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Enhancing the evidential value of textile fibres Part 1: Development of a spectral database and evaluative comparison strategy

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Highlights:

- Textile fibre evidence was evaluated via a database approach.
- Over 4,400 fibres were recovered and grouped.
- The approach improves efficiency, greatly reducing the number of comparisons required.
- The database provides improved objectivity in casework.

Abstract

In numerous major crime cases undertaken at our laboratory the recovery of large numbers of fibres (> 1,000), particularly in cases with no known source, presented several challenges. These included the inability to effectively manage the data (i.e. combination of MSP spectra, microscopic characteristics, composition, etc.) and perform comparisons in an efficient manner. To address these challenges, and in response to a growing need for performing fibre comparisons, we developed a database of textile fibre microspectrophotometric (MSP) spectra. The database, designed to compare MSP spectra using a modified Pearson method of correlation, currently contains over 20,000 normalised and first derivative spectra of casework, validation and reference textile fibres. A comparison strategy for cases with a large number of questioned samples was devised, involving identification of critical fibres in the casework data set, development of preliminary fibre groups classified according to their corresponding/similar MSP spectra, and

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