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Research Article

**DEVELOPMENT OF NATURAL LATENT FINGERPRINT
POWDER FROM DURIAN SEEDS - A GREEN AND
EFFECTIVE APPROACH IN CRIME SCENE**

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Ipoh - 30450, Malaysia.**Abstract:**

This invention relates to a latent fingerprints powder. The currently available latent fingerprints are usually ineffective if the fingerprint left is not within the first week after placing the latent. The latent fingerprints visualization chemicals are toxic and potential health hazards. To overcome this problem it is provided that the Durian Seeds are made into a powder form for the development of cheaper and more effective latent fingerprint powder for better visualization. Seeds of Durian was rich in starch and will produce white powder. The powder will adheres to the residue deposited from the fingers onto the surface that we touch. The reason is also for the adherence of Durian seeds powder to the latent fingermarks can be assigned by the formation of hydrogen bonds between the fatty acids/glycerides of sebum and the carbonyl and hydroxyl group of the components in Durian seeds powder. The latent fingerprint powder produced from durian seeds showed better visualization. This will plays a significant role in identifying the criminals in crime scene by analysing the old fingerprints. This natural latent fingerprint powder also non-toxic, safe and easily available. This product also with reduced cost of production.

Key words: Forensic science, Latent fingerprints Development, Durian seeds powder**Corresponding Author:****Dr. Mahendran Sekar,**

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INTRODUCTION

For years, fingerprints are considered as one of the valuable types of physical evidence in identification of criminal in crime scene. In general, three forms of fingerprint evidence can be found at a crime scene. It is whether visible (or patent) prints, impression (or plastic) prints and latent (invisible) prints. Latent prints are not visible to the naked eye and thus require some means of development or enhancement for their visualization.

A latent print is a mixture of some or all of the secretions excreted from the three types of glands that are available in the skin. When the complex secretions deposited on a surface which is nearly 99% of the print is water, it will evaporate rapidly from the deposit, and then the print will dry. This process begins to alter certain reagents ability to visualize the print. Therefore, fingerprint powder is developed to visualize the latent fingerprints and it is the most common and widely used techniques for latent fingerprint are powdering method. When the fingerprint powder is sprinkled over an affected area, the powder adheres to the oil, sweat or other materials left in a fingerprint [1-2].

Various methods are available to develop the latent fingerprints in the literature. Fingerprint powders are the traditional and most common method use by the investigator to visualize the latent fingerprint. In the past, powder dusting, ninhydrin dipping, iodine fuming and silver nitrate soaking were the most commonly used techniques for latent fingerprint development. These techniques are quite effective for many surfaces. However, these traditional methods for latent fingerprint detection are not always effective especially for visualization of old fingerprints

Today, latent fingerprint powder is widely used to detect fingerprints. Fingerprints are important as a physical evidence of a crime scene. Commonly used powder is white powder as it is less expensive and can detect on various surfaces. But, the powder is not from natural sources, not easily available and some fingerprint cannot be detected on white surface. Moreover, many types powder are usually ineffective if the fingerprint left is not within the first week after placing the latent [3].

The latent fingerprints visualization chemicals are toxic and potential health hazards. So, we need an alternative and effective latent fingerprints powder to overcome the disadvantages in the existing methods. Hence, in the present study we are interested to develop a novel technique for the visualization of latent fingerprints present on both nonporous and porous substrates. It is expected that

it will provide useful information to the crime scene investigations.

MATERIALS AND METHODS

Preparation of Durian Seeds Powder

500 g of Durian seeds were collected from the local market and were authenticated by a botanist. The seeds were separated and removed the upper layer skin, then dried in hot air oven at 35-40°C and grinded into fine talcum powder quality. The powder was stored in air-tight containers at room temperature until further use.

Detection of Latent Fingerprint [4-8]

Eleven latent fingerprints were collected on each different surface which includes both porous and non-porous surfaces. The test latent prints were collected with sebum mainly from face and forehead. The fingerprints from the donor were deposited various surfaces. First, the donor hand was cleaned with water and soap. Next, the hand was allowed to dry for thirty minutes before deposition. The latent impressions were made by pressing the thumb on each surface. The surfaces were kept at room temperature facing the ceiling, expose to dust and air conditioning.

