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Detection of glucose level using a novel biodegradable sensor substrate

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Abstract

Diabetes is a metabolic disorder which causes unstable blood sugar level because of improper supply of insulin or due to the body's poor response to insulin. Genetics and life style choices are a major cause to this chronic disorder. Glucose is marked as one of the best biomarkers for the detection of diabetes. With the increase in diabetic population, there is a huge demand for glucose biosensors. Treatment and control of diabetes is possible with continuous monitoring of blood glucose level. A cost-effective bed side monitoring kit is the immediate solution for the diagnosis of diabetes. The test strips available with the current point of care diagnostics kits are costly and non-biodegradable. This work proposes a biodegradable substrate made of 'thaliyola' which portrays the intrinsic value of Indian traditional leaves as base material for diagnostics. This study deals with an enzymatic biosensor where glucose oxidase and horse raddish peroxidase reacts with glucose whose reaction is estimated with help of potassium iodide resulting in a color change. The color variation obtained from different glucose concentrations is captured using imaging equipment for further analysis. Image of size 80 * 80 pixel was selected from the scanned samples, whose mean red component was estimated using scientific computing tool. A consistent trend was observed between the red component intensities and glucose levels taken for the study. The correlation between the concentration of glucose and mean red component proves the use of 'thaliyola' as a good substrate material. In future, this opens a possibility to develop cost effective and biodegradable glucose level estimation devices.

References

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