

Advances in Mixture Interpretation

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In forensic science, DNA profiles are obtained from body fluid material recovered during criminal investigations. These profiles are usually used for the identification of suspects, through direct comparison with control samples from known individuals, or database searches. Most often, profiles from single donors are obtained from body fluid material. These profiles are straightforward to interpret and search.

The continuing improvement of the sensitivity of extraction and amplification techniques have led to the increased likelihood of recovering DNA profiles from degraded or from extremely small quantity of body fluid material. When dealing with such degraded or minimal biological forensic evidence, it is common to obtain mixed and/or partial DNA profiles.

The current search/interpretation approach requires DNA analysts to take decisions regarding the presence or the absence of certain alleles within a given profile. The unnecessary use of binary decisions during the analysis of DNA profiles is clearly wasteful and error prone.

The use of a continuous DNA interpretation model allows for the automated interpretation of complex DNA profiles. It avoids the need to take decisions in the early steps of the search or interpretation processes, which removes the time consuming and error prone 'binary' decision step. It allows for improved precision and accuracy of database searching for these particular profiles and permits a meaningful assignment of the evidential value of complex DNA evidence.

This presentation will review the limits and challenges of current practice, it will present the solution developed at the FSS and will demonstrate its benefits through a series of practical examples.