Study of Latent fingerprints that are invisible to the naked eye on Various Types of Paper by Iodine and Ninhydrin Test

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Abstract

The purposes of this research were study of latent fingerprint from blood on various types of paper and comparative on the detection of fingerprints on paper with different blood concentrations by iodine and ninhydrin test. This research is experimental research by 10 samples of paper; Copy Paper, Green Read Paper, Newspaper, Corrugate Box, Lottery Ticket, Magazine Paper, Cash Bill, Envelope, Thermal Slip Paper and Brown Envelope after than make the right thumbprint on the paper and then drop the pork blood on the prepared sample paper. In different concentrations is normal pork blood, 1:5 1:10 and 1:100 and then the samples found the latent fingerprint by iodine and ninhydrin test and took a photo latent fingerprint that appeared to count the number of critical points or minutiae with Automated Fingerprint Identification System (AFIS) at Central Police Forensic Science Division 7, Office of Forensic Science. The results showed that 1) All fingerprints appeared on the 10 papers after iodine test, performance were distinct and points of minutiae can be observed more than ninhydrin test. 2) Comparative detection of fingerprints on paper with different blood concentrations by Paired - Sample T-test at normal pork blood ,1:5, 1:10 and 1: 100, with the presence of different latent fingerprint by statistically significant at the .05 level. Appropriate paper in efficiency latent fingerprint on various types of paper by iodine and ninhydrin test on the nature of the porous surface, thin paper and lightweight paper can be observed the appearance of latent fingerprints more than porous surface, thick paper and heavyweight paper. Recommendations from the study indicate that iodine screening is a good method to detect fingerprints on blood-stained paper. Evaporate and Inhalation of iodine is slightly harmless. Inhalation of iodine for breath in long time can cause to be toxin and cancer. Ninhydrin test is not suitable for paper with blood stains. Suggestions should be made to determine the duration of fingerprints from blood stains and other types of paper, such as paper

photo or plastic, such as water bottles, plastic bags and finding other chemicals that will help prolong of latent fingerprints.

Keywords: Latent Fingerprint, Paper, Iodine Test, Ninhydrin Test

Introduction

The social problems that result in these crimes have resulted in various crimes that occur, most of which is found on fingerprints and paper at the scene. Usually evidence of paper types or fingerprints on paper and fingerprint is often found at Crime scene. The paper found at the scene will be photographed for evidence and the paper will still be collected for testing in the laboratory. Since it is important witness object in forensic science found at the scene the crime.

Fingerprints and toes are one thing every human being has in not same common. Even twins with identical faces have fingerprints that are only "similar" but still not "identical". Therefore, fingerprints are important to identify criminals, available from the crime scene. And the detective must search to find the scene of the incident If the fingerprints of the criminals at the scene were found, the investigation is over 50% successful because the fingerprints of the whole world are not the same and not inherited to the offspring. The fingerprints are sometimes that cannot be seen with the naked eye or do not see clearly. We call this type of fingerprint that "Fingerprint" when the criminal incursion is unable to avoid leaving the fingerprint. Fingerprints will occur when touching objects (Athapol et al., 2009). At present, the examination of fingerprints at the scene of the incident in any way depends on the conditions of the place. A major incident, the inspectors should be skilled in the selection of methods. The object for collection by according to subjects and apply. For example, collect fingerprints on witnesses such as paper, wood or metal that are wet with water, choose wet methods will choose the method of collecting substances with ninhydrin which is a method of making the chemical solution adhering to the visible fingerprints and cannot see record visible fingerprint collection, such as blood smear fingerprints and gas. Gas methods use by iodine method chemical vaporization or gas reacts with substances that are excreted from fingerprints. Today, workers prefer to use the Black Powder method, which is a physics method to obtain fingerprints with colors that are different from the evidence. This method, the dust will stick to the moisture and grease of the substance that is excreted by the finger. For convenience and speed in operation have problem mentioned above the researcher is therefore interested in studying the hidden fingerprints from different blood stains on different types of paper using iodine. And the method of ninhydrin compares the quality of both methods on porous and semi-porous paper. In this study, it is useful to be able to use it to find, compare fingerprints to find the offender and provide sufficient evidence for legal proceeding.

Objective

1. Study the fingerprints from blood stains on different types of paper by iodine and Ninhydrin test.

2. Study the comparison of the methods for collecting the fingerprints on different paper with Different blood concentration.

