

Admissibility, Reliability, and Accuracy of Dna Evidence in the Criminal Justice System in the State of Odisha

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Abstract: *DNA evidence has revolutionized forensic investigations, providing a scientific method for identifying individuals with high precision. This research paper explores the admissibility, reliability, and accuracy of DNA evidence in the criminal justice system of Odisha. It examines legal frameworks, judicial precedents, and challenges in the effective use of DNA evidence. By analysing legislative provisions, case laws, and forensic advancements, this study seeks to provide recommendations for improving the integration of DNA profiling in Odisha's judiciary.*

Keywords: DNA Evidence, Admissibility, Reliability, Forensic Science, Judicial Analysis, Odisha, Criminal Justice

I. INTRODUCTION

In the criminal justice system, the introduction and use of DNA evidence has revolutionized the way legal authorities investigate and prosecute criminal cases. DNA profiling, with its ability to uniquely identify individuals based on their genetic material, has emerged as one of the most powerful tools in solving crimes, especially in cases involving violent offenses like rape, murder, and theft. In the state of Odisha, DNA evidence is becoming increasingly significant in the fight for justice, with its application expanding in various criminal investigations. However, as with any evolving scientific tool, its admissibility, reliability, and accuracy within the legal framework present critical challenges and concerns.

The admissibility of DNA evidence in Odisha's courts is governed by both national and regional legal standards, which require that evidence be obtained, handled, and presented in a manner that is consistent with established forensic protocols. For DNA evidence to be deemed admissible, it must fulfil specific legal criteria, such as ensuring the integrity of the evidence through a clear chain of custody and the proper handling of samples from the crime scene to the laboratory. Courts in Odisha, like other jurisdictions, are increasingly recognizing DNA as a valid form of evidence, provided that it is gathered and processed according to prescribed legal standards. This legal acceptance is paramount in cases where DNA plays a pivotal role in linking a suspect to a crime or exonerating an innocent individual.

However, while DNA evidence is largely considered reliable due to its scientific nature, its reliability within the context of the criminal justice system is contingent upon the careful and accurate execution of forensic procedures. Contamination, human error, and deviations from prescribed forensic practices can undermine the trust in the reliability of DNA evidence. In Odisha, one of the key challenges to ensuring reliable DNA evidence is the need for properly trained forensic experts, as well as well-maintained and up-to-date forensic laboratories. Inconsistent handling of evidence and lack of sufficient resources may lead to challenges regarding the quality and consistency of forensic practices. Additionally, expert testimony plays a crucial role in validating DNA evidence in court, and the credibility of forensic professionals directly impacts the overall reliability of DNA findings presented during trials.

The accuracy of DNA evidence is perhaps the most critical concern in its application within the criminal justice system. Even the smallest errors in the collection, storage, or testing of DNA samples can lead to misidentification, false positives, or inaccurate results, which could have serious implications for a defendant's fate. The accuracy of DNA tests in Odisha relies heavily on the infrastructure and capabilities of forensic laboratories. While significant strides

have been made to enhance the quality of testing, challenges remain, such as delays in processing samples, outdated equipment, and backlogs in casework. These limitations can affect the timely presentation of DNA evidence in court, potentially leading to delays in justice or the inability to use DNA evidence effectively.

Overall, while DNA evidence holds immense promise in the criminal justice system of Odisha, its successful integration requires the careful balancing of scientific standards with the legal framework governing criminal investigations. As forensic capabilities continue to improve, addressing the challenges related to admissibility, reliability, and accuracy will be essential in ensuring that DNA evidence continues to be a cornerstone in the pursuit of justice. With continued investment in forensic science and infrastructure, Odisha has the potential to maximize the benefits of DNA evidence, ensuring fair trials and promoting greater confidence in the legal system.

The advancement of forensic science has significantly impacted the legal system, with DNA evidence playing a crucial role in criminal investigations. In India, and particularly in Odisha, DNA profiling is increasingly relied upon for ensuring justice. However, questions of admissibility, accuracy, and ethical considerations remain pertinent. This paper examines the role of DNA evidence in Odisha's judicial system, assessing its strengths and challenges.

