

EXPANSION AND VALIDATION OF A SELF-REFERENCING ALGORITHM TO DISCRIMINATE BETWEEN HUMAN AND ANIMAL BLOOD FOR FORENSIC PURPOSES.

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Determining whether a bloodstain is of human or non-human origin is crucial in forensic investigations. In groundbreaking research, Bian et al. introduced a self-reference peak algorithm to analyze the Raman spectra of bloodstains, showcasing its significant potential for distinguishing between human and non-human blood [1]. However, their initial study included only three non-human species in developing the model. The current study enhances this capability by using the self-referencing algorithm to differentiate between human blood and that of 18 non-human species based on Raman spectra. The intensity ratios between the bands at 1003 and 1341 cm^{-1} in the Raman spectra were compared across species to identify a threshold separating human from non-human samples. The algorithm successfully classified spectra averaged from donors of all 18 non-human species. This algorithm is user-friendly, requiring minimal training or statistical knowledge, making it more accessible for forensic use compared to complex computational methods. This Raman spectroscopy technique is rapid, nondestructive, and highly accurate, positioning it as a promising tool for forensic applications.

[1] Bian H., Wang P., Wang J., Yin H., et al. “Discrimination of Human and Nonhuman Blood Using Raman Spectroscopy with Self-Reference Algorithm”. *J. Biomed. Opt.* 2017. 22(9): 1–7.