COMPARATIVE EVALUATION OF FIVE DNA EXTRACTION TECHNIQUES TO INCREASE LABORATORY'S PERFORMANCE

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The validation process is crucial for robustness, reliability and reproducibility of procedures performed in laboratory. Moreover the same data give the opportunity to compare different methodology, in order to increase laboratory's performance according to a "sample-based" approach.

Five DNA extraction techniques have been performed with samples of six different amount of whole blood (50 ul, 10 ul, 1 ul, 0.1 ul, 0.01 ul and 0.001 ul) diluted in water till a final volume of 100 ul. Extracted DNA have been subsequently quantified, amplified and typed with PowerPlex®ESI 17 Kit (Promega) for comparison.

For samples rich in DNA (50 ul and 10 ul samples which are comparable to forensic routine reference samples) results show that every methodology investigated in this study is useful to obtain a complete DNA profile, although some protocols extract a significantly higher amount of DNA than other methods. In this scenario high throughput techniques (96 samples per run) are cheaper, if every run is performed with an enough number of samples.

For less DNA samples (1µl or 0,1 µl of whole blood) small robotic platforms (12÷16 samples per run) show better performances in term of amount and quality of DNA and full DNA profile obtained. For samples under 0,1 µl of whole blood no differences have been observed between the investigated techniques.