DEDICATION

"Success consists of going from failure to failure without loss of enthusiasm Success is to be measured not so much by the position that one has reached in life as by the obstacles which he has overcome."

Booker T. Washington.

We dedicate our success to the failures we faced, the obstacles we overcomed and to the people who were there supporting us, raising our spirits high whenever accomplishment seems impossible. Thanks to their presence in our lives we had no fear of failure; we knew for sure that whenever we hit the bottom their loving hearts will lift us up.

To you mother for holding my hand since my day one in life. Without your tender, guiding and sometimes over protecting touch I would have never became who I am today, I am your creation.

To my mountain, who taught me to stand high, to feel proud of whom I am and not to fear falling rocks because I am stronger. To you father.

To you my friends, who know me, but love me anyway. Without you I can never make do in this world.

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Supervisor signature: …….

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ABBREVIATIONS

µm	Micrometer
ADC	Analog to Digital Converter
ANN	Artificial Neural Network
cm	Centimeter
DC	Direct Current
DNA	Deoxyribonucleic Acid
ELISA	Enzyme-Linked Immunosorbent Assay
FP-PCR	Filter Paper Polymerase Chain Reaction
GND	Ground
Hb	De-oxygenated Hemoglobin
HbO2	Oxygenated Hemoglobin
IR	Infrared
LASER	Light Amplification by Stimulated Emission of Radiation
LCD	Liquid Crystal Display
LED	Light Emitting Diode
M	Molar
mA	Milliamp
mm	Millimeter
MOT	Magneto-Optical Technique
mV	Millivolt
nm	Nanometer
OP Amp	Operation amplifier
P. F	Plasmodium Falciparum
P.M	Plasmodium Malaria
P.O	Plasmodium Ovale
P.V	Plasmodium Vivax
PCR	Polymerase Chain Reaction

Pfdhfr	Plasmodium falciparum dihydrofolate reductase
PfHRP	Plasmodium falciparum histidine rich protein
RBC	Red Blood Cell
RDTs	Rapid Diagnostic Tests
SSA	Sub-Saharan Africa
T	Tesla
UV	Ultra Violet
WHO	World Health Organization

Abstract

This study concerns with developing a trustworthy technique for detecting hemozoin (the waste product of malarial parasitic action on hemoglobin) in blood by detecting the intensity of IR LASER beam ,passing through human finger or blood sample, when interacting with hemozoin particles on application of a magnetic field in both non-invasive and invasive way. The proposed system consists a Laser infrared source, pair of permanent magnets and embedded processing system.

This study was validated by preliminary experiments across seventeen patients and twenty one blood sample, the obtained results showed that the developed method has accuracy of (93.75%) for patients and accuracy of (95.24%) for blood samples. less pain, small duration and more comfortable malaria test will be presented by this study.

المستخلص

تهتم هذه الدراسة بتطوير نظام لاكتشاف جزيئات الهيموزوين (الناتجة عن امتصاص الهيموغلوبين بواسطة طفيليات الملاريا) الموجودة في الدم و ذلك بتحديد شدة ليزر الأشعة تحت الحمراء المار بصورة مباشرة من خلال الأصبع أو عينة الدم و ذلك بعد تفاعله مع جزيئات الهيموزوين تحت تأثير مجال مغنطيسي دائم . يتكون النظام المقترح من مصدر ليزر للاشعة تحت الحمراء ، زوج من المغنطيسات الدائمة و نظام معالجة مضمن .

تم إثبات هذه الدراسة من خلال استخدام هذا النظام لإختبار (١٧) شخص و (٢١) عينة دم و أظهرت نتائج التجارب أن النموذج يعمل بدقة إختبار 93.75% في حالة الفحص على الأشخاص مباشرة و بدقة إختبار 95.24% في حالة الفحص على عينة الدم . وفر هذا النظام فحص للملاريا بصورة أقل ألما و في فترة زمنية قصيرة و براحة أكبر.