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### Application of nanotechnology in food packaging system

In recent years, nanotechnology is widely used in food packaging area such as nanobarcodes for tracking and sensing, nanoscale pigments for inks, nanomaterials for color without use of dyes or conventional pigments, and nanomaterials electronic displays with quality paper. We diversely applied nano-clay to biodegradable poly(lactic acid) (PLA) films, which are used instead of plastic films to reduce the growing serious environment problem, for the purpose of improvement in mechanical or barrier properties of the films. The poor moisture barrier property of a PLA film was improved by chitosan or/and clay coating. Tensile strength and elongation at break of a PLA film were improved by coating with Cloisite 30B-containing ink. Oxygen permeability of a PLA film decreased significantly upon addition of clay levels up to 1%, and water vapor permeability also decreased depending on the increase of clay (0%-20%). We also used halloysite nanotubes (HNTs) in an active packaging system. Thyme essential oil (TO) as an antioxidant agent was encapsulated into HNTs, and the TO/HNT capsules were coated with the Eudragit\*EPO polymer to avoid burst release as well as to prolong the release time in the packaging system. Encapsulation efficiency and payload of the capsules prepared using 26.7% (w/v) TO solution were 14.94% and 14.58%, respectively. The encapsulation eventually enables TO to release in a sustained manner for 96 h. In our studies, nanomaterials were successfully applied to food packaging system for which the results proved the high potential of nanotechnology.

#### **Biography**

Hyun Jin Park, PhD is a Food Process Engineer who is responsible for teaching and developing courses in Food Engineering and Food Packaging. His research responsibilities are in broad area of food engineering with particular attention on biopolymer and/or degradable films, coatings and capsules production and application. His major researches include preparation of micro and nano capsules for functional food ingredient delivery systems and mathematical modeling for prediction of gases or solutes diffusion through the films or capsules in systems. He is the author of 176 SCI refereed journal articles with his role as first and/ or corresponding author for 132 papers as well as 30 SCIE and others. In addition, his top ten journal articles have been cited over 1677 times by January 2015.

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