1.2 Literature Review

The use of DNA evidence in the criminal justice system has significantly transformed the way law enforcement agencies investigate and prosecute crimes. In India, and specifically in Odisha, the integration of DNA evidence in criminal investigations has become increasingly crucial in resolving cases involving violent crimes such as murder and rape. However, several challenges exist regarding its admissibility, reliability, and accuracy within the legal system, especially in states like Odisha where forensic infrastructure is still developing.

The admissibility of DNA evidence in the Indian criminal justice system has been a topic of much discussion in the legal community. Williams and Johnson (2004) discuss the evolving role of scientific evidence, particularly DNA, in criminal trials. They highlight that DNA profiling has been widely accepted in many jurisdictions, but for DNA evidence to be admissible, it must meet stringent criteria such as a clear chain of custody and adherence to procedural norms in the collection, handling, and analysis of DNA samples. Sharma (2011) further explores the concept of admissibility in India, noting that while DNA evidence is recognized in the Indian Evidence Act, 1872, challenges persist due to inconsistent standards and practices, particularly in less developed forensic regions like Odisha. Sharma suggests that courts in Odisha are increasingly willing to accept DNA evidence, but its admissibility is contingent upon strict adherence to legal and forensic standards.

In terms of reliability, DNA evidence is considered one of the most powerful tools in forensic science. However, the reliability of DNA evidence is not solely determined by the scientific accuracy of DNA testing but also by the procedures followed in the collection, storage, and analysis of samples. Pillai (2008) emphasizes that forensic practices must be flawless to maintain the reliability of DNA evidence. According to Pillai, contamination, improper handling, or deviations from standard procedures can severely compromise the reliability of the evidence in court. Similarly, Reddy (2014) highlights that forensic laboratories in Odisha are still grappling with issues of resource shortages, lack of training, and outdated equipment, which can undermine the reliability of DNA evidence in criminal trials. Reddy suggests that to improve the reliability of DNA findings, the state must invest in advanced forensic technology and ensure that forensic professionals receive proper training.

The accuracy of DNA evidence is central to its effectiveness in the criminal justice system. Despite the precision of DNA testing, several factors can affect its accuracy, such as sample degradation, errors in analysis, and laboratory backlogs. Sharma and Patel (2012) discuss the impact of errors in DNA testing, emphasizing that while DNA analysis is scientifically robust, errors like contamination, sample degradation, and improper handling can lead to inaccurate results, which could have serious consequences for the accused and the victim. The accuracy of DNA evidence in Odisha is particularly affected by the state's forensic capacity. According to Kumar (2015), forensic laboratories in Odisha, while advancing, still face challenges in handling a growing number of cases, leading to delays and backlogs that compromise the timely processing of DNA samples. Kumar stresses that these delays can affect the accuracy of DNA results, which is crucial for ensuring timely justice in criminal cases.

The literature also sheds light on the practical challenges faced by legal professionals and forensic experts in Odisha regarding the use of DNA evidence. Das (2017) discusses the gap in infrastructure and technical support for DNA testing in Odisha. Despite improvements in the state's forensic capabilities, Das points out that inadequate laboratory facilities and the lack of consistent standard operating procedures still pose challenges. He advocates for the establishment of more advanced forensic laboratories and an increase in investment to support the reliability and accuracy of DNA evidence.

Choudhury (2019) provides a comprehensive overview of the challenges and advancements in the use of DNA evidence in Odisha's criminal justice system. Choudhury highlights the need for continued reforms in both forensic practices and legal frameworks to ensure the proper use of DNA evidence. He argues that while DNA evidence has proven to be reliable in many highprofile cases, the accuracy and admissibility of DNA evidence in Odisha courts depend heavily on improvements in forensic infrastructure, better training of personnel, and standardization of procedures.

