

## eQMS::DNA

Life is coded with DNA,  
bring your business to  
life with our code

eQMS::DNA is a software for maintenance and efficient searching of database of genotypes for forensic purposes. It is also known as DNA Fingerprinting, DNA Profiling, DNA Typing or DNA Testing Software.



### POSSIBLE USE

Although the most widely known use of this kind of system is criminal forensics with human profiles, it can be used to track genotypes of any species for which appropriate PCR amplification kits exist. Apart from human forensic applications eQMS::DNA can be successfully applied as a reliable and efficient tool for implementation of meat traceability. It enables tracing of animal food products through the supply chain back to source animals, offering unprecedented levels of traceability. Other possible applications include pedigree tracking and animal provenience verification.

#### HUMAN FORENSICS

#### FOOD TRACEABILITY

#### ANIMAL PEDIGREE TRACKING AND VERIFICATION

eQMS::DNA maintains a database of DNA profiles of known donors and unidentified traces. It enables quick comparison of a new profile against the database in order to match it to a previously known donor or a trace of unknown origin.



### UNIQUE PROPERTIES

- Possible use of any type of polymorphisms for any organism for which PCR kits are available
- Keeping descriptive or identifying data on donors is possible
- Allows search for donor's kin (parents, offspring, siblings...)



### SEARCH TYPES

- Single donor trace against clean profiles
- Single donor trace against mixed stain profiles
- Mixed trace against clean profiles
- Single donor trace kinship search
- Ability to relax search criteria to accommodate for allele callout errors and data entry mistakes

The searches can be performed interactively or in fully automatic mode. Strict match single donor search is performed in less than a second on commodity hardware against a database with several hundred thousands of samples. Full kin search may take up to a minute.

**DNA DATABASE** software maintains data on individual donors with user-definable level of demographic and other details, multiple samples containing genetic material taken from the donor, and genotypes obtained from the samples, possibly using multiple techniques and identification kits. Both processed genotypes and optional additional data such as peak quality and confidence parameters and raw electroferograms can be kept. The system also keeps profiles of as yet unidentified traces, as well as traces with mixture of material contributed by several donors, with provisions for common contaminant identification.

The database can contains not only full DNA profiles (e.g. 13-loci CODIS standard in the case of human forensics), but also partial ones obtained using different identification kits. While searching it is possible to relax match criteria -- e.g. extend search to incomplete profiles from degraded DNA, or allow single base pair identification error (allele callout errors) on one or several loci or one locus data entry error.

The DNA fingerprinting system computes probability of random match using either population statistics gathered from profiles already in the database, or known allele distribution data for a particular population. Arbitrary number of distribution sets can be kept (including historical distributions from the database, necessary for retests).

The type of polymorphisms and number of loci used for constructing genotypes is configurable during installation. Manual entry of data from plate gel electrophoresis is possible, but typical data source will be results from automated capillary electrophoresis sequencers.

**eQMS::DNA** employs role-based access control with fine granularity (up to the attribute level). Full audit trail log is kept. The system fully adheres to CFR 21 part 11 recommendations.

The system can be deployed either as a standalone system or can be integrated with LIMS such as Pardus' **eQMS::LIMS**, forensic case management system, animal and flock registries etc. Various standard and custom data interchange formats are also supported.





**Key References**

- National Forensic center, Serbia
- National Forensic center, Macedonia

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