

Multi-line Pt-based lateral flow device for the colorimetric measurement of antioxidant levels in saliva

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Nowadays, with the increase of lifestyle-related diseases, frequent preventive screenings are of great interest in healthcare. An important biomarker for monitoring the health status of the organism is represented by the Total Antioxidant Capacity (TAC), which can be measured through several laboratory-based assays. However, the application of most of the commercially available kits is limited by invasiveness, long and costly procedures, and inaccuracy. To overcome such drawbacks, we developed an innovative detection mechanism exploiting the peroxidase-like properties of 4 nm platinum nanoparticles (PtNPs), combined with biologically relevant radical probes (hydroxyl radicals), to get an accurate and fast (5 minutes) assessment of the body TAC in saliva. The naked-eye evaluation of the total antioxidant content of the sample is allowed by the use of a chromogenic probe, namely 3,3',5,5'-tetramethylbenzidine (TMB). Moreover, we developed a multi-line Pt-based lateral flow device, based on three sequential test lines with increasing amount of Pt nanozymes. Saliva sample flows through the strip, running first into TMB and then reaching the detection area, where a number of blue lines appears proportionally to the level of antioxidants. This non-invasive colorimetric nanosensor provides a rapid, easy and naked-eye detection of the body TAC.