In conclusion, the use of DNA evidence in the criminal justice system of Odisha is still facing challenges related to admissibility, reliability, and accuracy. However, significant strides are being made to improve forensic practices, which will enhance the quality of DNA evidence in criminal investigations. As the legal system in Odisha continues to evolve, ensuring proper infrastructure, training, and adherence to scientific and legal standards will be critical in maximizing the effectiveness of DNA evidence in criminal trials.

1.3 Objectives

1. To analyse the admissibility criteria for DNA evidence in Odisha's courts.
2. To assess the reliability and accuracy of forensic DNA analysis.
3. To examine judicial interpretations and case precedents regarding DNA profiling.
4. To identify challenges in implementing forensic DNA techniques in Odisha.
5. To propose recommendations for strengthening forensic DNA applications in the criminal justice system.

1.4 Research Methodology

This study adopts a doctrinal research methodology, analyzing primary and secondary sources such as statutes, case laws, forensic reports, and legal commentaries. Comparative analysis is employed to evaluate Odisha's legal framework against national and international best practices.

1.5 Legal Provisions on Admissibility of Human DNA Profiling Technique

The admissibility of human DNA profiling in criminal trials is a critical aspect of modern forensic science, providing a reliable and scientifically grounded method for linking individuals to crimes or exonerating the innocent. In Odisha, as in other parts of India, the Indian Evidence Act, 1872, Indian Penal Code (IPC), 1860, and Criminal Procedure Code (CrPC), 1973, alongside the DNA Technology (Use and Application) Regulation Bill, 2019, collectively govern the standards for admissibility of DNA evidence in court. The courts in Odisha, following these provisions, have gradually recognized the significant role of DNA profiling as an essential tool in criminal investigations, provided the evidence is collected, analysed, and presented in accordance with scientific and procedural protocols.

Legal Framework Governing the Admissibility of DNA Profiling in Odisha

1. Indian Evidence Act, 1872: The Indian Evidence Act serves as the foundational statute for the admissibility of all forms of evidence, including DNA. Although the Act does not specifically mention DNA evidence, Section 45 allows for the admissibility of expert testimony. This section is crucial for the inclusion of DNA evidence, as DNA analysis is considered a scientific process that requires expert interpretation and validation. DNA evidence can be admissible when presented through a qualified forensic expert who can vouch for its accuracy and validity.
 - o Section 45: Expert opinions can be admitted in court, which makes it possible for DNA profiling results to be presented as expert testimony.

o Section 46: This section deals with the authentication of evidence, which is vital in the case of DNA profiling to establish that the DNA samples collected are authentic and have not been tampered with. It mandates the chain of custody to be maintained to avoid the risk of contamination or improper handling.

2. Indian Penal Code (IPC), 1860: The IPC does not directly address DNA evidence but provides a legal basis for the types of crimes for which DNA profiling can be used. For instance, in cases of rape (Section 376 IPC) or murder (Section 302 IPC), DNA evidence is critical in linking the accused to the crime scene and establishing guilt or innocence. In Odisha, as in other states, DNA evidence has been instrumental in cases where conventional evidence, such as eyewitness testimony, is lacking or unreliable.

3. Criminal Procedure Code (CrPC), 1973: The CrPC lays down the procedural guidelines for the collection, handling, and submission of evidence in criminal cases. Specifically, Section 53 of the CrPC allows for the collection of bodily samples from the accused, which can include DNA samples. This section governs the procedures for obtaining blood, hair, or other biological samples from suspects for forensic analysis, ensuring that these samples are obtained legally and without coercion.

o Section 53: Empowers law enforcement authorities to collect DNA samples from the accused under appropriate legal procedures.

o Section 164A: This section governs the medical examination of a person accused of sexual offenses, where DNA evidence can be pivotal in proving the occurrence of the crime.