There are 2 methods which were designed to enhance the latent fingerprint which is physical or chemical process. Therefore, the method used for development of latent fingerprint using durian seeds powder is powder dusting which is a physical method. This method involves application of finely divided particles that will physically adhere to the aqueous and oily components in latent print residue of the thumb on surfaces.

In this study, we have developed a new fingerprint powder using durian seeds. In other to do so, one kilogram of durian seeds were collected at a local shop. Then, the outermost layer of the seeds was removed and the inner part is washed and dried for few days. Then, the seeds were grounded into fine particles by using a blender to the level of talcum powder but no particle size was measured. The powder prepared was kept in a plastic tube and sealed.

The experiments were carried out in February to April when the temperature varied from 22 to 33 °C and the relative humidity between 59% and 98%. The powder is sprinkled over a surface and then by brushing method is used to visualize the latent fingerprint. The technique used is by brushing in the direction of any ridges that begin to appear until latent print reaches point of sufficient clarity. Then, the excess powder was cleaned by using taping method to remove excess powder. Lastly, the fingerprints were photographed using high resolution camera.

In this research, different types of surfaces were used to compare the clarity of fingerprint using Durian seeds powder. Both porous and non-porous surfaces were employed in the research. The surfaces included were aluminium sheet, carbon paper, writing surfaces of CD, mirror, painted steel, newspaper, petri dish, plastic bottle, surfaces of water bath(steel), transparency sheet, wooden surface and microscope slide [3].



Fig 1: Visualization of latent fingerprints Aluminium foil using Durian seeds powder

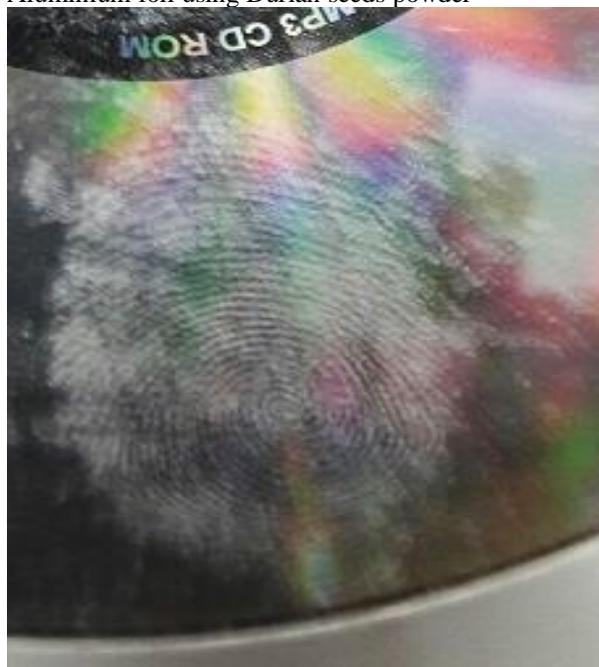


Fig 3: Visualization of latent fingerprints on written surface of CD using Durian seeds powder

RESULTS AND DISCUSSION

The results of the latent fingerprint development using durian seeds powder on eleven different surfaces are shown in figures below. Latent fingerprints present on majority of the surfaces examined can be successfully developed with Durian seeds powder.

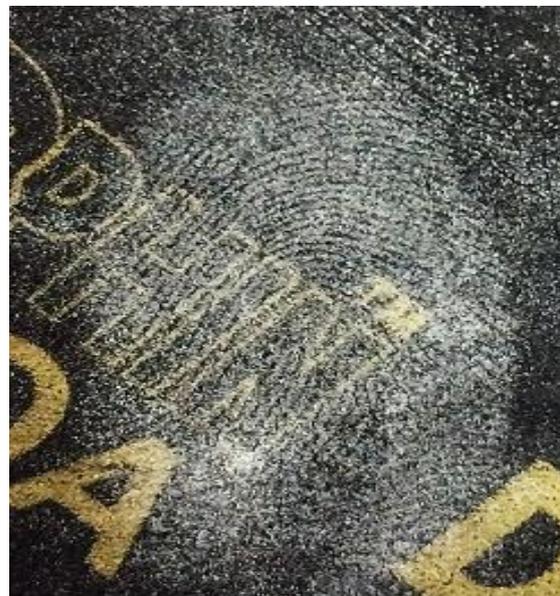


Fig 2: Visualization of latent fingerprints on Carbon paper using Durian seeds powder



