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Genetic identification of urine samples used for doping control

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Urine samples are often used for toxicological or doping control analysis. In some contentious situations, the origin of positive samples has to be ascertained to prove that no manipulations or switching occurred. Genetic profiling is a powerful tool that can enable to formally identify fresh samples. Usually, urine flasks are generally stored at 4°C, which is detrimental for the DNA they contain. The aim of this study was to evaluate the potential of recovery for nuclear or mitochondrial DNA (mtDNA) profiles from 20 urine samples over a 4 months period. Complete SGM Plus profiles (10 autosomal loci and one sex marker) were obtained for 90% of the samples stored 6 days at 4°C. After 2 and 4 months at this temperature, this rate dropped to 33 % and 14 %, respectively. After the longest period, partial nuclear profiles (> or = to 4 autosomal loci) were recovered for 48% of the samples. Even with this limited genetic information, putative donors could be identified with an acceptable statistical power (minimum likelihood ratio (LR) of 4'125). Considering the mtDNA marker, we obtained a reliable typing of the HVR I and HVR II for all the samples tested even after the longest storage period. Because mtDNA data base used for the calculations was of small size, concomitant statistical power was relatively low ($43 \leq LR \leq 435$). These observations demonstrated that the vast majority of the 20 urine samples could be reasonably identified with a combination of nuclear and mtDNA markers, even after 4 months. Comparisons of two DNA extraction protocols to recover DNA from urine samples and some nuclear profiles are presented in the poster.