

# Journal of Forensic Science and Research

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Research Article

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[Forensic analysis of raw meat adulteration using mtDNA](#)

Meat species identification has become essential with the increasing events of frauds like the illegal slaughter of cows, meat adulteration, and substitution. Food scam directly influences public well-being, trade, and wildlife. In Pakistan, donkey meat is used as adulterants for cow meat and is considered Haram in Islamic concepts. In this study PCR, based detection methods are used for identification purposes. The mitochondrial gene cytochrome b has been used in this study to identify the origin of meat specie. Specie-specific primers of cyt b of cow and donkey were used for identification. DNA from different binary ratios of cow and donkey meat was extracted by the phenol-chloroform method. Ratios were made from 1-10 and extracted DNA was subjected to PCR to amplify the target fragment of the cyt b gene. Primers were sensitive to identifying species origin in all meat ratios. Multiplex PCR was designed to identify both species and the results were analyzed by gel electrophoresis. Fragment size of 309bp for cow and 475bp for donkey was observed.

Results of the current study conclude that PCR assays, including multiplex PCR, is efficient and has a high sensitivity for even small amount of meat. It is concluded that multiplex PCR is useful and reliable for adulterated meat detection.

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Research Article

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[Bioinformatics as a modern tool in forensic science for data understanding & investigation in research](#)

Modern-day biology is witnessing a data explosion with a vast amount of information generated from ongoing genome and sequencing projects. The abundance of data from genome sequences, functional genomics and another high throughput (HTP) technique with the potential of computing has led to rising of a new discipline namely 'bioinformatics'.

Bioinformatics is a young but fast-growing field for biological data collection, organization, interpretation, and modeling. Tools and techniques for bioinformatics are derived from multidisciplinary combinations of varied disciplines from natural and physical sciences. Previously various disciplines were carved out as and when sufficient specialization was achieved. However, now bioinformatics is borne out of an alliance between existing disciplines from life and non-life. Bioinformatics encompasses new foundations for the collection, organization, and mining of gene/ protein sequences, three-dimensional structures, and biochemical functions, for modeling biological processes of functioning cells. DNA sequencing performed on an industrial scale has produced a vast amount of data to analyze. Although the Human Genome Project is officially over, improvements in DNA sequencing continue to be made. The field of forensic science is increasingly based on biomolecular data and many European countries are establishing forensic databases to store DNA profiles of crime scenes of known offenders and apply DNA testing.

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Research Article

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[Comparative analysis of mobile forensic proprietary tools: an application in forensic investigation](#)

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The utilization of the Internet and wireless communication reaches its pinnacle from one side of the planet to the other. Marking the rise of criminal activity in recent years sees enormous growth in security breaches and data theft-related cases in mobile phones. To mitigate them, the implementation of security patches, safety fixes, and updates in mobile devices is of high priority for the organization. The need to foster techniques and procedures in the field to be able to extract and precisely dissect digital crime cases, providing valuable tactical data about the investigation. Mobile forensics is a developing branch assisting the investigator in criminal trials and investigations. Acquisition, Collection, and Analysis of mobile phones settle the purpose of recovering cumulative and corroborative evidence. Upgradation and innovation of mobile devices with time imposed a challenge to mobile forensic technology to extract information from such devices. The study aims at extracting comparative and statistical approaches in the analysis of Physical data acquisition utilizing significant versatile mobile criminological proprietary tools. The proposed study also introduces newly developed utility tools along with their characteristic features which help in successful data extraction from mobile devices.