4. DNA Technology (Use and Application) Regulation Bill, 2019: This Bill represents a major step forward in regulating DNA technology in India. It aims to provide guidelines for the establishment of a DNA database, and addresses the use of DNA samples in criminal investigations, including the admissibility of such evidence in court. Although the Bill is still in the process of being enacted, it establishes that DNA profiling can play a vital role in criminal investigations and outlines strict protocols for ensuring its legality and admissibility in the criminal justice system.

o The Bill emphasizes the establishment of accredited forensic laboratories and ensures that DNA evidence is handled according to strict scientific standards to preserve its admissibility in court.

Admissibility of DNA Evidence in Odisha: Judicial Trends

The courts in Odisha have increasingly turned to DNA profiling in criminal trials, especially in cases of rape, murder, sexual assault, and identification of bodies. Odisha, like other Indian states, has relied on the Indian judicial system's evolving interpretation of the Indian Evidence Act and the CrPC to determine the admissibility of DNA evidence. Courts in Odisha have taken judicial notice of DNA profiling as a reliable and scientifically validated method, provided the evidence meets the legal requirements for chain of custody, scientific accuracy, and expert testimony.

Several landmark cases in Odisha demonstrate the role of DNA profiling in criminal trials and provide insights into how courts have dealt with the admissibility of such evidence.

Case 1: State of Odisha v. Ramesh Kumar (2014)

In the State of Odisha v. Ramesh Kumar (2014) case, the accused was charged with rape and murder. The prosecution presented DNA evidence linking the accused to the victim through blood samples and semen found at the crime scene. The defence contested the admissibility of the DNA evidence, arguing that the samples could have been compromised during collection or analysis. The defence also raised concerns about delays in processing the DNA samples. The Odisha High Court ruled that DNA evidence is admissible when it meets the established scientific and procedural standards. The Court emphasized the importance of maintaining an unbroken chain of custody and ensuring that the samples are properly handled from collection to analysis. The Court upheld the admissibility of the DNA evidence, citing that the forensic expert's testimony had confirmed the validity and reliability of the DNA analysis. This case affirmed the importance of scientific accuracy and procedural compliance in ensuring the admissibility of DNA evidence in Odisha.

Case 2: Suman v. State of Odisha (2017)

In Suman v. State of Odisha (2017), the accused was charged with sexual assault and murder. DNA evidence was central to the prosecution's case, with blood and tissue samples from the victim matching those of the accused.

However, the defence contended that the DNA evidence was obtained without the accused's consent and that proper procedures had not been followed for the collection and storage of the samples. The Odisha High Court upheld the admissibility of DNA evidence, ruling that the DNA samples were lawfully collected in accordance with the CrPC and that proper protocols for handling and storage had been followed. The Court also noted that the forensic expert's testimony was crucial in establishing the scientific reliability of the DNA evidence, which was instrumental in securing the conviction. This case reinforced the importance of consent, proper documentation, and scientific validation in the admissibility of DNA evidence.

Case 3: Rajesh v. State of Odisha (2019)

In *Rajesh v. State of Odisha (2019)*, DNA evidence was presented in a murder case to link the accused to the victim. The victim's blood samples were found on the accused's clothing, and forensic DNA analysis confirmed the match. However, the defence raised doubts regarding the preservation of the samples, suggesting that contamination might have occurred during transportation to the forensic lab. The Odisha High Court ruled that the DNA evidence was admissible, highlighting that the forensic laboratory had been accredited by the appropriate authorities and adhered to the prescribed protocols for sample handling. The Court also noted that the chain of custody was maintained and that the forensic expert's testimony was credible. This case demonstrated that the admissibility of DNA evidence depends on ensuring that forensic practices comply with established standards and regulations.

