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Latent Fingerprint Development Using Plant-Based Powders Derived from Groundnut Shell

Abstract:
Fingerprints are regarded as one of the most dependable means of personal identification in forensic investigations. Latent prints, which are commonly encountered at crime scenes, often need to be developed for proper examination. While conventional fingerprint powders are widely used, their chemical composition may present environmental and health concerns. In this context, the present study examines the potential of groundnut shell, an agricultural by-product, as a sustainable option for latent fingerprint visualization.
Groundnut shells were processed into a fine powder and applied with a soft brush on latent fingerprints deposited over various non-porous substrates, including mirrors, glass slides, tempered glass, and compact discs. The developed impressions displayed clear ridge flow and recognizable pattern details with acceptable contrast and limited background smudging. Minor granularity was observed in certain samples, though the overall print quality was adequate. These findings suggest that groundnut shell powder can serve as an economical and eco-friendly alternative for fingerprint development on non-porous surfaces, with further refinement and comparison against commercial powders required to validate its forensic utility.
Keywords: Latent fingerprints; Groundnut shell powder; Forensic science; Eco-friendly fingerprint powder; Non-porous surfaces; Biodegradable alternatives

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