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Paper Title:	Albumin Detection Kit for Early Kidney Disease Indication Using Imprinted Graphene Oxide/Polyhydroxyalkanoate Membrane
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#### Abstract

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Kidney disease is a significant health issue in Thailand, affecting about 17.5% of the population, making early detection crucial to prevent the disease from advancing to more severe and costly stages. Traditional diagnostic methods, including urine and blood tests, are effective but often invasive, time-consuming, and require professional supervision, limiting their accessibility for regular screening. This study introduces a novel, cost-effective kidney disease screening kit designed for convenient at-home use. The kit utilizes a graphene oxide (GO) and polyhydroxyalkanoate (PHA) composite membrane, combined with the albumin protein imprinting technique, to selectively capture human albumin (ABH) from urine samples through the syringe-push membrane absorption (SPMA) technique. The captured albumin interacts with a coomassie brilliant blue G-250, resulting in a color change that correlates with albumin concentration. The study's findings indicate that the addition of graphene oxide improves the membrane's morphology, enhancing its ability to capture albumin. A linear relationship between the blue color intensity and albumin concentration was established, ranging from 0% at 0 mg/mL to approximately 18% at 1 mg/mL, which enabled the creation of a semi-quantitative color strip model for easy reference. The kit demonstrated effective albumin detection across this concentration range, providing both qualitative and semi-quantitative data. These results suggest that this screening kit could serve as a practical and accessible tool for early kidney disease detection, offering a promising alternative to traditional diagnostic methods by enhancing ease of use, affordability, and accessibility.

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