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Characteristics of a Nanocrystalline-based, UVA-activated, 'Consume within' Indicator for Intelligent Packaging

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A 'consume within' indicator is important for the perishable foods because the oxygen is the growth factor of aerobic microorganisms in perishable foods. It follows that a useful addition in intelligent packaging technology is a capable diagnostic indicator which allows the real-time monitor of the quality or safety of the foods. A novel UVA-activated, 'consume within' indicator ink is based on TiO₂ as a nano-semiconductor photocatalyst. An anatase TiO₂ is encapsulated in CWI-ink containing remazol brilliant blue r, glycerol and hydroxyl ethyl cellulose. This study focused on characteristics of UVA-activated, CWI-ink, which utilized a nanocrystalline, TiO₂, to activate the indicator. This novel CWI-ink was applied as a thin film on a glass cover slip. The dried-ink film, originally blue color was photoactivated to yellow by UVA-light under oxygen-free condition, and recovered to its original color when exposed to the oxygen. The result indicates that the uncovered (i.e. no O₂ barrier) and covered RBBR indicator may find a role as consume-within indicators for fresh food at 5°C (where consume-within lifetimes of 24/48 h are of relevance for fresh foods like meat and seafood).

Keywords: Anthraquinone, 'Consume within' indicator, Intelligent packaging, Oxygen indicator, Semiconductor

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