Drugs and Food Anti-counterfeiting Technologies Combating Counterfeiting: A Systematic Review

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Abstract

Anti-counterfeiting technologies have evolved over the past few years to combat and prevent counterfeiting incidents in the pharmaceutical and food sectors. It is worth noting that numerous studies have used different technologies to combat food and drug counterfeiting. The current systematic review evaluated these technologies' use, effectiveness, and how they could be used to eliminate food and drug counterfeiting. Several online databases were searched and retrieved for articles related to anti-counterfeiting technology for drugs and food and published literature from (2010 to 2022). A thorough examination of the selected publications was done to extract useful information, including study design, the application of those technologies to combat counterfeiting of drugs and food, how those technologies are implemented, their effectiveness in fighting counterfeiting, evaluation outcomes, the country of study, the name of the author(s), as well as the publication year. In the study, 29 publications were selected and evaluated, with 22 (75.86%) dealing with anti-counterfeiting technologies related to drugs, 4 (13.79%) pertaining to anti-counterfeiting technologies related to food, while three (10.34%) dealt with both anti-counterfeiting technologies related to drugs and food. Blockchain technologies have mainly been used in the fight against counterfeiting, with the majority in China 8 (27.58%), and the highest number of reported studies was reported in 2021 (n=6; 20.68%), followed by 2016 and 2012 (n=5; 17.24%). Several technologies have been used to detect food and drug counterfeiting in single studies, including serialization, SMS verification, RFID, and GSM. The conclusion has been reached that technological interventions have proven highly effective at combating drugs and food counterfeiting to a large degree. However, technological interventions against the counterfeiting of food were considerably lower than those against the counterfeiting of drugs. Thus, it is necessary to perform studies on highly effective technologies in order to uncover ways of preventing counterfeit foods, such as blockchain, QR codes, mobile authentication services, internet of things (IoT), laser, web-based, and 3D technologies. To help combat anti-counterfeiting through technologies, awareness, and knowledge about anti-counterfeiting technologies should be spread amongst the general public.

Keywords
Technology, anti-counterfeiting, counterfeiting, food, drugs

Biography / Biographies

Mona Haji is currently a PhD graduate of the Logistics and Supply Chain Management Program within the Engineering Management and Decision Sciences Division at the College of Science of Engineering (CSE), Hamad Bin Khalifa University (HBKU) in Doha, Qatar. Her field of interest is Logistics and Supply Chain Management. She published several papers in international journals addressed public health and how to ensure food quality and drug safety. In addition to her experience in materials and store management, she has also established maintenance contracts. She has a MSc in Engineering Management from the Science and Engineering Department, University of Qatar, and BSc in Mechanical Engineering from the Science and Engineering Department, University of Colorado at Denver, USA