



ORIGINAL ARTICLE

# A new technique for visualization of latent fingerprints on various surfaces using powder from turmeric: A rhizomatous herbaceous plant (*Curcuma longa*)

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## KEYWORDS

Forensic science;  
Latent fingerprints;  
Development;  
Turmeric powder;  
Surfaces;  
Powdering method

**Abstract** Various methods have been reported for the development of latent fingerprints on different surfaces in the literature. This paper presents a new powdering method which is simple, non-toxic for the development of latent fingerprints that can be employed on different substrates. In this investigation a less expensive, simple and easily available, turmeric powder, a common ingredient in Indian food, has been used to decipher the latent fingerprints on nine different substrates. It is found that it gives very clear results in majority of the surfaces.

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## 1. Introduction

Fingerprints have often been and still are considered one of the valuable types of physical evidence in identification. In general, three forms of fingerprint evidence that may be found at a crime scene are visible (or patent) prints, impression (or plastic) prints and latent prints. Latent prints are not visible to the naked eye and thus require some means of development

or enhancement for their visualization. New techniques have been developed for latent fingerprint detection but the traditional fingerprint detection technique for treating latent prints is 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. Powdering technique has been used as a technique since the early 1900s. Over this period, many fingerprint powder formulations have been in use, with each formula consisting of a colorant for contrast and a resinous material for good adhesion.<sup>1</sup> Hundreds of fingerprint powder formulas have been developed over the years. In general, there are four classes of fingerprint powders-regular, luminescent, metallic and thermoplastic.<sup>2</sup>

In the past, powder dusting, ninhydrin dipping, iodine fuming and silver nitrate soaking were the most commonly used techniques for latent print development. These traditional techniques are quite effective for many surfaces. However, these traditional methods for latent print detection are not always effective and scientists have attempted to improve the existing methods for the visualization of latent prints. There are different powders which have been used by various

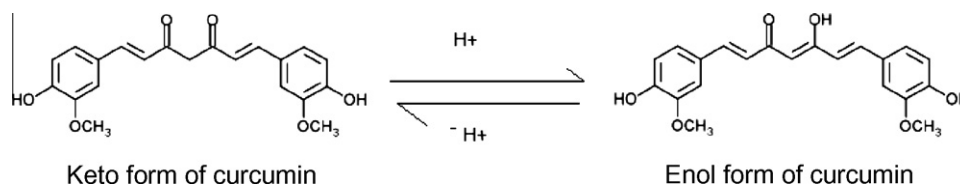
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workers<sup>3,4,6-23</sup> for the development of latent fingerprints on different surfaces as shown in Table 1. Some of the chemical substances used in the fingerprint powders are toxic and pose potential health hazards. In order to overcome this disadvantage, we have attempted to use a new powder for developing latent fingerprints which is easily available, non-toxic and it has so many medicinal uses (turmeric powder).

Turmeric (*Curcuma longa*) is a rhizomatous herbaceous perennial plant of the ginger family Zingiberaceae. It has been cultivated in India from very ancient times. The rhizomes which yield turmeric are short thick with blunt tubers. The product consists essentially of coloring principles 1,7-bis-(4-hydroxy-3-methoxy-phenyl)-hepta-1,6-diene-3,5-dione (also known as curcumin) and also its desmethoxy and bis-desmethoxy-derivatives in varying proportions. It can exist in two tautomeric forms, i.e., keto and enol. Functional use of curcumin as a food additive is color.<sup>24,25</sup>



The authors in this communication has attempted to develop a new technique using turmeric powder, a condiment commonly used in Indian food, for the development of latent fingerprints present on different surfaces which has not been reported so far.

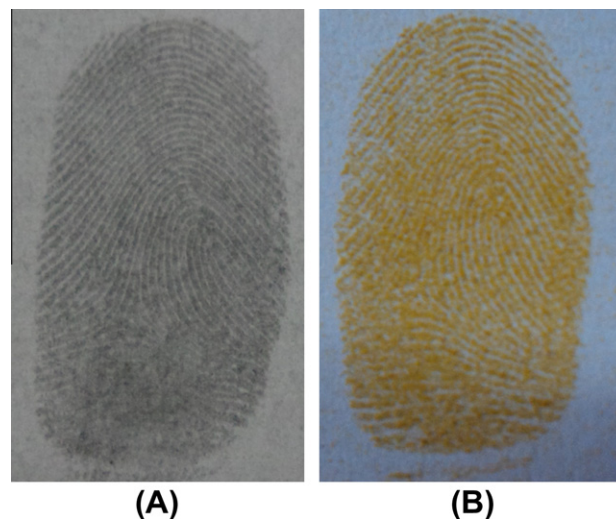
## 2. Materials and methods

Eleven test latent fingerprints were collected on different surfaces. The test latent prints were collected with sebum mainly from face and forehead. The method used in the development of latent prints is powder dusting. It is a physical method of enhancement of latent prints and works on the mechanical adherence of the fingerprint powder particles to the oily components of the skin ridge deposits. Application of powder to the print by brushing is a simple and an easy technique but it also has disadvantages that the brush on coming in contact with the surface having the print destroys the print and hence the ridge characteristics get destroyed. In order to develop latent fingerprints with the help of turmeric powder, few grams of pure (freshly grinded from rhizomes) commercially available turmeric powder was taken in the present study and then further ground in a blender in order to get a very fine powder to the level of talcum powder but no particle size was

measured. The powder so prepared was kept in the glass tubes and sealed. These were stored at the laboratory conditions. The powders when kept in the open formed the masses probably due to the absorption of water from the atmosphere and on again grinding in the blender formed the same type

**Table 1** Showing various chemicals or powders used by different workers for development of latent fingerprints.

Serial No.	Name of powders
1.	Lead powder <sup>4</sup>
2.	Titanium oxide powder <sup>5</sup>
3.	Sudan III <sup>3</sup>
4.	Phloxine B dye <sup>12</sup>
5.	Fluorescein dye <sup>7</sup>
6.	Rhodamine B dye <sup>7,19</sup>
7.	Rhodamine 6G <sup>6</sup>
10.	Eosin yellow dye <sup>11</sup>
11.	Eosin-blue dye <sup>10</sup>
12.	Guinea green dye <sup>13</sup>
13.	Aniline blue dye <sup>14</sup>
15.	Cyano blue dye <sup>16</sup>
16.	Azure I dye <sup>15</sup>
17.	Azure II dye <sup>17</sup>
18.	Congo red dye <sup>18</sup>
19.	Basic fuchsin dye <sup>9,21</sup>



**Figure 1** Comparison between visualization of latent fingerprints on simple paper with black powder (A) and turmeric powder (B).

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