

## Optical spectrophotometry into hemozoin: towards sensitive malaria diagnosis

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The lack of prompt and sensitive diagnosis hampers malaria control and elimination, highlighting the need for next generation technology alternative for the established optical microscopy and Rapid Diagnostic Tests (RDTs) as means of in situ point-of-care malaria parasite detection. Hemozoin (Hz), a byproduct of hemoglobin (Hb) degradation inside human infected red blood cells (RBCs), has been extensively explored as a malaria biomarker. Along with malaria parasite maturation inside the RBC, Hb and Hz proportion is inversely related, which originates specific optical spectra of healthy and infected samples. Herein, we characterized the optical spectra of *Plasmodium falciparum*-infected RBCs, aiming the development of an innovative diagnostic device, detecting malaria without finger prick blood sampling, measuring directly in patients' skin. Absorbance and reflectance spectrophotometry demonstrate their potential by increasing the limit of detection (LoD: 12 parasites/ $\mu$ L of RBC) when compared with microscopy or RDT (LoD: 50-200 parasites/ $\mu$ L of RBC). This sensitivity, coupled with the possible integration into a low-cost, fast, and non-invasive diagnostic device meets the growing clinical demands for malaria control and elimination.

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