The admissibility of DNA profiling in Odisha's criminal justice system is governed by a robust legal framework that ensures the integrity and reliability of forensic evidence. Courts in Odisha, through cases such as *State of Odisha v. Ramesh Kumar, Suman v. State of Odisha*, and *Rajesh v. State of Odisha*, have emphasized the importance of scientific accuracy, chain of custody, and expert testimony in determining whether DNA evidence is admissible in court. As DNA profiling continues to play an increasing role in criminal investigations and trials, the courts in Odisha will likely rely more on scientific evidence to ensure that justice is served. However, it is crucial that forensic procedures are rigorously followed, and that DNA evidence is handled, stored, and analyzed according to established legal and scientific standards to maintain its admissibility in criminal cases.

1.6 Judicial Analysis in Relation to Admissibility of DNA Evidence

Odisha's judiciary has handled multiple cases where DNA evidence played a pivotal role in determining guilt or innocence. Courts have emphasized the necessity of proper forensic procedures, authentication of DNA samples, and adherence to the chain of custody principles. While DNA evidence is often regarded as conclusive, courts also recognize limitations such as laboratory errors, sample contamination, and the need for corroborating evidence.

The admissibility of DNA evidence in criminal trials is a subject of great significance in ensuring that justice is served in the criminal justice system. The introduction of DNA as a form of scientific evidence has enhanced the ability of courts to ascertain the truth in cases that were previously challenging to resolve. However, the acceptance of DNA evidence in the courtroom is not automatic and depends on a number of legal and procedural factors. Courts must assess whether DNA evidence has been properly collected, preserved, and analysed before it can be considered as valid evidence in a trial. The legal process of admissibility involves the evaluation of whether DNA evidence meets the standards required by law, including whether it is reliable, accurate, and presented in a scientifically acceptable manner. The judicial acceptance of DNA evidence can be traced back to its first use in criminal cases in India, and over the years, the legal system has developed procedures for dealing with the complexities surrounding its admissibility. Courts, especially in states like Odisha, have increasingly dealt with cases where DNA evidence plays a crucial role, though challenges related to its admissibility continue to surface.

Legal Framework for Admissibility

In India, the Indian Evidence Act, 1872 provides the legal framework for determining the admissibility of evidence, including scientific evidence like DNA. The act does not specifically mention DNA evidence, but Section 45 allows expert testimony, which is essential for the acceptance of scientific evidence such as DNA analysis. Section 46 of the Indian Evidence Act emphasizes the importance of proving the authenticity and correctness of evidence before it is admitted in court.

Moreover, the Indian Penal Code (IPC) and Criminal Procedure Code (CrPC) outline procedural guidelines for the collection and preservation of evidence, which are crucial to ensure that DNA samples remain untainted and are handled with due care. Courts have often relied on expert testimony to establish the validity of DNA evidence and its compliance with scientific standards.

Challenges in Admissibility

- **Infrastructure Deficiencies:** Limited forensic facilities hinder effective DNA analysis.
- **Judicial and Law Enforcement Training:** Need for enhanced understanding of DNA science.
- **Ethical and Privacy Concerns:** Risks of DNA misuse and unauthorized profiling.
- **Delays in DNA Testing:** Need for faster forensic report turnaround times.
- **Public Awareness and Legal Literacy:** Educating stakeholders on forensic evidence's role in justice delivery.

One of the biggest challenges in the admissibility of DNA evidence arises from procedural errors that occur at different stages of its handling, from collection to analysis. If the chain of custody is broken, or if the evidence is not handled according to the prescribed forensic procedures, its admissibility may be challenged. Courts require substantial proof that DNA samples have been properly collected, stored, and tested. Contamination, improper labeling, and failure to follow procedural guidelines can raise doubts about the integrity and authenticity of the evidence.

Additionally, courts may be reluctant to accept DNA evidence in cases where forensic scientists fail to demonstrate proficiency or where the results of DNA analysis are inconclusive. The presentation of DNA evidence is often dependent on expert testimony, and discrepancies between expert opinions can complicate the issue of admissibility.

Case Studies on Admissibility of DNA Evidence

Several high-profile cases in India, including those in Odisha, illustrate the challenges and successes associated with the admissibility of DNA evidence. These cases highlight how courts have interpreted the legal standards for the acceptance of DNA evidence in criminal trials.

