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Evaluation of Selected DNA Extraction Method for Efficient Extraction under Various Conditions

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Abstract:DNA extraction is an important first step in DNA analysis for biomedical and forensic purposes. The DNA extracted from biological samples must be free from contaminants, such as protein and RNA. Although DNA may have to be extracted from different sources for forensic purposes such as saliva, semen, stains, hair and bones, blood samples are common objects of forensic analysis.DNA quality is a critical issue for most amplification-based analysis, since the DNA amplification is influenced by the presence of co-purified inhibitors from matrix or extraction reagents, which can decrease, subsequent Polymerase Chain Reaction (PCR) efficiency. DNA damage may also occur during the extraction procedure because of oxidation and enzymatic hydrolysis problems, associated with extraction buffers formulation and excessive mechanical shearing.This study therefore evaluated several methods in order to identify the most efficient extraction protocol for the production of DNA used in PCR technology. Blood samples were collected from 60 persons from Hila City-Iraq. These samples were used to simulate the different possible blood samples obtained for forensic medical purpose. The following simulations were created: 20 frozen blood samples, 40 dried blood stain samples on carpet.extraction of genomic DNA was attempted from the listed forms of blood samples by using four different methods: Promega purification kits, Favorgen purification kits, salting out methods, and two-step lysis assay. These methods were compared for the best extraction of DNA and were confirmed by molecular detection of β-globin gene using polymerase chain reaction (PCR) technique.
After extraction of DNA and electrophoresis by use agarose gel electrophoresis and measuring the concentration and purity of DNA by bio drop spectrophotometer. Purity was then confirmed by PCR. The results indicated that the best methods for genomic DNA isolation were from frozen, and dried stains on carpet using Promega purification kits.
Keywords: Forensic science, DNA extraction, Blood stain.

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