EVALUATION OF A LOW COST METHOD FOR LONG-TERM STORAGE OF GENOMIC DNA FROM CRIME SCENE SAMPLES

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In 2008, the central criminal police office of the federal state of Baden-Württemberg, in South-West Germany, processed approximately 21,000 DNA crime scene samples. The continuously increasing workload of forensic DNA analysis causes severe problems regarding long term storage of the samples. The standard long term storage method by freezing the samples at -20°C requires considerable space and investments for the freezers. Continuous expenses for power supply, the need of supervision for safety precautions (power failure) and the risk of damaging the DNA by multiple freeze-thaw cycles represent further shortcomings. Alternative low-cost methods were validated for secure long term storage of forensic DNA samples at room temperature in comparison to standard freezing at -20°C. For this purpose genomic DNA extracted from buccal swabs using ChargeSwitch® magnetic bead technology (CST) was either lyophilized or supplied with ethanol in different approaches. After several time intervals amount and quality of the DNA were analyzed by real time PCR (Quantifiler® Human DNA Quantification Kit) and short tandem repeat (STR) typing (AmpFlSTR®SEFiler plus™ Kit and genRES®MPX-2LF Kit). For evaluation allelic peaks with heights > 100 relative fluorescence units (rfu) were counted and their numbers compared. In the course of the observation period one method finally revealed satisfying results concerning DNA degradation and allele recovery: DNA extracts were supplemented with ethanol to a final concentration of 70% volume and stored at room temperature in the dark. For reanalysis DNA was co-precipitated with linear acrylamid and resuspended. The described method presents an economic way for long-term storage of DNA samples to be efficiently reanalyzed by STR analysis even years after DNA extraction.