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# Compact detectors made of paired LEDs for photometric and fluorometric measurements on paper

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## ABSTRACT

The utility of strikingly simple and cheap optoelectronic detectors operating according to a Paired-Emitter-Detector-Diode (PEDD) principle for microfluidic paper-based analytical devices ( $\mu$ PAD) has been experimentally confirmed. The prototypes of these compact detectors have been made of only two customary light emitting diodes without any additional optical parts like lens, filters, fibers etc. Moreover, for their operation economic and portable equipment is required (low-power circuit and ordinary voltmeter). Photometric and fluorometric PEDDs for paper devices are developed. In both cases the possibility of their applicability in transmittance and reflectance modes of measurements are presented. In these investigations as model analytes some coloured and fluorescence substances have been handled, but the utility of several developed systems for real chemical analysis has also been demonstrated. The results of photometric determination of hemoglobin in human blood, as well as fluorometric determination of quinine in tonics and calcium ions in mineral waters using various PEDD- $\mu$ PAD systems have been shown.

## Keywords:

Paper,  $\mu$ PAD, Spectrophotometry, Fluorescence, Light emitting diodes

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