

**ABSTRACT:**

Beads of kappa-carrageenan/sodium carboxymethylcellulose were prepared based on different blend formulations using genipin, a natural and non-toxic cross-linking reagent. Different genipin concentrations (0.5, 1.0, 1.5 mM) were used to study the effects on swelling ratio of the beads in different pH values under simulated gastrointestinal tract condition (pH 1.2 and 7.4). Results have shown that the cross-linked beads possess lower swelling ability in all pH conditions and swelling ratio decreases with increasing genipin concentration (95.24% in pH 1.2; 100% in pH 7.4 at 0.5 mM genipin; 76.2% in pH 1.2; 85.71% in pH 7.4 at 1.5 mM genipin). It was also found the beads released beta-carotene slower and lesser after being cross-linked. Microstructure study shows that cross-linked beads exhibited smoother surface and more spherical shape compared to the native beads. This indicates that cross-linking of genipin has enhanced the beads network stability and their structure to be applied as suitable hydrogel.