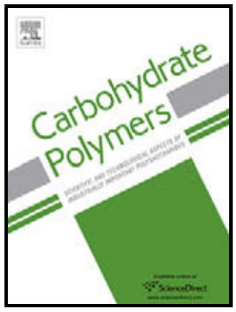

Title: New Insights into Xanthan Synergistic Interactions with Konjac glucomannan: A Novel Interaction Mechanism proposal

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A unified model of Xanthan/Konjac Mannan interaction based on Rheological and DSC data.
Interactions dependent on the conformation of the xanthan chains.
An understanding of the gelation mechanism.
Testing of the model by varying xanthan functional group and salt content.

New Insights into Xanthan Synergistic Interactions with Konjac glucomannan: A Novel Interaction Mechanism proposal

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Abstract

The interactions of xanthans containing precise acetate and pyruvate concentration with Konjac glucomannan (KGM) were studied at different sodium chloride and polymer concentrations. A new unified model of the interaction is proposed, taking into account previous models in the literature. This study suggests that the interactions occur by two distinct mechanisms dependent on xanthan conformation. These interactions are not mutually exclusive and may co-exist and hence produce complicated traces. Consequently two types of gel which melt at different temperature ranges can be formed. Depending on the xanthan helix coil transition temperature, one or both of the synergistic states may exist in the hydrocolloid blend. The proposed model has been tested rheologically and using Differential Scanning Calorimetry by varying salt concentration and using samples containing different functional group concentrations.

Keywords
Xanthan, Konjac mannan, Helix, Random Coil, Models of Interaction

1. Introduction

Mixed polysaccharide gels are a current active area of research. Methods continue to be improved to control and describe the mechanism of interaction and the properties of mixed gels.

One polysaccharide which is well-known for gelation dependent on synergistic interaction with mannan based gums, is xanthan. Xanthan gum is an extracellular polysaccharide used as a food additive and rheological modifier, however it does not form true gels on its own (Ross-Murphy et al., 1983). Xanthan forms self-supporting gels in mixtures with galactomannans of low galactose content, such as locust bean gum, or with glucomannans such as konjac glucomannan (KGM). Similar to xanthan, these polysaccharides have a β-(1→4) linkage linear backbone.

Konjac glucomannan, which is used in the work here, is found in the tuber of the *Amorphophallus* konjac plant (40% by dry weight). This glucomannan is made-up of a linear backbone of blocks of β-(1→4)-linked mannopyranose units, which are interposed with linear β-(1→4)-linked blocks of glucopyranose units. The usual ratio of glucose and mannose