Paper Based Biosensor for Quantitative Detection of Salivary Biomarkers for Early-Stage Oral Cancer Diagnosis

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ABSTRACT

The proposed paper-based analytical device has significant potential for quantitative detection of biomarkers responsible for oral carcinoma, which is a major public health concern, because early diagnosis can reduce the risk of disease. Although, many diagnostic platforms are available to diagnose oral cancers to date, paper-based point-of-care diagnostic device is considered to be cost effective, simple, easy-to-use and requires less volume of the sample to detect the presence of biomarkers responsible for early diagnosis of oral carcinoma and tobacco-smoke exposure. The diagnostic platform that is described here utilizes the hydrophobic material (wax) to create microfluidic channels by patterning them on the hydrophilic substrate (paper) to detect the desired biomarker in saliva as biological fluid. Detection of biomarkers in saliva is advantageous as it is a non-invasive and potential diagnostic tool. Presence of biomarkers such as salivary cotinine and nitrite can be detected in single paper-based analytical device allowing the biomarkers to be quantified parallelly. The biomarkers are qualitatively analysed using colorimetric assay and quantitatively analysed via ImageJ software.

Keyword: Salivary Nitrite, Salivary Cotinine, Paper based analytical device, Colorimetric Assay.