

Integrated Forensic Workflow: One-Step Fingerprint Visualization and DNA Profiling

Zinexts MagPurix® as a new benchmark for STR profiling in Forensics diagnostic from fingerprints

Executive Summary

Forensic laboratories often face the challenge of balancing fingerprint visualization quality with DNA recoverability from the same sample.

Traditional cyanoacrylate fuming followed by fluorescent dye staining provides clear ridge details but can compromise DNA integrity, limiting the possibility of genetic profiling.

A study published in *Microchemical Journal* (Risoluti et al., 2019) demonstrated that the Lumicyano one-step fluorescent cyanoacrylate enables latent fingerprint visualization without secondary staining steps maintaining DNA quality.

When combined with Zinexts **MagPurix® Automated Nucleic Acid Extraction** System and the Forensics DNA Extraction kit, the workflow delivers both high-quality fingerprint images and complete DNA profiles from the same forensic trace, offering a new benchmark in forensic efficiency.

Key Findings

1. One-Step Fluorescent Fingerprint Visualization

- Lumicyano enables fingerprint development and fluorescence visualization in a single step, removing the need for solvent-based post-staining (e.g., BY40).
- Ridge details remain visible and well-defined even after 100 days, with fluorescence lasting up to 20 days under proper storage conditions.
- The simplified process reduces analysis time, chemical exposure, and environmental impact.

2. Compatibility with DNA Profiling

- DNA extraction was evaluated using Zinexts MagPurix® and Qiagen EZ1 systems on Lumicyano- and cyanoacrylate-treated samples.
- MagPurix® achieved superior results, yielding 27 out of 30 complete DNA profiles (90%), compared with only 3 out of 12 from the EZ1 system (25%).
- Sampling with acetone and MagPurix® buffer achieved 100% complete profiles (15/15), confirming strong compatibility with Lumicyano-treated samples.
- The study confirmed that no DNA degradation occurred following Lumicyano treatment.

3. Workflow and Laboratory Benefits

- Integrates latent fingerprint detection and DNA profiling from a single trace.
- Eliminates solvent-handling steps, reducing health and safety risks.

- Delivers consistent, high-quality STR profiles with minimal hands-on time.
- Compatible with fresh and aged fingerprints and multiple non-porous substrates.

Conclusion

The integration of Lumicyano with the Zinexts MagPurix® Automated Extraction System offers a validated, one-step workflow that enables both fingerprint visualization and DNA profiling from the same forensic sample.

This approach enhances evidential recovery efficiency, shortens processing time, and maintains the integrity of both physical (ridge pattern) and biological (DNA) evidence.

Zinexts MagPurix® provides unmatched reliability in forensic DNA extraction — enabling laboratories to streamline operations, safeguard sample integrity, and maximize evidential value.

Reference

Risoluti, R., Filetti, V., Iuliano, G., Niola, L., Schiavone, S., Arcudi, G., & Materazzi, S. (2019). Updating procedures in forensic chemistry: One-step cyanoacrylate method to develop latent fingermarks and subsequent DNA profiling. *Microchemical Journal*, 147, 478–486. <https://doi.org/10.1016/j.microc.2019.03.056>