

DEVELOPMENT AND IMPLEMENTATION OF DNA MIXTURE INTERPRETATION SOFTWARE

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Mixed DNA profiles are routinely obtained in casework samples, especially those from drug, sex and volume crime cases. Interpretation of these profiles can clarify the individual DNA contributors and statistical evaluation can be made of these findings. This interpretation of complex DNA profiles is important in casework but can be challenging and time consuming for the forensic scientist and the process is prone to calculator or operator error.

The *MixtureCalc* computer software has been designed and developed by SPSA for the de-convolution and statistical interpretation of two person mixed SGM/SGM+ DNA profiles. Transcription error rate is reduced as exported Genemapper[®] data can be imported into the software. Adjustment of the data can be performed to account for -8bp, -4bp and +4bp stutter using lab specific validated stutter percentages. The software produces a retained list of genotype options using specific Peak Height Ratio rules. Mixture Ratios (MR) or mixture proportions (Mx) are calculated and can be used as a guide to assist the scientist in selecting options suitable for statistical analysis. Further filtering of options is possible by the software through the application of Mx tolerances based on an assessment of the profile. The software was further developed through collaboration with academic partners with the incorporation of a system of ranking of options using residual analysis. Existing in-house statistical analysis software has been incorporated to allow for the calculation of Likelihood Ratios (LR) and Match Probabilities and takes into account multi-race options and conditioning.

This fully validated bespoke in-house software is being used in preference to commercially available products. The software has given the Scottish Police Service Authority laboratories the advantages of significant savings in time and money and increased accuracy and consistency in mixture interpretation.

A Freeware version of the software has been presented and launched to the international forensic community and is available on the ISFG website (<http://www.isfg.or/software>).