



NIIDS—Digital Urine Analysis with Printed Electrochemical Sensors

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There is a need for developing new solutions that enable rapid diagnostic tests in low resource settings. CSEM is working on the development of a handheld fluidic cartridge, containing an array of printed electrochemical sensors for the digital recording of urinary glucose and pH. The system is being developed for the Swiss Tropical and Public Health Institute (Swiss TPH) to assist clinical decision making in low-resource settings such as refugee camps.

Clinical decision making in low-resource settings is often based on limited diagnostic information. Inaccurate treatment of febrile illnesses (e.g. by broadband antibiotics) is often the consequence. The Swiss TPH aims to develop a diagnostic tool for the most common pathogens and febrile illnesses, to fight migrant diseases. Nowadays, basic urinalysis is done with urine paper dipsticks with colour indicators.

We have developed a digital sensing device to detect important ions and metabolites in urine. Among these are pH, sodium and glucose. Sensors for glucose and pH have been realized on the device and showed good results in first urine tests. Our printed pH sensors show excellent agreement with the reference system and very good sensor reproducibility. Glucose can be measured with higher sensitivity compared to urine dipsticks, which may allow to detect diabetes at an early stage. Later, sensors for additional analytes, such as sodium and lactate, will be added to the device array.



Prototype device for the electrochemical urine analysis of 1-4 analytes.