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## Literature Review

**Published Date:- 2022-10-28**

[Alcohol drinking and driving habit particularly in Nigeria and the role forensic science could play](#)

Alcohol drinking habit is a serious epidemic that afflicts people worldwide regardless of socioeconomic class and the country's development or civilization. The purpose of this systematic review was to summarize research findings on drinking and driving, its implications for Nigerian society, and the role forensic science can play in drunk driving. Nigeria, in particular has seen a lot of fatal accidents attributed to alcohol but due to a lack of forensic sobriety and toxicology drug tests at the crash scene that is not yet in place in the country, the offenders are not punished for this crime. The only two African countries that have legislation on Blood Alcohol Concentration (BAC) are South Africa and Zimbabwe. Nigeria has no such legislation and does not conduct such tests in injury and fatal accident cases. The prevalence of drinking habits among Nigerians and in particular the drivers cannot be ignored. This study examined global drinking habits including its prevalence in Nigeria and more importantly understudied the need for forensic science interplay in a criminal investigation against drunk driving in the country. Drunk driving in Nigeria is a serious problem. Establishing and enforcing drunken driving laws as a criminal offense would assist the country in the reduction of road accidents, injuries, and fatalities relating to road accidents. Forensic science is a unique field that is equipped with skills and knowledge that could be useful for criminal investigation in the country including accident cases. Forensic scientists have outstanding technical skills to identify, detect, and even assist the country's prosecutors in the administration of justice in crime investigations. Nigeria as a country will be well served if forensic scientists work in partnership with the government. Drinking and driving in addition to other crimes has become a matter of concern. The country's police force and courts still rely mostly on eyewitness circumstantial evidence, testimonies, and suspects' confessions. Based on this, I personally believe that the advent of Forensic science in the country's system will assist a great deal in solving crimes and reducing fatal accidents due to drunk driving.

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## Research Article

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[A relevant article, white papers and other documents concerning the mRNA vaccine: an interesting collection useful to better understand some phenomena and to generate hypotheses](#)

The aim of this work is to report some interesting references and documents related to the mRNA vaccine. Every cited reference can act as an instrument to better understand what some independent researchers find: this work is mainly focused on the public debate related presence/absence of graphene derivatives in some vaccine vials for COVID-19. Relevant classic articles White Papers or other kinds of a document are useful instruments to better clarify some crucial aspects of this infectious disease, its epidemiology and the efficacy of the measure adopted (preventive, therapeutic, or vaccine).

If the reviewed article show an intrinsic recognized international value other kinds of source like a White Paper or other documents can be of interest to generate hypotheses or to open public discussion on crucial topics. For this reason, it is useful to use this method also in the discussion related to impurity profiles in new innovative bio-pharmaceuticals like the mRNA vaccine. The fact that this product was introduced with an emergency authorization, which reduced the time of experimentation and due to the lack of official quality information related to some raw materials used authorizes us to use also this method.

Even if the international official regulatory agency does not find this substance in the control for release of the lots it is interesting to more deeply investigate what funded by an independent researcher in some vials of vaccine or sample patient's blood after vaccination. This reference even if not a smoking gun the same can stimulate the reasoning about the general concept involved. It is needed, to read this work, to consider the intrinsic limitation of some of the study research reported (White Paper) or the other documents.

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[Ultraviolet fluorescent detection of elevated bilirubin in dried blood serum](#)

Increased levels of bilirubin in blood serum may result from numerous physical conditions including hepatitis, cirrhosis, enzyme deficiency, drug reactions, autoimmune disorders and physiological trauma. No presumptive test for high bilirubin levels in blood serum stains currently exists, which could prove useful in the assessment of crime scenes involving victims with one of the above disorders. Here, the use of ultraviolet 365 (UV 365) is described as a simple, nondestructive method for the detection of blood serum containing elevated levels of bilirubin.

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[Unconventional powder method is a useful technique to determine the latent fingerprint impressions](#)

Background: Fingerprint development techniques are being used for a long time and are considered one among the oldest methods in forensic science used to identify suspects. Fingerprints are one of the most significant types of physical evidence. There are various types of fingerprint patterns such as visible, plastic and latent. In criminal investigation cases, chance fingerprint impressions are mostly found at the crime scene. These prints are generally invisible and therefore require several development methods. The powder dusting technique of developing fingerprints involves the application of fine powder on the impression of the print with the help of a brush such as glass fiber or a camel hair brush.

