

OSAC RESEARCH NEEDS ASSESSMENT FORM



Title of research need: Interlaboratory Study of the Microspectrophotometry of Fibers

Keyword(s): Fibers, MSP, microspectrophotometry, visible, ultraviolet

Submitting subcommittee(s): Chemistry Materials (Trace) **Date Approved:** 6/12/2025

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Yes; OSAC 2022-S-0017 *Standard Guide for Microspectrophotometry in Forensic Fiber Analysis*

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

No; we are not aware of any current research in this specific area.

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). *Current Topics in Opioid Research*. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

- (1) Biermann, T.W. and Wiggins, K.G., "Microspectrophotometry." In Robertson, J., Roux, C., and Wiggins, K.G. (eds.), *Forensic Examination of Fibres*, 3rd ed. Boca Raton: CRC Press, 2018, pp. 180-224.
- (2) Can, H., Hongcheng, M., Hongling, G., Jun, Z., "Color analysis of textile fibers by microspectrophotometry," *Forensic Chemistry*, Vol. 18, 2020, pp. 100-221.
- (3) Eng, M., Martin, P., and Bhagwandin, C., "The Analysis of Metameric Blue Fibers and Their Forensic Significance," *Journal of Forensic Sciences*, Vol. 54, No. 4, 2009, pp. 841-845.
- (4) Grieve, M.C., Biermann, T.W., and Davignon, M., "The Evidential Value of Black Cotton Fibres," *Science & Justice*, Vol. 41, No. 4, 2001, pp. 245-260.
- (5) Palenik, C.S., Beckert, J C., and Palenik, S., "Microspectrophotometry of Fibers: Advances in Analysis and Interpretation," National Criminal Justice Reference Service, Office of Justice Programs Publications, May 2015, Web. 12 Sept. 2017. < <https://www.ncjrs.gov/pdffiles1/nij/grants/250437.pdf>>
- (6) Suzuki, S., Suzuki, Y., Ohta, H., Sugita, R., and Marumo, Y., "Microspectrophotometric Discrimination of Single Fibers Dyed by Indigo and Its Derivatives Using Ultraviolet-Visible Transmittance Spectra," *Science & Justice*, Vol. 41, 2001, pp. 107-111.
- (7) Was-Gubala, J. and Starczak, R., "UV-Vis Microspectrophotometry as a Method of Differentiation Between Cotton Fibre Evidence Coloured with Reactive Dyes," *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, Vol. 142, 2015, pp. 118-125.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at <https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest>? Is your research need identified by NIJ?

No.

5. In what ways would the research results improve current laboratory capabilities?

Although some information can be gained from fiber proficiency test results among various laboratories, there has been no specific research regarding the consistency of expected results among forensic laboratories for fiber comparison using the MSP. An interlaboratory study would help address any gaps or needs at individual laboratories for conducting forensic fiber comparisons using MSP.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

This research would provide fundamental knowledge that is not within the current scientific literature, including consistency in interpretation of comparative results between laboratories using MSP and information on the consistency of specific results, such as absorption maxima on samples.

7. In what ways would the research results improve services to the criminal justice system?

The research would provide information on the successful application of MSP, as outlined in OSAC 2022-S-0017, to individual laboratory casework, and would further demonstrate that MSP is a useful technique in the discrimination of fiber samples. It would also provide the legal community with additional confirmation that MSP is a reliable technique within the forensic fiber community.

8. Status assessment (I, II, III, or IV):

I

| | Major gap in current knowledge | Minor gap in current knowledge |
|---|--------------------------------|--------------------------------|
| No or limited current research is being conducted | I | III |
| Existing current research is being conducted | II | IV |

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.