

Title : Study of the effects of variables on textile analysis using FT-IR spectroscopy for forensic applications

Author(s) :

1. Porntip Chaipraphan
- 2.
- 3.

Student ID : 650510076

Student ID :

Major : Chemistry

Advisor(s) :

1. Associate Professor Dr. Kongkiat Trisuwan
- 2.
- 3.

Type of presentation* (choose 1) :

<input type="checkbox"/>	Oral Presentation	(เฉพาะ ตัวแทนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
<input type="checkbox"/>	Poster	(กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
<input checked="" type="checkbox"/>	Cooperative Education	(กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

This research aimed to study the effects of contamination variables on the analysis of cotton fibers using Fourier Transform Infrared Spectroscopy (FT-IR) combined with the Attenuated Total Reflectance (ATR) technique for forensic applications. Cotton fabric samples in white, gray, and black were contaminated with fresh pig blood, chili sauce, soil, and subjected to burning, as well as laundering with detergent, bleach, and multipurpose stain remover. The analysis revealed that contaminants significantly altered the spectral characteristics. Fresh pig blood exhibited peaks corresponding to Amide A, Amide I, and Amide II. Although the Hit Quality values were relatively low, the fiber type could still be identified. In contrast, samples contaminated with chili sauce showed a broad O-H stretching peak differing from the sharp cellulose peak of cotton, with low Hit Quality values that hindered fabric identification. Soil-contaminated samples exhibited siloxane and aluminosilicate peaks similar to kaolinite minerals, and while the fabric type could still be identified, the Hit Quality decreased. Washing helped reduce stains and improved spectral clarity, indicating that the choice of cleaning agent should be considered carefully to preserve the fiber's properties. Video microscope examination revealed that blood contamination caused rough fiber surfaces due to dried blood platelets, chili sauce caused stickiness, soil left dried residue, and burning made the fibers fragile. Additionally, black cotton fabrics showed lower %Transmittance due to higher infrared absorption. Overall, contaminant variables were found to affect the reliability of fiber analysis using ATR-FTIR, emphasizing the need for careful consideration during evidence collection and forensic examination.

*Type of presentation must be matched with an option you choosing on student upload system.

**The abstract can be more than one page and must be approved by project advisor before upload.