



FORENSIC EXAMINATION OF DISPUTED PRINTED BOOKS

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ABSTRACT

Documents feature in the financial, legal, business, social and personal affairs. Due to spreading of use of documents, very often spurious documents are produced for perpetuating crime like cheating, fraud misappropriation, criminal misconduct, forgery anonymous communication and violation of copyright Act. In one case, a good number of science books of class ten standards were printed and circulated for sale. Taking the advantage of huge sale, the similar books were clandestinely printed by unscrupulous trader and sold at lower rate than actual printed price. The sale of original books was thus affected and on verification the original publisher could know about the fraudulent printing of same book and selling at lower price. Subsequently the original publisher lodged a complaint to the police and both original and disputed books were seized and sent to forensic laboratory for examination. This paper deals with the examination/comparison of both types of books using FTIR and video spectral comparator (VSC) to differentiate the original and disputed one.

Keywords: Printed book, Copyright Act, Forensic evidence, FTIR, video spectral comparator (VSC).

INTRODUCTION

There are various types of documents available in different transaction in day to day activities. It is known, documents features in different white-collar crimes now being frequently reported [1, 2]. In the course of investigation of such cases, various classes of documents are seized by investigating officers, seeking evidence present in the documents. They are:

- Documents with questioned signature/ writings
- Documents containing alleged addition, alteration on contract, deed, will etc.
- Documents related to bank cheque, draft.
- Documents related to passport, visa.
- Printed documents
- Fake foreign/ Indian currency notes.
- Documents related to the age or date.
- Holograph.

Almost all the documents retain information and convey the same by different examination. The findings are established by look, tilt and touch and other advanced scientific methods. The examination of hand written documents carry a lot of characteristic features whereas in printed documents common features are absent. In order to examine printed documents, the following aspects have

been considered for examination [3, 4]:

- Paper characteristics of the printed book
- Words, mark, spacing, alignment
- Ink character
- Binding pattern
- Composition of color photograph.

In this paper, the characteristics of both the genuine/disputed books have been examined with FTIR, video spectral comparator (VSC).

Case History: One publisher printed general science book of tenth standard for course study and there was huge sale of books. Taking the advantage of huge sale, one unscrupulous publisher printed similar book fraudulently and sold them at much lower than printed price. The sale of genuine books printed by the authorized publisher was affected. Knowing the fact about violation of copyright Act, the genuine publisher lodged a complaint to the police. During investigation of the case, both genuine and disputed books were seized by the police and sent for forensic examination to establish the real fact.

Experimental:

The original and disputed books were thoroughly checked on ordinary light and with magnifying glass. The length, breadth and thickness of the books were measured by the scientific instruments. The optical absorption and FTIR spectra were recorded by a video spectral comparator (Model: VSC-5000, Froster & Freeman, UK) and Perkin Elmer (Model: Spectrum-BX).

RESULTS AND DISCUSSIONS:

The photographs of the front and back sides of original book are shown in the figures 1 (a) and (b) and those of disputed book are shown in figures 2(a) and (b) respectively.

Study under ordinary light: In order to compare the original book with the disputed one, length, breadth, thickness of both types of books were measured and tabulated in Table-1:

The sharpness and color combination of the cover pages of the disputed books are not same as those of original one. The background color under the word

“NabamSreni” is blackish blue in the disputed books whereas it is pure blue in original ones. The background color under the words “Santra Publication” is not same in the original and disputed books. The paper used in printing the original books is white color whereas that used for disputed books is off-white, which can easily be distinguished in the naked eye.

FTIR study: FTIR spectra of a particular page of two original books presented in the figure 3 are almost similar, whereas, the FTIR spectra of a particular page of two disputed books show different patterns indicating that the paper used is different in disputed and original books.

Video Spectral Comparator study: Absorption spectra were taken on the two colored obverse pages of original and disputed books and presented in the figure 4. The absorbance is observed to be different in original and disputed books. The reflectance of disputed book is also found to be different from original book as indicated in figure5.