Fig 4: Visualization of latent fingerprints on mirror using Durian seeds powder



Fig 5: Visualization of latent fingerprints on painted steel using Durian seeds powder



Fig 6: Visualization of latent fingerprints on paper using Durian seeds powder



Fig 7: Visualization of latent fingerprints on petri dish using Durian seeds powder

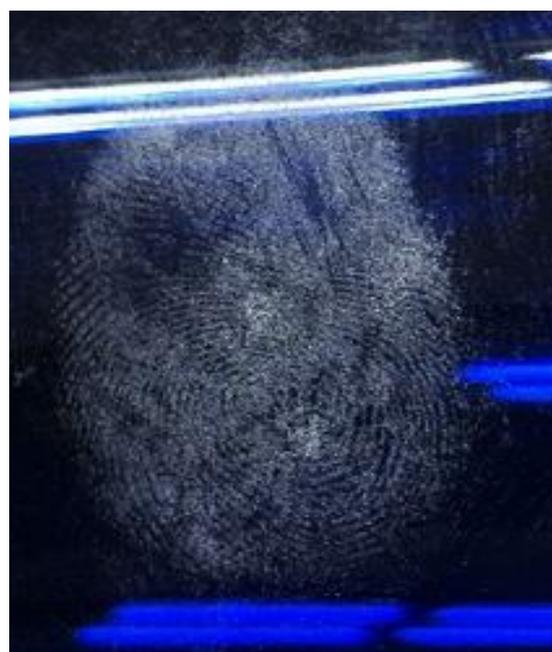


Fig 8: Visualization of latent fingerprints on plastic bottle using Durian seeds powder



Fig 9: Visualization of latent fingerprints on steel using Durian seeds powder



Fig 10: Visualization of latent fingerprints on translucent sheet using Durian seeds powder



Fig 11: Visualization of latent fingerprints on wooden surface using Durian seeds powder



Fig 12: Visualization of latent fingerprints on microscope slide using Durian seeds powder

The results for the development of latent fingerprint development using Durian seeds powder on twelve different surfaces are shown in Figure 1–12. Based on the figures, majority of the latent fingerprint that are present on the various surfaces examined can be developed with durian seeds powder. The differences are only the clarity of the fingerprint on each surface.

In this paper, development of latent fingerprint is employed on both porous and non-porous surfaces in the research. The surfaces used which were aluminium sheet, carbon paper, writing surfaces of CD, mirror, painted steel, newspaper, petri dish, plastic bottle, surfaces of water bath (steel), transparency sheet, wooden surface and microscope slide gives a clear latent fingerprint ridges and this proves that the development of latent fingerprint using durian seeds powder could be successfully done which were evident from the figures.

The reason for the adherence of finely divided particles of durian seeds powder to the latent fingerprints on the surfaces is that the main component of durian seeds which starch were proven to be physically adhere to the aqueous and oily components in latent fingerprint residue of the palm on surfaces.

The latent prints can be developed with durian seeds powder can help to catch theft in our daily lives. Personal belonging such as plastic water bottle and compact disk were proven to be effective surfaces for the visualisation of latent fingerprint using durian seeds powder and this can help in personal identification in theft cases. Besides, the durian seeds powder is nontoxic, therefore, it will not harm the user or the personal belongings such as water bottle which can still be used after visualisation.

But, it has a few drawbacks such as the durian seeds powder is only suggested to be used on the surfaces having clear or coloured surfaces as the powder itself is white. So, it could not visualize the prints on white surfaces. Latent prints present on white surfaces could not be developed clearly in comparison to others may be due to lack of contrast. The reason may be for the adherence of Durian seed powder to the latent fingermarks can be assigned by the formation of hydrogen bonds between the fatty acids/glycerides of sebum and the carbonyl and hydroxyl group of the components in Durian seeds powder. Therefore, durian seeds powder can be proven to be successfully employed as a powder on majority of the surfaces.

It is suggest that further studies on the development of finger prints using durian seeds powder under

various conditions of humidity, temperature, season variation and comparative evaluation with the existing fingerprint powder to show the effectiveness of durian seeds powder.

CONCLUSION

It is concluded that the durian seeds powder can be successfully used to visualized latent fingerprint on various surfaces in crime investigations. However, further studies are warranted to confirm its effectiveness and resolution on various surface.

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