Journal of Biotechnology and Biomaterials

ExtendedAbstract Open Access

# An IoT Based Glucose Monitoring System

**Dr. Shalini R, Madhumita.M, ManojKumar.A.S, Pratheba.D and Sangeetha.K**

*SSIET, India, Email: weilingmg@gmail.com*

## Abstract

Diabetes is a serious disease that occurs when our body has difficulty in properly regulating the amount of glucose in the blood stream. Non-invasive diagnosis technique is becoming more prominent in diagnosing diseases due to their pain free and simple monitoring methods. Henceforth, we proposed a non-invasive, sensitive acetone sensor system that offers fast and real-time electronic readout of acetone levels in the breath which is being converted to appropriate glucose levels in the blood using acetone-glucose negative correlation. The breakdown of excess acetyl-CoA from fatty acid metabolism in diabetic patients leads to increase in the levels of acetone in the blood. This acetone reaches lungs and is exhaled through breath and also excreted in urine. Therefore, the breath acetone levels could be a measure of the blood glucose levels of a person. A TGS822 tin oxide (SnO2) sensor has been used to detect the concentration of acetone in the exhaled air. Acetone in exhaled breath showed a correlation with the blood glucose levels. Our objective is to reduce the risk of patients from pricking fingers and also to reduce discomfort they experience during their regular glucose check-ups. This system can also be tele-monitored by doctors anytime, anywhere using mobile phones, laptops and other many electronic gadgets through internet. Health monitoring systems based on Internet-of-things (IoT) have been recently introduced to improve the quality of health care services. We designed IoT-based system architecture from a sensor device to a back-end system for presenting real-time glucose, in graphical and human-readable forms to end-users such as patients and doctors. Thing Speak is an open data platform for the Internet of Things. Our sensor device connects to the server through an API keyand the sensor readings are plotted in the graphical form making it easier for the end user to interpret. The results obtained shows that breath acetone levels can be used to determine blood glucose levels efficiently

## Introduction:

Non-invasive diagnosis technique is becoming more prominent in diagnosing diseases due to their pain free and simple monitoring methods. Diabetes can also be detected using non-invasive methods. Diabetes mellitus is a major health problem worldwide. This health condition arises from many complex metabolic disorders leading to high glucose levels in a person. High glucose levels can lead to many health disorders such as kidney failure, blindness, heart diseases and even premature death. Frequent testing and accurate determination of glucose levels is essential for diagnosis, effective management and treatment of diabetes mellitus. Therefore, there have been constant efforts to develop efficient and sensitive techniques for the determination of blood glucose levels. A number of invasive enzymatic and non-enzymatic methods and systems have been reported for the detection of glucose.

Conventionally, glucose level is determined from a small volume of blood sample collected by finger pricking. Though the test may not pose any risk to a healthy adult who goes for the diabetes check-up in every 2 to 3 months, but it is very painful to the diabetic patients because every time they have to prick the finger. The current invasive method is based on the enzymatic catalysis principle where a thin needle is used to prick the finger of the patient to minimize the discomfort .To avoid such painful diagnosis, extensive research has been devoted towards developing non-invasive techniques that measure blood glucose levels without taking the blood sample some of the non-invasive techniques used are electrical impedance, NIR spectroscopy, urine analysis, ultrasound and thermal spectroscopy. However, none of these methods seems to achieve the desired accuracy due to varying environmental conditions and physical movements and therefore none of them led to any accurate and safe commercial device. Further, compared to the breath analyser other techniques appear to be expensive due to the sensor components involved.