

Proceeding Paper

# Design of an Adaptable Sensing Platform for Metabolomic Sensing <sup>†</sup>

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**Abstract:** A single paragraph of about 100 words to give a brief introduction to your work.

**Keywords:** keyword 1; keyword 2; keyword 3 (List three to ten pertinent keywords specific to the article yet reasonably common within the subject discipline.)

**Citation:** Bai, S.; MacKay, S.; Cook, J.; Gonzalez-Vasquez, P.; Chen, J.; Wishart, D. Design of an Adaptable Sensing Platform for Metabolomic Sensing. *2021*, *3*, x.  
<https://doi.org/10.3390/xxxxx>

Academic Editor(s):

Published: 1 November 2021

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Colorectal cancer is among the top contributors to cancer death, but that is only due to the lack of efficient screening methods. Specific metabolites in urine have been identified as a factor in cancer detection, but a laboratory NMR device is required to identify these metabolites; however, the cost of these devices starts at 25 thousand dollars and requires trained professionals to operate. To increase the accessibility of colorectal cancer screening, a solution was proposed that the absorbance of metabolite-specific assays is to be measured using a portable and inexpensive metabolic biosensor. The first step was to create low-cost quantitative color-based metabolite assays that use redox-sensitive dye or colorimetric reactions that change color intensity when reacting with specific concentrations of these metabolites in urine. To complete the experiments, a device that utilizes the TCS34725 color sensor was created. The sensor is placed 1cm above a microfluidic cartridge with a channel that can hold 100 microliter of liquid, and a diffused LED light source is placed 1cm under the cartridge to provide light to the sample liquid in the cartridge channel. All of this is then placed inside of a black box environment to complete the setup. A laboratory microplate reader is used for reference on the quantitative color-based Creatinine assay, and a linear trend was observed with an R2 of 0.999. The sensor device observed a polynomial curve due to light saturation at higher concentrations, but an R2 of 0.992 was obtained. In conclusion, the device can distinguish between the different concentrations of metabolites within samples, thus creating the possibility of an affordable and easy-to-use biosensor platform that can benefit the population within rural and inaccessible communities. In the Future, this portable metabolic biosensor system has the potential to be modified such that screening for other diseases can be done.

**Author Contributions:**

**Funding:**

**Institutional Review Board Statement:**

**Informed Consent Statement:**

**Data Availability Statement:**

**Conflicts of Interest:**

## References