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Cyber-physical Watermarking with Inkjet Edible Bioprinting

Silk/food-dye drug watermarks readable by smartphones for anti-counterfeiting and dosage authentication.

Researchers at Purdue University have created a method to print edible watermark taggants onto pharmaceuticals. Such taggants place the security of the drug in the dosage form itself instead of the secondary packaging, allowing traceability in case the drug and packaging are separated. Other taggant methods exist; however, they use additives that may be hazardous for human health. On the other hand, the Purdue technology uses FDA-approved food coloring for the watermark and silk proteins. Additionally, the watermark can be recognized by a smartphone camera, providing a high level of accessibility for patients to verify their own medicines. The printed watermark also protects against counterfeiting of drugs, with other properties that prevent duplication of the watermark. This technology can provide serialization, track and trace, and authentication at the dosage level, empowering patients to play a key role in combating counterfeit medicines.

Related Publication: H.J. Jeon, J.W. Leem, Y. Ji, S.M. Park, J.W. Park, K.Y. Kim, S.W. Kim, and Y.L. Kim, "Cyber-physical watermarking with inkjet edible bioprinting," Advanced Functional Materials Advanced Functional Materials 32(18):2112479, 2022. https://doi.org/10.1002/adfm.202112479

https://www.purdue.edu/newsroom/releases/2022/Q1/small-cyberphysical-watermarks-could-prevent-huge-headaches-caused-by-fake-meds.html

Technology Validation: The researchers enhanced the robustness of the watermark by using different reference colors, deciding on an integrated color correction that is recognizable by various smartphone models and under diverse lighting conditions.

Advantages

-Allows patients to verify their own doses

-Allows identification of a watermarked drug separated from its packaging

Technology ID
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Category
Cybersecurity/Threat Detection & Incident Response
Pharmaceuticals/Pharmaceutical Packaging & Delivery Systems

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View online

-Non-toxic

-Accessible

-Prevention against counterfeit drugs

Applications

-Drug authentication and anti-counterfeiting

-Dosage monitoring

TRL: 3

Intellectual Property:

Provisional-Patent, 2022-01-20, United States

PCT-Patent, 2022-12-23, WO

NATL-Patent, 2024-07-04, United States

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