



Innovative Biomedical Devices in Egyptian Resource-Limited Settings

Ahmed Hassan^{1,2}, Mohamed El Sayed^{3,4}

¹ Alexandria University

² Department of Mechanical Engineering, Environmental Research Institute (ERI)

³ Department of Sustainable Systems, Alexandria University

⁴ Environmental Research Institute (ERI)

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Correspondence: ahassan@outlook.com

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Author notes

Ahmed Hassan is affiliated with Alexandria University and focuses on Engineering research in Africa.

Mohamed El Sayed is affiliated with Department of Sustainable Systems, Alexandria University and focuses on Engineering research in Africa.

Abstract

In Egypt, where resource constraints are prevalent in healthcare settings, there is a critical need for innovative biomedical devices that can enhance diagnostic capabilities without substantial investment. A prototype of the diagnostic device was developed based on feedback from healthcare professionals in Egypt. Testing involved a sample size of 50 patient samples across different RLEs, with performance evaluated using a precision-recall curve analysis. The preliminary testing indicated an accuracy rate of 92% for detecting key pathogens, with no significant variations observed across multiple RLE settings. While the device showed promising results in initial trials, further validation and standardisation are required to ensure its effectiveness in broader use. Further research should focus on validating the device's performance under various operational conditions and cost-effectiveness studies within different socio-economic contexts. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African, Biomedical, Engineering, Innovation, Diagnostic, Technology, Resource-Limited*

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