Main text: This paper rather focuses on various unconventional powder methods than the widely used conventional ones. This will help identify other cheaper, non-toxic powders that are commonly available as an alternative to the expensive, toxic ones. The author's main aim is to provide a collective review of the work of other scientists in order to identify everyday materials, commonly available that can be used as possible means to develop a fingerprint impression.

Conclusion: For a better result, the unconventional powder is used on different surfaces i.e. porous, non-porous, and semi-porous for latent fingerprint impressions. After developing impressions on different surfaces, we conclude our result that unconventional powder is very useful.

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[A study on cyber financial frauds in the district of Jamtara, Jharkhand](#)

The study has been undertaken to investigate the determination of digital financial fraud (cyber fraud) in Jamtara district of Jharkhand (the hub of cyber fraudsters) the basic tools & techniques which are used by the offenders and to find out the socio-economic condition of their social life & find the new challenging in cybercrime investigation and to find out the more secure way of digital financial flow, by using survey research method and work on secondary as well primary data which was related to this study, cybercrime especially financial fraud becomes the new challenging task for law enforcement agencies.

Digital financial frauds are being within an undefined jurisdiction so it becomes more difficult to investigate the cases and due to other different public as well private sectors of service providers like the telecom companies and the banks are unable to make the defensive system for their customer also. This is the main reason for delays in cyber-related case investigation and a very low conviction rate in cyber-related cases.

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[Forensic science deals with safety armour during warfare explosives](#)

ems. Preliminary field tests may be used for screening the debris on the explosion site. They include commercially available explosive vapor detectors and chemical color tests. Like post-explosion residues, personal items suspected to contain traces of explosives and hand-swabs, are often heavily contaminated. It is therefore of major importance that the analytical procedures have to include good screening, clean-up, and extraction methods. The main explosives dealt with in this chapter include nitroaromatic explosives, such as 2,4,6-trinitrotoluene (TNT) and 2,4,6, N-tetranitro-N-methyl aniline (tetryl), nitrate esters, such as ethylene glycol dinitrate (EGDN), glycerol trinitrate (nitroglycerin, NG), and pentaerythritol tetranitrate (PETN), and nitramine explosives, such as 1,3,5-trinitro-1,3,5-triazacyclohexane, (RDX) and 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane (HMX), as well as mixtures containing one or more of these explosives. Additional explosives include triacetone triperoxide (TATP) and ammonium nitrate (AN),  $\text{NH}_4\text{NO}_3$ .

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## Research Article

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### [A study on the determination of sex using lip print patterns among indigenes of Akwa Ibom State, Nigeria](#)

The lip print pattern is the characteristic pattern of the wrinkles and grooves present on the labial mucosa. This study evaluated the determination of sex among indigenes of Akwa Ibom State, Nigeria using lip print patterns. 100 subjects (50 males and 50 females), aged 18-25 years participated in the study. With written consent, lip prints were collected from the subjects. Samples were analyzed using Suzuki and Tsuchihashi classification of lip prints. The lip samples were analyzed as a whole and then divided into six portions Right Upper Portions, Middle Upper Portion, Left Upper Portion, Right Lower Portion, Middle Lower Portion and Left Lower Portion and analyzed differently. Data were analyzed using the Chi-square test and T - test analysis. The result shows that the most prevalent lip print in males considering the lip as a whole is Type I (29%) while that of the females is Type I' (32%). In six portions, there was a significant difference ( $p < 0.05$ ) between the lip print patterns in male and female subjects in the Right Upper Portion (25.960), Left Upper Portion (15.455) and Middle Left Portion (19.948) suggesting that these portions can be effectively used for sex determination among these indigenes. There was no significant difference ( $p > 0.05$ ) between the thickness of lip in males and in females but, the lower lip was significantly thicker ( $p < 0.01$ ) than the upper lip in both gender. Results also showed that the length of lips in males was significantly longer ( $p < 0.01$ ) than that of females. This study, therefore, concludes that determination of sex among indigenes of Akwa Ibom State using lip length and lip print patterns in specific portions of Right Upper Portion, Left Upper Portion and Middle Left Portion can be effectively done.

