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Characterisation and computational analysis of a novel lipase nanobio-based reagent for visualising latent fingerprints on water-immersed glass slides (Article)

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Abstract

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Considering the significant evidential values of fingerprints in underwater criminal investigations and the need to visualise them using a user- and environmentally-friendly reagent, development of a novel, rapid and relatively greener nanobio-based reagent (NBR) is deemed beneficial. Lipase from the commercial Candida rugosa immobilised onto acid-functionalised multi-walled carbon nanotubes (NBR) was used as the safer and cheap lipid-sensing reagent to visualise groomed whole/split fingerprints on non-porous objects immersed in stagnant tap water for up to 30 days under a laboratory-controlled setting. Attenuated Total Reflectance – Fourier Transform Spectrometry, Field Emission Scanning Electron Microscopy and bioinformatics (molecular docking and molecular dynamics simulations) were employed to characterise and confirm the attachment of NBR onto the lipid constituents of wet fingerprints. Chromatographic results further confirmed the presence of n-hexadecanoic and octadecanoic acids on fingerprints up to 30 days of immersion. Thus, NBR may potentially be useful as the future state-of-the-art fingerprint visualisation technology. © 2020 Elsevier Ltd

SciVal Topic Prominence

Topic: Dermatoglyphics | Cyanoacrylates | Forensic Sciences

Prominence percentile: 94.443

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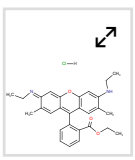
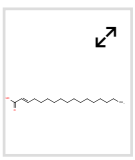
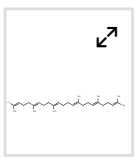
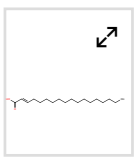
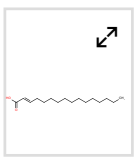
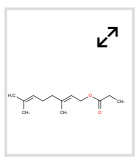

Author keywords

Bioinformatics | Candida rugosa lipase | Forensic science | Latent fingerprint | Nanobio-based reagent

Indexed keywords

Engineering controlled terms: Candida | Field emission microscopes | Molecular dynamics | Multiwalled carbon nanotubes (MWCN) | Palmitic acid | Scanning electron microscopy

Engineering uncontrolled terms: Attenuated total reflectance | Computational analysis | Criminal investigation | Field emission scanning electron microscopy | Fourier transform spectrometry | Functionalised multi-walled carbon nanotubes | Molecular dynamics simulations | Octadecanoic acids

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