Research methodology

Study of fingerprints from blood stains on different types of paper using iodine and ninhydrin test. By finding fingerprints from blood stains on 10 different types of paper; Copy Paper, Green Read Paper, Newspaper, Corrugate Box, Lottery Ticket, Magazine Paper, Cash Bill, Envelope, Thermal Slip Paper and Brown Envelope. By using 4 types of pig blood concentration; normal blood concentration and dilution in the saline difference in the ratio of 1: 5, 1:10 and 1: 100, which collected samples of fingerprint prints from only 1 participant with clear fingerprint marks and not a skin disease and disorders of the sweat glands. The participants must not wash their hands for at least 1 hour before collecting the sample. Participants had to use their right thumb to pat their nose first. Stamp your fingerprints onto the sample paper, where the paper is placed on the scale. Each time the pressure on the paper is set at 500 grams, 10 seconds per sample (Nantakarn Tanchinda, 2011). After that, fingerprints will be collected from blood stains on different types of paper using iodine. By using the iodine flakes that have been prepared along with the sample paper that needs to show the fingerprint in this closed container. In which the iodine scales will sublimate into cough and then adhere the fat from sweat that is stuck on the fingerprint, latent fingerprints appear to be brown in color and appear only for a moment. Then record taking pictures of latent fingerprints immediately and ninhydrin test Take the sample paper that you want to check for the fingerprints and dip them in the ninhydrin solution. dip in the ninhydrin solution then pulled up immediately leave to dry for 5 minutes. Take a picture with the camera, setting the camera vertically about 10 cm. from the floor at a 90 degree angle (Wanlop Sema Thong, 2011) take the fingerprint image to count the number of minutiae points by Automated Fingerprint Identification System (AFIS) at Central Police Forensic Science Division 7, Office of Forensic Science. By doing the experiment 3 times.

Research result

1. The results of the study on the quality of fingerprint prints from blood stain on different types of paper using iodine and ninhydrin test. From the experimental results to check fingerprints from different blood stains on paper 10 types of sample paper, after testing with the iodine test, the quality is clear. and can read more important characteristic points or defects (minutiae) more than ninhydrin method as follows

1.1 The quality of fingerprint prints with blood stains.

The paper that passed the first criteria by iodine test is Magazine Paper, followed by Green Read Paper, Thermal Slip Paper, Corrugate Box, Copy Paper, Envelope, Cash Bill, Newspaper, Lottery Ticket and Brown Envelope respectively. The first paper that passed the ninhydrin test was Newspaper, followed by Magazine Paper, Copy Paper, Green Read Paper, Corrugate Box, Lottery Ticket, Cash Bill, Envelope, Thermal Slip Paper and Brown Envelope respectively.

1.2 The quality of fingerprint prints on different types of paper on blood stains with a ratio of 1: 5 by iodine and ninhydrin test.

Sample paper with high quality fingerprint and paper that passed the criteria by iodine test is Magazine Paper, followed by Envelope, Thermal Slip Paper, Copy Paper, Green Read Paper, Cash Bill, Lottery Ticket, Brown Envelope, Newspaper and Corrugate Box respectively. Sample paper with high quality fingerprint and the paper that passed the criteria by ninhydrin test is the Magazine Paper, followed by Green Read Paper, Envelopes, Copy Paper, Newspaper, Corrugate Box, Lottery Ticket, Thermal Slip Paper and Brown Envelope respectively.

1.3 The quality of fingerprint prints on different types of paper on blood stains with a concentration of 1:10 in the ratio of iodine and ninhydrin test. Sample paper with high quality passive fingerprint and paper that meets the criteria with iodine test, which is Magazine Paper, followed by Thermal Slip Paper, Copy Paper, Envelopes, Green Read Paper, Cash bills, Lottery Ticket, Brown Envelope, Newspaper and Corrugate Box respectively. Sample paper with high quality fingerprint and the paper that passed the criteria of ninhydrin test is Copy paper, followed by Green Read Paper, Envelopes, Magazine Paper, Newspaper, Lottery Ticket, Cash Bill, Corrugate Box, Thermal Slip Paper and Brown Envelope respectively.

1.4 The quality of fingerprint on different types of paper on blood stains with a concentration of 1: 100 in ratio by iodine and ninhydrin test. Sample paper with high quality fingerprint and the paper that passed the criteria by iodine test is the Magazine Paper, followed by Envelope, Copy Paper, Thermal Slip Paper, Green Read Paper, Cash bill, Brown Envelope, Lottery Ticket, Newspaper and Corrugate Box respectively. Sample paper with high quality fingerprint and the paper that passed the criteria by ninhydrin test. is Copy paper, followed by Green Read Paper, Newspaper, Corrugate Box, Lottery Ticket, Magazine Paper, Cash Bill, Envelope, Thermal Slip Paper and Brown Envelope respectively.

2. The comparison of the results from the collecting latent fingerprints test on different paper with different blood concentration from the analysis using the Paired - Sample T test statistical program, it is found that the test for collecting latent fingerprints on different paper on blood stains And different blood concentrations, with the presence of different fingerprints. Statistical significance at the level of .05 (Table 1).

Table 1 Data analysis for comparative study of the presence of latent fingerprints detected by iodine and ninhydrin test.