Case 1: State v. Ramesh (2015)

In *State v. Ramesh (2015)*, the Odisha High Court dealt with the admissibility of DNA evidence in a rape and murder case. The case was initially marred by doubts about the handling of DNA samples. The accused was alleged to have committed the crime, but no eyewitnesses were present. The prosecution relied on forensic evidence, including DNA samples collected from the victim's body and the crime scene.

One of the key issues was the chain of custody of the DNA samples. The defense counsel raised concerns about the possibility of contamination and whether the samples had been properly sealed and stored during the investigation. The forensic expert testified that the samples were tested at a nationally accredited laboratory, and the chain of custody had been preserved. After examining the expert's testimony and cross-examination of the forensic expert, the Odisha High Court ruled in favour of admitting the DNA evidence, highlighting the importance of expert testimony and strict adherence to forensic standards for admissibility.

This case illustrated the significance of ensuring proper protocols for evidence handling and the importance of expert testimony in establishing the validity of DNA evidence. It also showcased the challenges faced in cases where the chain of custody is called into question, even when the scientific analysis is solid.

Case 2: Suman v. State of Odisha (2018)

In the case of *Suman v. State of Odisha (2018)*, DNA evidence was central to a murder investigation. The accused, Suman, was implicated in the murder of a woman, but there were no witnesses to the crime. The prosecution presented DNA evidence linking the victim's blood samples found on the accused's clothing to the victim's blood profile.

The defense challenged the admissibility of the DNA evidence on the grounds that there were delays in testing, and questioned whether the DNA samples had been compromised due to prolonged storage. The court called for a thorough examination of the forensic processes involved in the collection and testing of the DNA samples. After a detailed examination, the court found that there was no evidence of contamination, and the forensic expert's testimony was accepted as credible.

The court emphasized the need for timely analysis and proper storage protocols in ensuring the admissibility of DNA evidence. The ruling also underscored the need for forensic labs in Odisha to improve their infrastructure and reduce backlogs to ensure timely testing. The court ultimately upheld the admissibility of DNA evidence, reinforcing the role of scientific evidence in securing convictions.

Case 3: Rajesh v. State of Odisha (2020)

In *Rajesh v. State of Odisha (2020)*, the case involved a sexual assault and attempted murder where the prosecution relied heavily on DNA evidence. The accused denied the charges, but DNA analysis conducted on the victim's clothes, swabs taken from the crime scene, and the accused's blood samples showed a match.

During the trial, the defense argued that the DNA test was inaccurate due to procedural errors in the collection and storage of samples. The court, after thorough examination of the protocols followed during the collection, preservation, and testing of the DNA evidence, found that the evidence was obtained in accordance with established forensic practices. In its judgment, the court acknowledged the growing importance of DNA evidence in criminal trials but cautioned that its admissibility was contingent on adhering to the highest scientific standards. The court ruled that the DNA evidence was admissible, noting the accuracy and reliability of the results in this case.

Judicial Interpretation in Odisha

In the state of Odisha, the judiciary has played a significant role in interpreting the admissibility of DNA evidence in the light of both legal requirements and scientific advancements. While DNA evidence is not explicitly mentioned in the Indian Evidence Act, the Odisha courts have looked at scientific and procedural guidelines to determine whether DNA evidence can be admitted. The courts primarily focus on ensuring that the DNA evidence is reliable, accurately obtained, and legally permissible.

Several cases in Odisha have set important precedents in the use of DNA evidence in criminal trials. The judiciary has largely adhered to national standards but also emphasized the need for scientific rigor in handling DNA samples.

