**Gelation of gellan induced by trivalent and monovalent cations studied by NMR and particle tracking**

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Gellan is a linear anionic polysaccharide that has been widely used in various food industries. Cations play a crucial role in producing transparent, hard and brittle gels from gellan solutions. The effect of addition of mono-valent and divalent cations has been widely investigated, however, there are only a few reports about the effect of addition of trivalent cations１. In this study, the effect of trivalent cation Fe3+ and monovalent cation K+ on the gelation process of a sodium salt form of gellan (DG, deacylated gellan gum) has been investigated by nuclear magnetic resonance (NMR) and particle tracking measurements. It has been found that Fe3+ shows weak gelation abilities of DG, and the gelation is greatly enhanced in coexisting Fe3+ and K+ solutions. From particle tracking measurements, the 1100nm particles were restricted at 35 ℃ and the 270 nm particles still continue the movement. It indicates that DG form the gel network structures at 35 ℃, but the network size is larger than 270 nm. This study reveals the gelation mechanism and network structure in gellan solution induced by Fe3+ giving a new insight into the gelation behaviour and mechanism of gellan as affected by metal ions including trivalent cations.

References:

Yang X., Kimura M., Zhao Q., Ryo K., Descallara F. B. A., Matsukawa S.,” Gelation of gellan　induced by trivalent cations and coexisting monovalent cations studied by rheological and DSC　measurements”, Carbohydrate Polymers 345 12248 (2024)