

Fabrication of paper chip for urinalysis using image analysis

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Aging around the world is becoming a serious problem. Therefore, it is necessary to diagnose and manage diseases that are vulnerable to such an elderly population, and a simple and inexpensive diagnostic device is required. The conventional method is a well plate assay and a dipstick for the urine test. However, these methods have disadvantages such as requiring equipment and expensive. To overcome these limitations, we demonstrate a paper-based diagnostic device for urine analysis. We printed a solid wax using a wax printer, heated it with a laminator to be absorbed the wax to paper for fabricating a circular assay pad by creating a hydrophobic barrier. It then absorbs the indicator for each of BSA, pH, and glucose to functionalize the pad. When urine is dropped on a functionalized pad, a color reaction occurs. These results analyze based on a reference table created using the CIE (International Lighting Commission) Lab color space. We envision that these paper-based diagnostic devices are expected to contribute to increased life expectancy through self-diagnosis and management of elderly people as a low-cost device which is simple and instrument-free.