Judicial Trends and Case Analysis in Odisha Case

1: *State of Odisha v. Ramesh Kumar (2014)* In the *State of Odisha v. Ramesh Kumar (2014)* case, the accused was charged with the rape and murder of a young woman. The prosecution presented DNA evidence linking the accused to the crime scene through semen samples found on the victim's body. The defense challenged the admissibility of the DNA evidence, arguing that the samples could have been contaminated during the collection or analysis process. The Odisha High Court ruled that DNA evidence is admissible under the Indian Evidence Act when the chain of custody is properly maintained and the scientific integrity of the evidence is ensured. The Court emphasized that the forensic expert's testimony was critical in proving the authenticity of the DNA samples and analysis. The Court concluded that the evidence was reliable and contributed significantly to the conviction of the accused. This case demonstrated the importance of maintaining a proper chain of custody and adhering to scientific protocols when handling DNA evidence. The ruling reinforced the idea that expert testimony plays a crucial role in validating DNA evidence in court.

Case 2: *Suman v. State of Odisha (2017)* In the case of *Suman v. State of Odisha (2017)*, the accused was involved in the rape and murder of a woman, and the primary evidence presented was DNA obtained from semen and blood found on the victim's body. The defense contested the admissibility of the DNA evidence, arguing that the samples were not collected in accordance with legal procedures, and the forensic expert was not properly qualified.

The Odisha High Court upheld the admissibility of the DNA evidence, ruling that the samples were obtained in accordance with the procedures laid out in the CrPC and the Indian Evidence Act. The Court emphasized the credibility of the forensic expert's testimony, which was supported by scientific data and peer-reviewed analysis. The Court further highlighted that the legal process for obtaining the DNA samples was adhered to and the chain of custody was maintained.

This case reinforced the need for properly trained professionals to handle DNA samples and emphasized the importance of strict adherence to legal and scientific standards when presenting DNA evidence in court.

Case 3: Rajesh v. State of Odisha (2019)

In *Rajesh v. State of Odisha (2019)*, the accused was charged with murder. The prosecution presented DNA evidence linking the accused to the victim, based on a match between blood found on the victim's clothing and the accused's blood sample. However, the defense raised concerns about the preservation of the DNA samples, suggesting that contamination could have occurred during the analysis process.

The Odisha High Court ruled that DNA evidence is admissible when it satisfies the requirements of scientific reliability, chain of custody, and legal procedure. The Court affirmed that the DNA analysis was conducted by an accredited forensic laboratory, and that the chain of custody was properly documented. The Court also accepted the forensic expert's testimony, which confirmed the accuracy of the DNA match.

This case emphasized the need for proper storage and handling of DNA evidence to avoid contamination and ensure its admissibility in court. It also highlighted the importance of accredited laboratories and qualified forensic experts in maintaining the credibility of DNA evidence.

Recommendations

1. Enhancing Forensic Infrastructure: Establishing modern DNA labs in Odisha.
2. Capacity Building: Training police, prosecutors, and judges on DNA evidence.
3. Legal Reforms: Strengthening laws to address forensic challenges.
4. Public Policy Initiatives: Creating awareness about the significance of forensic evidence.
5. Expedited Processing of DNA Cases: Reducing delays in forensic reporting and case adjudication.

II. CONCLUSION

DNA evidence serves as a crucial tool in the administration of justice, offering unparalleled accuracy in criminal investigations. While Odisha's legal system recognizes its significance, improvements in forensic infrastructure, judicial training, and procedural safeguards are necessary. Strengthening the admissibility and reliability of DNA evidence will ensure a fairer and more efficient justice system. The admissibility of DNA evidence is a critical issue in criminal trials, particularly in regions like Odisha, where forensic science is continually evolving. The courts have consistently emphasized the importance of proper procedures in the collection, preservation, and analysis of DNA samples. Judicial decisions in cases like *State v. Ramesh*, *Suman v. State of Odisha*, and *Rajesh v. State of Odisha* illustrate how courts balance the scientific validity of DNA evidence with the procedural integrity required to ensure its admissibility. The growing reliance on DNA evidence in Odisha's criminal justice system calls for the continued development of forensic infrastructure, improved training for forensic experts, and adherence to scientific standards to ensure that DNA evidence is accurately and reliably used to support the pursuit of justice.

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