



C44 Thermographic Applications to Pharmaceutical Industry Monitoring and Detection of Counterfeit Drugs

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The goal of this presentation is to propose a new and innovative methodology to be used for monitoring and detection of counterfeit drugs, providing attendees with an increased knowledge of monitoring and detection techniques.

This presentation will impact the forensic science community by sharing a proposed methodology based on the use of thermal infrared imagery. This will be acquired with the last-generation IR thermal scanners. A library of a number of reference drugs signatures, to be compared with those coming from the counterfeit ones, will be suggested.

According to World Health Organization (WHO), counterfeit drugs are products with the correct ingredients or with the wrong ingredients, without active ingredients, with insufficient active ingredients, or with fake packaging. Public health risks include ineffective medicines, intoxication due to harmful ingredients, no quality assurance, no regulatory oversight, adverse reactions not monitored, product recall not possible, erosion of public confidence in medical care and health systems, and waste of money.

Counterfeit medicines pose an ever-increasing threat to public health. Precise tracking of illegal counterfeit prescription drug activity is next to impossible. Low-quality counterfeit medication may cause several dangerous health consequences, including side effects or allergic reactions, in addition to their obvious lack of efficacy due to having less or none of their active ingredients.

Currently, there are no ultimate solutions to the problems associated with counterfeit drugs. The goal of this work is to show the application of a thermography Infrared (IR) system for determining the authenticity of a pharmaceutical product. That application was first proposed by two inventors in Israel and patented. They proposed a method and system for determining the authenticity of a pharmaceutical product using thermography-based equipment.

It is possible to determine counterfeiting even without removing the product from its cover, package, or container. The system to test the authenticity of a pharmaceutical product is composed of a thermography IR apparatus for acquiring, in a wavelength or a wavelength range selected from the Mid Wave IR (MWIR) to very Long Wave IR (VLWIR) range, one or more thermographic IR images of a certain product. A database of predetermined signatures of reference drugs, and a display unit for displaying at least one or more IR images and a signature of a predetermined reference drug or a result of comparison between one or more IR images and a signature of a predetermined reference drug are required.

A study was conducted on the existing technical scientific-related literature, with the goal of focusing on the new applications of the IR thermography technology already vastly adopted in industrial and, especially, chemical facilities for production and maintenance activities. Evidence of the topic in question has been found in numerous similar problems at the international level. The result of this extensive research of applications has led to finding a promising new investigation methodology for the detection of the counterfeit drugs on the market, on which this study was based.

At the international level, results suggested a database of all known sources of counterfeit drugs, keeping track of underground counterfeiting operations, and divulging all information to international anti-crime agencies. Thermography allows detection of the counterfeit phenomenon, whether a suspicious sample is original or not. The methodology requires the use of a specialized laboratory to rapidly screen the increasing suspicious samples, detect counterfeit drugs, and allow the seizure of these products. Legal prosecutions perform more in-depth analyses on some carefully selected samples, evaluate the real risks with the further evolution of this phenomenon, and also update the data for informational campaigns.

The use of IR technology (already developed for a chemical industrial plant) on a major number of products will make the proposed methodology even more reliable and broadly applied.

Drugs, Counterfeiting, Thermography