IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138
INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG
An International Open Access, Peer-reviewed, Refereed Journal

DETECTION OF BLOOD FROM RUSTED IRON SURFACE USING TEICHMAN AS CONFIRMATORY TEST

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Abstract : At many crime scenes the blood is found as evidence on different surfaces (cloth, floor, soil, bed-sheet, etc). As blood is biological fluid its properties may be changed according to surface that may interfere in our laboratory results of the analysis of suspected blood stains. This changes vary according to the surface, their composition, environmental effects on surfaces where bloodstain may be found. According to the study, the overall study was of the examination of blood is on dark fabric(visualization assay) , fabric of twelve different types, detection of blood stain on fabric with detergent wash, species identification using blood stain from iron rusted surfaces. I have taken research topic of detection of blood from rusted iron surfaces. Because somewhere the rusted iron surface will do effect on haemoglobin content of the blood that will give difference in results of examination of blood. Here I have taken rusted iron surfaces for the blood stain detection whether the stain found on it is blood or not and how this surface give results on performing test of Teichman reagent as confirmatory test for blood. The whole test will be done for 30 days' time period on each day after 24 hours of deposit of stain on that iron rusted surface. And after 20 day to day 30 the color of the crystals started to fade from medium brown to slighter light brown colour. Thought not much change in color difference.

Index Terms **- Blood,Surface,Confirmatory test,stain,fabric.**

I. INTRODUCTION

In crime scene the blood, bloodstains is found as evidence. In cases like homicide, murder, rape, assault, etc. The blood is potent evidence as it provide source of DNA hence in identifying the person whose blood found at the crime scene. All the unnatural death specially where physical injury is done there is lot of chances to find blood as biological evidence. In primary condition we don't know whose blood is that. It may of victim, suspect, or anyone who may there to save victim. So after examination only, the blood will reveal identity of that person. As blood is biological evidence there are chances of deteriorating of it according to factors like surface, environmental condition, etc., So it's important for that the forensic expert must have prior knowledge of it. Same as for blood on specific surface like rusted iron surface. [1]In most of the criminal cases found blood on the rusted iron surfaces which may be gave positive or negative result during the analysis and this is drawback for the investigation.

And our aim is to find the changes that may occur if blood found on that surface. Lot of crime related to murder found on construction sites in the city and there is huge possibility of use of such weapons of iron having rusted, or finding blood on such surfaces. Here the changes in blood detection on rusted iron surface are observed using confirmatory test for blood. Because if we know what are the changes and results then and only we can subject it to the further process of DNA extraction.

First it is important collect blood as biological evidence and sending suspected stain sample to forensic laboratory. Before proceeding for DNA extraction and analysis it is important to first confirm whether collected suspected stain is blood or not and then further proceedings. As blood detection test in India in forensic science laboratory the Kastle-Meyer Reagent (Phenolphthalein assay) is used as presumptive test for blood. And Takayama and Teichman Test used as confirmatory test for blood. Then and only after confirmation the blood is subjected to the blood group typing, species identification and then at last DNA extraction and analysis if the identified species is human.

II. RESEARCH METHODOLOGY

This is the simple research experiment conducted in the lab with five different pieces of slab of rusted iron surface. The blood from volunteer spread over this slab. The reason for taking five slabs rusted iron metal was for the comparative study. After spreading the blood sample over slabs, we let it to dry for one day. And then only from next day my experimental study started. Here for blood detection purpose I performed phenolphthalein reagent test as presumptive test only once and then proceed for Confirmatory test of suspected blood sample that is used in DFSL labs in India according to their manual. As confirmatory test here I have used Teichman Reagent.

2.1. Preparation of Teichman Reagent

Weight 0.1 gm Potassium Chloride/ Potassium Bromide/ Potassium Iodide on weight balance and add it in 100 ml Glacial Acetic acid and mix properly to prepare Teichman reagent. Here I used Potassium chloride.

2.2. Steps for Using Teichman Reagent

Take a cotton swab and wet it with saline water. Now take blood sample from rusted iron surface using swabbing such that swabbing should be done to take blood in concentrated manner in the cotton swab. Here now there are two methods of taking blood stain sample from cloth to test slide.

1)Take a small piece of suspected stains swab on test slide.

2) With the help of tweezers and needle tweeze the wet swab containing blood to the test slide.

Whatever method used, the next step is to put coverslip on it and add a drop of reagent from one side of slide and tilt it toward coverslip till stain is filled with reagent. Subject slide to gentle heat at 65^0C for 10-20 seconds. Cool slide for 30 minutes and then observe in 40X and 100X magnification under light microscope. If confirmatory is successful then brown rhombohedron shaped crystals of Ferroprotoprophyrin Chloride appear, which is the positive reaction for detection oh heme group in blood which is eventually confirmatory test for the blood detection.

2.3. Reaction mechanism of Teichman Reagent with blood

Test based on reaction of heme part of blood with salt and glacial acetic acid to form brown- colored rhombic crystals. These prismatic-rhombic-shaped brown crystals are a sign of the formation of hematin chloride which is also known as ferriprotoporphyrin chloride crystals.