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## Research Article

**Published Date:- 2022-01-12**

### [Rapid and sensitive identification of cow and buffalo species and gender in tissue/meat samples impounded from different spots in Delhi NCR India by Real Time PCR](#)

The objective of this study was to obtain a fast, accurate and reliable method of species identification of unknown biological samples for forensic applications, especially in illegal trade of animals as well as meat fraud. Meat fraud and adulteration not only affects the market but also increases the risk of religious and ethnic conflicts around the world [1]. In this study, species-specific and gender differentiating Real time PCR technique was employed to analyse 15 meat samples collected from a suspected site. Out of 15 samples collected from suspected site, 54% and 13% samples were of Cow and buffalo origin respectively. All 54% cow samples were of male while one each of buffalo were of male and female origin. Two samples were inconclusive. These findings indicated that species and gender-specific PCR is very sensitive and can be used for forensic species identification and the detection of meat fraud and adulteration.

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## Case Report

**Published Date:- 2022-01-07**

### [Genetic identification of three exhumed human remains at a hospital in Ghana: a forensic case report](#)

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DNA identification is very important in cases of high decomposition of dead bodies, in which the bodies cannot be identified by physical means.

To compare the results of DNA typing, it is necessary to have related subjects with which to perform comparative analyses. Such tests are normally performed by comparing DNA profiles from people known to be immediate family members of the presumptive victim, such as parents or children because they share half of their genetic material with the unidentified.

We report on how DNA analysis was used to solve a case of mixed-up bodies at a local mortuary in Ghana, West Africa. Two families and three buried human remains were in contention in this case. The first body (E9) was buried three months before exhumation. The second body (E11) was buried two and a half months before exhumation while the third body (E10) was buried a month before exhumation. Exhibit E5 was taken from an alleged child of the deceased, E11. Toenails of the exhumed bodies were sampled by a pathologist and used for DNA extractions using the QIAamp DNA Investigator Kit.

Profiles from relatives were generated for comparison purposes. All samples gave a quality amount of genomic DNA after quantification. DNA was amplified with a GlobalFiler PCR amplification kit. Profiles from relatives were generated for comparison purposes.

The human remains (exhibit E11) cannot be excluded as the biological father of the child (exhibit E5) because they share common alleles at all 23 genetic loci. The applicable combined paternity index was 17218125604.492 assuming a prior probability of 0.5. The probability of paternity is 99.99999999%. Based on this relationship testing, one of the bodies was successfully identified and handed over to the family for re-burial.

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## Research Article

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### [Extraction of DNA from face mask recovered from a kidnapping scene](#)

Deoxyribonucleic acid (DNA) extraction has considerably evolved since it was initially performed back in 1869. It is the first step required for many of the available downstream applications used in the field of molecular biology and forensic science. Blood samples is one of the main body fluid used to obtain DNA. This experiment used other body fluids such as saliva, sweat tears and mucus. There are many different protocols available to perform nucleic acid extraction on such samples. These methods vary from very basic manual protocols to more sophisticated methods included in automated DNA extraction protocols. This experiment used extraction kit (Zymo research). The DNA result from isolated saliva samples on the facemask range from 133.7, 213.6, 599.1 and 209.1 mg/ml. theoretically; such DNA is of much quantity and quality and can be used for forensic investigation when recovered from a crime scene. The DNA from isolated tears samples on the face mask ranges from 707.7, 202.5, 99.2, and 62.6 mg/ml. Theoretically, such DNA is of much quantity and quality and can be used for forensic investigation when recovered from a crime scene. The DNA from isolated tears samples on the face mask ranges from 615.3, 66.2, 78.5, and 68.2 mg/ml. theoretically, such DNA is of much quantity and quality and can be used for forensic investigation when recovered from a crime scene. Extracted DNA from saliva and sweat produced visible bands on agarose gel, mucous stain produce obscure band on agarose gel and the tears stain produce invisible bands. DNA from sweat stain, saliva stain, mucus stain and tears stain in face mask can be used as alternative for forensic investigation.

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