Abstract

Malaria is primarily caused by Plasmodium falciparum, a single-celled parasite that poses a significant public health challenge, particularly in remote locations with little access to healthcare. The emergence of drug-resistant P. falciparum strains poses a significant challenge to malaria eradication efforts. Certain malaria parasite strains have been found to impair the efficiency of antimalarial medicines. Early detection of drug resistance strains is critical for tailoring treatment programs and implementing successful containment strategies. This study introduces novel isothermal amplification techniques to detect drug-resistant strains of P. falciparum. This thesis uses both the LAMP test and PCR to detect target nucleic acids. Gel electrophoresis is used to visualize and compare amplification results from different techniques. Using gel band patterns, we may compare the sensitivity and specificity of LAMP to traditional PCR. The results obtained suggest that the LAMP test condition has been successfully optimized and that it can be further integrated into downstream detection methods or used as it is. The study found that LAMP produced comparable and reliable results to PCR. LAMP is an enticing alternative because of its simplicity and lack of required equipment and technical abilities. This study provides proof of initial development of a novel approach for detecting and defining drug resistant strains of Plasmodium falciparum, leading to improved malaria control and better patient outcomes.