Table 1. Original Books and Disputed Books

	Original Books		Disputed Books				
	Book-1	Book-2	Book-1	Book-2	Book-3	Book-4	Book-5
Length(in cm)	20.6	20.7	21.1	21	21.1	21.15	21.1
Breadth(in cm)	13.3	13.3	13.45	13.5	13.5	13.6	13.5
Thickness(in mm)	8.96	8.97	8.07	8.01	7.95	8.04	8.08
Weight(in gm)	174	176	172	168	172	172	172

Figure 1. Front cover and back pages of a genuine book (a, b)



Figure 2. Front cover and back pages of a disputed book (a, b)



Figure 3. FTIR spectra of particular pages of two original and disputed books

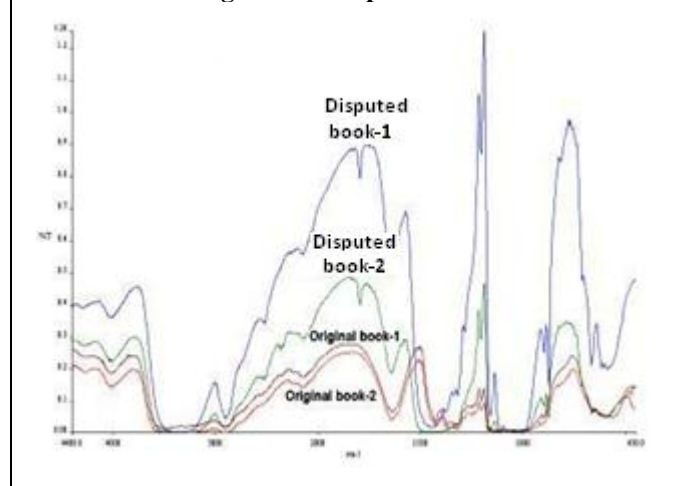


Figure 4. Absorbance taken on the green colored feather of the top bird printed on the front cover page of original and disputed book.

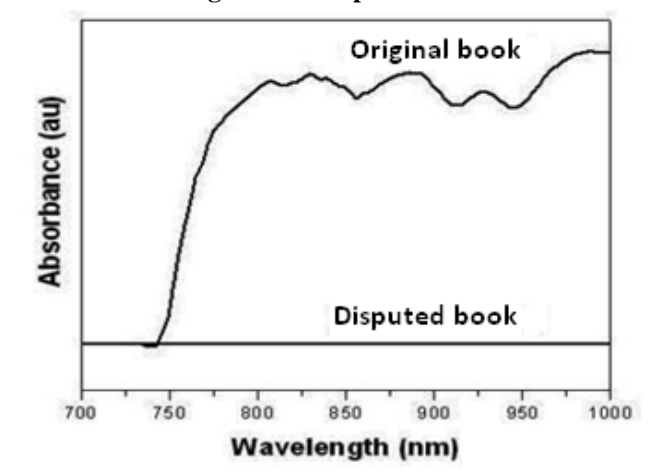
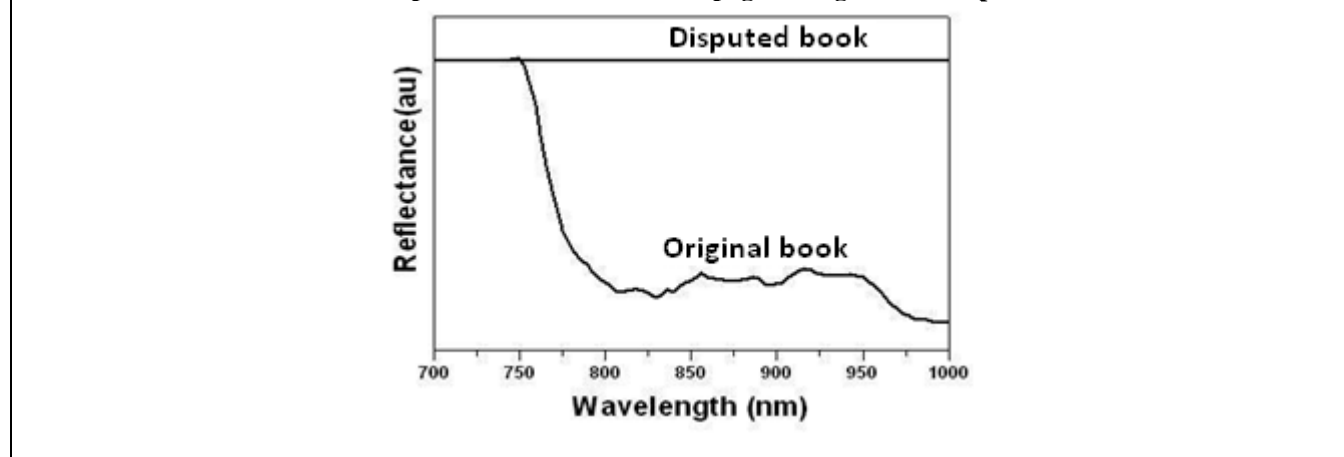


Figure 5. Reflectance taken on the green colored feather of the top bird printed on the front cover page of original and disputed book.



CONCLUSION: The difference in the physical parameters of original and disputed books along with the patterns of FTIR and absorption spectra could conclusively establish their genuineness.

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