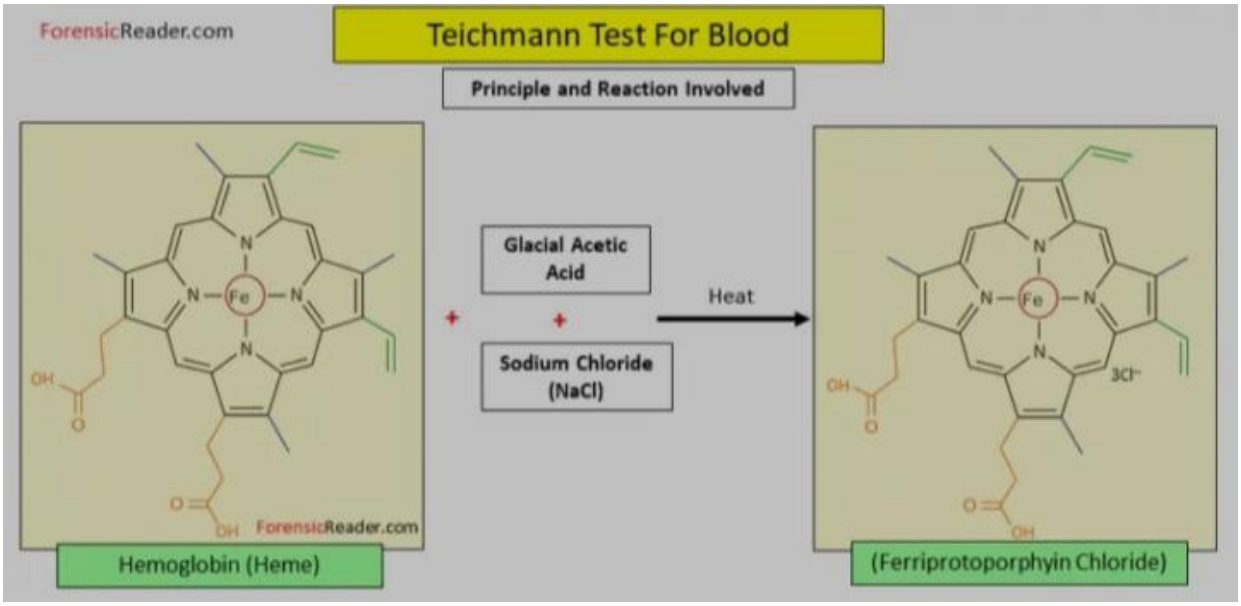

figure 1: reaction of the teichman reagent.[2]

III. RESULTS AND DISCUSSION

3.1 Results

The confirmatory result for detection of blood through rusted iron surface shows the formation and presence of hematin crystals of brown rhombic shape through 40X magnification of objective lens of light microscope as a result of reaction between blood and teichman reagent

For 30 days the experiment was conducted. And test of teichman reagent performed on blood sample spread on rusted iron surface from day 1 to day 30.

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fig.2. red- brown hematin crystals formed on piece of cotton swab.

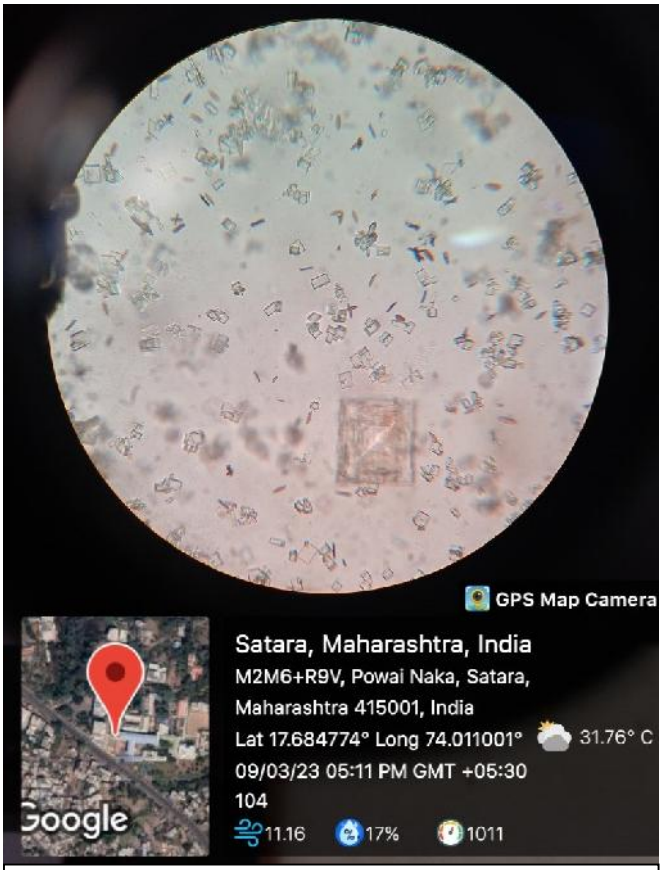

fig.3. clear rhombic hematin crystals formed without using piece of cotton swab. instead tweezers used to tweeze the blood collected on swab to test slide.