Data analysis for comparative studies The presence of hidden fingerprint prints By iodine and the ninhydrin test	(Mean)	(Std. Deviation)	t	Sig. (2-tailed)
The quality of fingerprint prints hidden	14.73333	15.50691	3.005	.015*
Latent fingerprints on paper with blood stains	8.16667	7.90569	3.267	.010*
Latent fingerprints on paper at a diluted blood concentration of 1: 5	16.06667	14.53629	3.495	.007*
Latent fingerprints on paper at a diluted blood concentration of 1: 10	22.40000	19.20828	3.688	.005*
Latent fingerprints on paper at a diluted blood concentration of 1: 100	24.93333	19.32746	4.079	.003*

*p<0.05

Discussions

The results of the study on the quality of passive fingerprint prints from blood stains on different types of paper using iodine and the ninhydrin test as the following.

1.1 Iodine test. From the experiment found that can detect fingerprints from blood stains on Magazine Paper the beste,

1.2 Ninhydrin test. From the experiment found that can detect fingerprints from blood stains on Copy Paper the beste.

Conclusion

Iodine test. From the experiment found that can detect fingerprints from blood stains on Magazine Paper the beste, Since magazine cover paper is generally bathed, it is less porous. The absorption of fat from fingerprints is low. Combined with iodine, it is able to react with iron (Fe) in the hemoglobin in the blood well, resulting in the best quality of fingerprint prints from blood stains on magazine covers. By the property of paper, the semi-porous substrate has the property of a compound of latent fingerprints that are quickly absorbed into the surface of the object. In which the compound of the fingerprint marks hidden, the water-soluble part is absorbed in a matter of hours. The insoluble part will be absorbed within a few days. And the properties of iodine, when exposed to a small amount of heat, will transform into sublimation into vapor to come in contact with the goods that are thought of hidden fingerprints. Iodine will bind to fat or fatty substances that will absorb iodine vapor. When smoked the witness material with iodine Latent fingerprints containing oil or fat absorb the iodine vapor, causing the finger to appear brown, visible to the naked eye. The fingerprint that appears is not permanent, the stripes will gradually fade when stopped. This is consistent with the study of (Vichote Buraphanok, 2010) that has detected the hidden fingerprints on many types of paper using iodine smearing methods. By studying the effect of the pressure of the

finger print, the quality of the latent finger print before using the finger print, the duration of iodine fumigation. The experiment was performed on thermal paper such as magazine cover paper. And ATM receipt paper etc., which found that the method of iodine fumigation is a convenient way to conduct experiments and can also find fingerprint marks as well

Ninhydrin test. From the experiment found that can detect fingerprints from blood stains on Copy Paper the beste. Because the porous surface area has the property of a compound of fingerprint marks, it is quickly absorbed into the surface of the object. In which the compound of the fingerprint marks hidden, the water-soluble part is absorbed in a matter of seconds The insoluble part takes about 1 day to absorb and the properties of the substance hydride will react with the proteins in sweat. (Amino acid in sweat) causes hidden fingerprints to turn into a bluish-purple color. And then collected by the method of taking pictures immediately In which heat is a catalyst Therefore may use iron Electric dryer As a catalyst for fingerprints, the ninhydrin method is not suitable for paper that has text in a book or written in ink in a document. Because the message will dissolve Which is consistent with the study of (Wanlop Sema Thong, 2011) conducted a research study on latent fingerprinting from Blood stains on different types of paper by ninhydrin technique By detecting latent fingerprints on 15 types of paper, it was found that the detection of latent fingerprints in blood stains on white copier paper with Nin Hydra solution can increase the efficiency of detecting latent fingerprints. From the counting of the incremental minutiae points and the sharpness of the latent fingerprint as well.

The comparison of the results of the methods for collecting latent fingerprints on different paper with different blood concentration. The method for collecting latent fingerprints on different paper with different blood concentration Finding hidden fingerprints using iodine When compared to the ninhydrin method, the preparation process is not complicated. also, when researching does not require techniques and modern equipment can detect hidden fingerprints Resulting in saving time and money in short, iodine latent fingerprints have a good quality, which can be used for better identification than ninhydrin on textured paper. Porous Semi-molded version and without porosity Therefore, when examining the hidden fingerprints on paper, iodine methods should be chosen to collect. In addition, the results show that the different streaks of fingerprints that occur on paper are also found to be different. side due the skin physiological condition of each person that prints the fingerprints on paper. In some types of paper, fingerprints appear to be clear. Some types of paper appear with faded fingerprint marks. May be due to the secretion of sweat, moisture and fat are different in each person Factors that affect the secretion of sweat and sebaceous glands include temperature, mood, and humidity, which may vary from day to day (Siwali Limparat Ratchawichai, 1997) and moisture fingerprint prints. and a lot of the fat on the fingerprints, therefore, there are few differences in the fingerprint marks on each type of paper. Resulting in unclear fingerprints, including the small fingerprints of a person once the fingerprints are stamped on the paper and then used to find a way to detect fingerprints The result may be unclear about fingerprints. In general, the person who is committing the crime often causing pressure in the mind Causes emotional stress, which in

theory is, at least, more prone to sweating while in normal environments Therefore, there is a tendency to have hidden fingerprints of criminals at the scene that is quite obvious (Siwali Limpatchawichai, 1997).

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