



Anti-counterfeiting technology for packaging

Companies invest heavily in building brand equity. It is important to protect your brand and minimize revenue loss from threats such as counterfeiting and substitution. Consumption of counterfeited food and beverages can also pose health and safety risks. A May 2015 report by Allied Market Research called *Global Anti-counterfeit Food and Beverage Packaging Market* predicts that the anti-counterfeiting food packaging market is expected to reach \$62.5 billion globally by 2020.

To help minimize these risks, packaging can be designed with anti-counterfeiting features. Classic solutions have been tamper-resistant/evident packaging. More sophisticated packaging technologies that have been developed to combat counterfeiting include track and trace technology and authentication technology.

Radio frequency identification (RFID) technology is an example of track and trace technology. RFID tags consist of an antenna connected to a microchip which can be applied to the product using a self-adhesive label. RFID tags are considered the next generation of bar codes that can track the product throughout the supply chain. RFID tags can hold reference information specific to the product, such as names or serial number, but can be made unclonable using a cryptic digital signature. A reader is used to verify the authenticity of the product.

Authentication technology uses holograms, watermarks, specialized ink and dyes, and taggants. Three-dimensional



holographic labels and watermarks are difficult to replicate, but end users are able to easily identify and confirm the authenticity of the product.

What is a taggant? A taggant is a chemical or physical marker added to materials. Physical taggants come in different forms but are usually microscopic, used at low levels for simple and fast detection in a non-destructive manner. Taggants are uniquely encoded and virtually impossible to duplicate and can only be verified with specialized but inexpensive readers. The devices are incorporated into the material of the item or into the package or label.

Microtrace is a company that has a specifically formulated security ink (Spectral Taggant) that uses multi-component chemistry. A handheld spectral reader gathers hundreds of data points per reading to ensure an exact match. The ink can be delivered as press ready in various types and colours, but the ink must be printed in a small and concentrated location on the package.

Microtrace also uses microscopic particles (Microtaggant Identification Particles) ranging from 20 to 1,200 microns. The security is offered through the use of various materials within each particle. These particles can be incorporated into

a range of materials, like adhesives, ink, films, paper, yarns and thread.

DNA markers can also be used to authenticate products. DNA sequences can be custom created and embedded into inks, varnishes, thread, laminates and metal coatings. Applied DNA Sciences has created SigNature DNA markers from plant DNA. This platform has proved to be resistant to extreme environmental conditions such as UV radiation, heat, cold, vibration and abrasion.

DNA Technologies has incorporated DNA taggants into holographic images (DNA Matrix Hologram). The hologram is visually recognized but the security feature relies on spectrum analysis.

Anti-counterfeiting technology development has been driven by brand protection and economic loss. Although there is a general lack of awareness and affordability of these technologies, recent campaigns by anti-counterfeit trade organizations and interventions from government have increased their use.

Combined use of overt, covert and forensic features can deliver enhanced security and protection. Overt technology such as holographic devices provide instant visual authentication. Covert techniques like RFID and taggants use microscopic tagging to confirm authenticity. Forensic features include molecular and biological tracers (like DNA markers) that are difficult to reproduce and to detect. The multi-layered approach helps stakeholders throughout the supply chain identify counterfeit products and deter counterfeiters from introducing non-authentic goods into the supply chain. ●

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