Abstract

Plasmodium falciparum, a type of single-celled parasite, is the main cause of malaria and remains a major problem for public health worldwide, especially in areas where healthcare is not easily accessible. A major obstacle in the effort to eradicate malaria is the rise and spread of drug-resistant forms of *P. falciparum*. These specific strains of malaria parasites have been discovered to reduce the effectiveness of antimalarial drugs. It is crucial to quickly and properly detect these strains of medicine resistance to customize treatment plans and apply effective containment measures. This study addresses the important problem of detecting drug-resistant strains of *P. falciparum* by providing innovative techniques of isothermal amplification that were specifically designed for this purpose. In this thesis, both the loop-mediated isothermal amplification (LAMP) assay and PCR are utilized as the primary methods for detecting target nucleic acids. Gel Electrophoresis is employed to visualize and compare the amplification results from each technique. By examining the band patterns on the gels, we can compare the results of LAMP to conventional PCR. The findings of this thesis revealed that the LAMP test is a feasible alternative to PCR for application in rural regions. The findings showed that LAMP generated results that were similar as those acquired using PCR. This makes LAMP an appealing choice owing to its simplicity and lack of specific equipment and technical skills. This study introduces an innovative and easily available approach that can aid in identifying and describing drug-resistant strains of *Plasmodium falciparum*, hence improving efforts to control malaria and optimizing patient results.

Keywords: *Plasmodium falciparum*, loop-mediated isothermal amplification, drug-resistant malaria