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Potential use of blood-fed mosquitoes as evidence in forensic casework

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Medico - criminal entomology has been an important source of evidence in forensic investigations for many years. However, it has not been widely used to provide direct evidence for personal identification in forensic casework so far. In this study, we made an attempt to determine the usefulness of human DNA extracted from blood-fed mosquitoes as evidence in forensic casework. Approximately 1500 adult female mosquitoes of same age from four different species, i.e. *Culex quinquefasciatus, Armigerus sabalbatus, Aedes aegypti* and *Anopheles tessellatus* were fed with the same volume of human blood and maintained under the same environmental conditions. Three batches (N=1, 5 and 10) of randomly selected blood-fed mosquitoes were crushed and blotted onto filter paper strips separately at two hour intervals subsequent to blood meals up to 48 hours to determine the longitudinal variation in the extraction of polymerase chain reaction (PCR) amplifiable human DNA from mosquitoes. Human DNA was extracted from filter papers using a chelex-100 extraction protocol and amplified by PCR technique using human primers. Amplified products were run in 1.5% agarose gels. PCR amplifiable human DNA could be extracted from mosquitoes of *Cx. quinquefasciatus* and *An. tessellatus* up to 48 hours subsequent to blood meals. However, this duration was up to 46 and 42 hours in *Ae. aegypti* and *Ar. Sabalbatus*, respectively. The amount of amplifiable DNA was inversely proportionate to the post-feeding duration, but increased with number of mosquitoes at each time interval. Amplifiable human DNA could be extracted even from a single mosquito of four different species even after 48 hours from a blood meal with slight variation among species. However, as the amount of DNA decreases with time interval, more mosquitoes will have to be used for extraction in late sample collections. Similarly, it may be required to use a highly sensitive PCR protocol when analyzing such samples. Blood-fed mosquitoes collected even after 2 days from a crime scene may be used as a source of direct evidence for personal identification in forensic casework.

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