

Results	<p>Synthesized nano-structures, hydrotalcites, were found to have typical 2-dimensional structures with tens of nm particle size. Natural inorganic mineral, scoria, and synthetic nano-structure showed 2~6 wt % and 15~30 wt % of antimicrobial molecule loading efficiency. The incorporated ferulic acid was released in sustained manner from nano-structures in both deionized water and saline. The introduction of conducting polymer did not change the structure of oxygen scavenging nano-structure and the final materials was found to have hundreds of nm size with plate like morphology. The structures and antimicrobial molecule loading efficiency of nano-structured materials was not affected significantly upon scale-up process. To reinforce sustained release of cinnamaldehyde from nano-structures, Eudragit L100 polymer was treated on the surface of nano-structures, resulting in suppressed release by 20%. The obtained antimicrobial nano-structure materials were put into a micro punctured pouch and packed with fresh-cut vegetables to evaluate its antimicrobial functions. To explore another way of fresh-cut vegetable application, the antimicrobial nano-structures were coated in the packaging film utilizing polyurethane binder. It was found that the polymer pre-treatment on nano-structure enhanced homogeneity of film coating. Oxygen scavenging nano-structures showed 30% retardation of ferrous oxidation by conducting polymer, suggesting the potential utility of long-term oxygen scavenging material.</p> <p>The major packing type of fresh-cut products revealed in normal packaging type and the marking percent of expiration date or manufacturing date on the packaging of fresh-cut products was approximately 59%. The effect of nano-structure (cinnamic acid-layered double hydroxide cinnamaldehyde) on the freshness maintenance of fresh-cut onion slice, green onion slice, and cabbage dice, was conducted in 2015 and 2016 using an actual distribution process model. Treatment of nano-structure resulted in reduced bacterial population on fresh-cut products during distribution.</p>
Expected Contribution	<ul style="list-style-type: none"> <li>- Offering the information of quality management method of fresh-cut products to fresh-cut producers and distributors</li> </ul>