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Paper Title:	Non-invasive Diabetes Detection by DIY Raman Mapping Spectroscopy
Authors:	Parawee Tangkiatphaibun (King Mongkut's Institute of Technology Ladkrabang & AIRC Advanced Imaging Research Centre, Thailand); Pasin Kuncharin (KMITL, Thailand); Nicholas Piyawattanametha (Advanced Imaging Research Centre, Thailand); Wibool Piyawattanametha (KMITL and Chulalongkorn University, Thailand); Pholchanok Udomtanasub (KMITL, Thailand)
Email:	66016071@kmitl.ac.th

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#### Abstract

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Non-communicable diseases like diabetes continue to be major global health challenges, traditionally managed through invasive glucose monitoring methods. To address this, our research focuses on developing a DIY Raman spectrometer enhanced with a fiber laser for non-invasive glucose detection. Utilizing Surface-Enhanced Raman Spectroscopy (SERS) with a SERS S440 substrate at 500 ppm, we successfully achieved Raman mapping and demonstrated the capability to capture Raman shifts across various samples. The mapping results indicate the system's effectiveness in visualizing molecular composition, laying a strong foundation for future integration of SERS multiplexing to further enhance sensitivity and enable simultaneous detection of multiple analytes. This approach presents a cost-effective and accessible solution, showcasing the potential of advanced Raman spectroscopy in diabetes care and non-invasive monitoring technologies. Our work represents a significant step toward improving the accessibility and accuracy of glucose monitoring for patients globally.

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