

Development of Loop-Mediated Isothermal Amplification Assay for Mass Screening of Sand Flies for *Leishmania* Parasite

Fathima Afreen. M.R.¹, Wijegunawardana, N.D.A.D.^{1*}

¹*Department of Bioprocess Technology, Faculty of Technology,
Rajarata University of Sri Lanka.*

**ashawijegun@tec.rjt.ac.lk*

The research initiative aimed at advancing the diagnostic capabilities for Leishmaniasis, a disease transmitted through sand fly bites and prevalent in regions with limited healthcare access and high poverty rates, particularly in tropical and subtropical settings. The primary objective was to create an efficient diagnostic tool utilizing Loop-Mediated Isothermal Amplification (LAMP) for the early detection and surveillance of *Leishmania* infection in sand flies. The meticulous design of LAMP primers targeted specific, conserved regions within *Leishmania* DNA, ensuring both sensitivity and specificity in detecting the parasite. Ethical considerations were prioritized, with institutional research ethics clearance obtained, and informed consent secured from study participants. Sample collection occurred in endemic regions of Sri Lanka, involving effective trapping methods and precise laboratory procedures for the identification and extraction of sand fly DNA. The subsequent Polymerase Chain Reaction (PCR) analysis, combined with gel electrophoresis, validated the success of the LAMP assay in amplifying *Leishmania* DNA in sand fly samples. The results confirmed the specificity and reliability of the developed diagnostic tool. The study's outcomes emphasized the potential of LAMP assays for mass screening of sand flies, highlighting their sensitivity, specificity, cost-effectiveness, and user-friendly nature. In summary, the research successfully addressed the challenges of Leishmaniasis detection by developing and validating a LAMP assay. This accomplishment contributes significantly to enhancing early detection, surveillance, and control strategies for Leishmaniasis, particularly in regions where sand flies play a crucial role in disease transmission.

Key words: *Leishmania, LAMP assay, Sand fly, PCR, DNA extraction.*