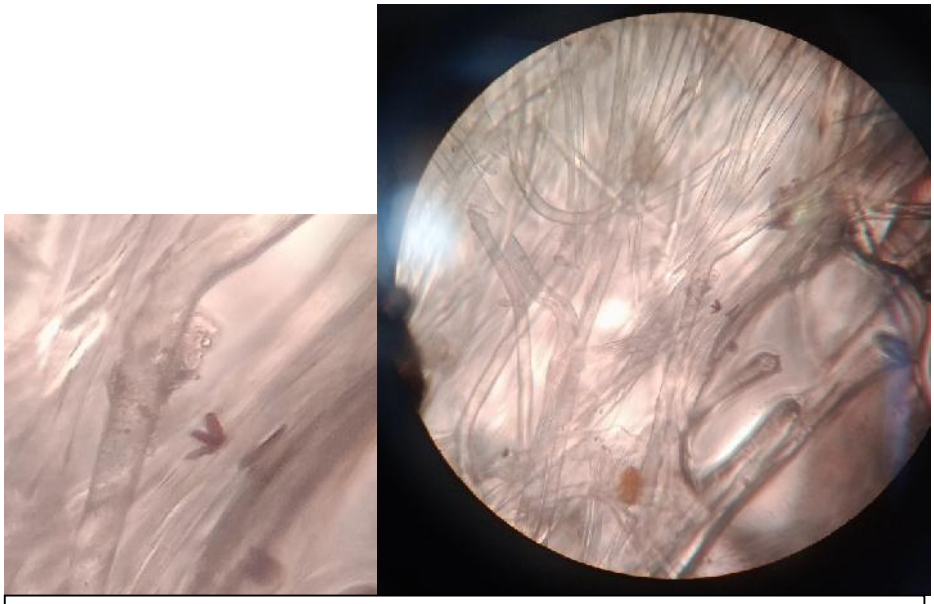

fig.4. clear rhombic hematin crystals formed on piece of cotton swab.

3.2 Discussion

Although the confirmatory test for detection of blood on iron rusted surfaces performed for 30 days. It didn't happen that on performing every day I got confirmatory results for blood. Because for the rusted iron surface the precision for detecting blood is very low. The method you used to collect blood from surface also vary. As you can see first two images I have shown the crystals were formed on fibres of cotton piece taken for test on test glass slide. The amount of crystals formed are low. Means there are some chances that if you don't used very high magnifying power microscope then you will get false results. And whereas in 3rd image you can see the crystals formed after reaction are little bit in more quantity. Because the blood sample that was collected using wet swab with saline water was tweezed with tweezers to remove that blood sample on test glass slide. So here we can say that the second method for collection of blood for doing blood detection test is good mehod. In forensic labs also one of this two methods are used. Many difficulties may be faced that I faced during experiment such as the maintaining amount of heat provided to test slide while performing experiment. One more factor that come in observation blood sample on rusted surface was how bloodstain resemble on that surface. So it observed that the color of blood stain to that iron rusted surface is exactly the same. And it will be difficult to identify blood stain on that surface at once.

The research I conducted here may be useful as information for readers while studying detection of blood on different surfaces. I don't say that this results are truly same for all condition as condition like environmental, surface condition, geographical location can affect the results, even temperature also.

The iron rusted surface is also the potent evidence at crime scene which may have blood sample on it. And it is important to observe it carefully as, through careful observations only we can identify the blood sample on that surface. Next about the confirmatory test of blood as whether it is blood on rusted iron surface. So yes on this surface also we can detect blood but there are difficulties and low precision in results. Here my focus was on detection of blood sample from iron rusted surface. And for that purpose I used teichman reagent as confirmatory detection technique. So this technique according to lab manual of DFSL in India can be used.

III. Acknowledgment

My first sincere gratitude is to my guide Miss. Manjushri Bagul Ma'am, Assistant Professor, Department of Forensic Science, Yashavantrao Chavan Institute of Science, Satara (Autonomous). My second most sincere gratitude is to towards the Mr. Gaurav Varade sir, Assistant Professor, Department of Forensic Science, YCIS, Satara (Autonomous) for providing me suggestions while carrying out experiments through their huge experience in the field of Forensic Science. I give my sincere thanks to our Principal Dr. B. T. Jadhav Sir for giving me opportunity to carry out my project. I heartly thank to Dr. Anita Mali Ma'am, Head of Department of Forensic Science, Yashavantrao Chavan Institute of Science, Satara (Autonomous) for providing all the facilities and permissions I needed for my project work. I also thanks Mr. Vikram Hankare Sir, Incahrge Department of Forensic Science, Yashavantrao Chavan Institute of Science, Satara (Autonomous).

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