

Dedication

To my family.

To my best friends with my love

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Table of content

Title	Page No
Dedication.....	i
Acknowledgments.....	ii
Table of content.....	iii
List of figures.....	vii
List of tables.....	viii
List of abbreviations.....	ix
Abstract.....	x
المستخلص.....	xi

CHAPTER ONE: Introduction to nanotechnology

1.1 overview.....	1
1.2 review for development of nanotechnology.....	1
1.3 nanometer scale.....	2
1.4 nanoparticles	2
1.4.1 Properties of nanoparticles.....	3
1.4.2 Gold nanoparticles.....	5
1.4.3 Optical and electronic properties of GNPs.....	6
1.4.4 Application of GNPs.....	7
1.5Problem statement.....	8
1.6 Objectives	8
1.7Method of research.....	8
1.8Layout.....	9

CHAPTER TWO: Synthesis of nanoparticles

2.1 Introduction.....	10
2.2 Methods of synthesis of GNPs.....	11
2.3 Fenugreek seeds (<i>Trigonella foenum</i>).....	12
2.4 Black seeds (<i>Nigella sativa</i>)	13
2.5 Microwave assisted synthesis of GNPs	14
2.6 Review of synthesis of GNPs.....	15
2.6.1 Black seeds.....	15
2.6.2 Fenugreek seeds.....	15
2.7 The materials and method	16
2.7.1 Preparation of plant seeds extract and metallic solution.....	16
2.7.2 Biosynthesis of GNPs by microwave irradiation.....	18
2.8 Results.....	18
2.9 Conclusion.....	19

CHAPTER THREE: GNPS characterizations

3.1 Introduction	20
3.2 Characterization instrument.....	20
3.2.1 UV/visible spectrometer.....	20
3.2.2 Energy dispersive X-ray spectrometer.....	21
3.2.3 X-ray diffractometer.....	21
3.2.4 Fourier transform infrared spectrometer.....	23
3.2.5 Transmission electron microscope.....	24
3.3 The method and material.....	26
3.4 Review of characterization.....	28

3.5 Results and discussion.....	31
3.6 Conclusion.....	44

CHAPTER FOUR: GNPs biosensor

4.1 Introduction.....	45
4.2 Review of test strips applications.....	46
4.3 Universal immunochromatography assay (ICT).....	47
4.3.1 Overall design.....	48
4.3.2 Basic principle to produce ICT.....	48
4.3.3 Common ICT types.....	50
4.4 Properties of antibodies.....	51
4.5 Assay components and materials.....	52
4.6 Colloidal gold in ICT.....	53
4.7 Materials and methods.....	54
4.8 Conclusion.....	58

CHAPTER FIVE: summary and future work

5.1 Summary.....	59
5.2 Future work.....	60
References	61

List of Figures

Figure 1.1: Shapes of gold nanoparticles.....	6
Figure 1.2: Colors of various GNPs sized.....	7
Figure 1.3: The steps of the research.....	8
Figure 2.1: Methods of fabrication of GNPs.....	11
Figure 2.2: Mechanism of synthesis nanoparticles using plant extracts.....	12
Figure 2.3: Fenugreek (<i>Trigonella foenum-graecum</i>) plant.....	13
Figure 2.4: Nigella sativa plant.....	14
Figure 2.5: Golden chloride and metallic solution.....	16
Figure 2.6: Seeds and its extract.....	17
Figure 2.7: Synthesized GNPs by microwave.....	18
Figure 3.1: XRD basic diffraction parts and instrument parts.....	22
Figure 3.2: Different parts of the microscope.....	25
Figure 3.3: UV/visible-1800 Spectrophotometer.....	27
Figure 3.4: Lab x, XRD-6000.....	27
Figure 3.5 :TEM (JEOL-JEM-2100).....	28
Figure 3.6: TEM images of nanoparticles.....	29
Figure 3.7: TEM images and UV/visible spectrometer.....	30
Figure 3.8: UV/visible spectroscopy and TEM result.....	31
Figure 3.9: UV/visible spectrum for black seed.....	32
Figure 3.10: UV/visible spectrum for fenugreek seed.....	32
Figure 3.11: EDX spectrums of fenugreek GNPS.....	34
Figure 3.12: EDX spectrums of black seed GNPS.....	34
Figure 3.13: The XRD pattern of dried GNPs synthesized by black seed 10ml.....	35

Figure 3.14: Fenugreek XRD.....	36
Figure 3.15: FTIR spectroscopy.....	37
Figure 3.16: TEM images of GNPs formed by black seed.....	38
Figure 3.17: TEM image of GNPs by black seeds and its histogram.....	39
Figure 3.18: TEM images of GNPs formed by fenugreek 8ml.....	40
Figure 3.19: TEM image and its histogram 8ml.....	41
Figure 3.20: TEM images of GNPs formed by fenugreek 10ml.....	42
Figure 3.21: TEM image and its histogram.....	43
Figure 4.1: The principle of lateral flow.....	49
Figure 4.2: Common immunoassay procedures.....	51
Figure 4.3: Over lapping between assay components.....	52
Figure 4.4 Model of the lateral flow assay.....	54
Figure 4.5: Relation between particles concentration and the signal.....	57

List of tables

Table (3.1): Characteristic IR bands.....	37
Table (3.2): Size ranges and means.....	44
Table (4.1) Assay components function, materials and treatments.....	52

List of abbreviations

AFM	Atomic Force Microscope
EDX	Energy dispersive X-ray spectroscopy
ELISA	Enzyme-Linked Immunosorbent Assay
FEG	Field emission gun
FTIR	Fourier transforms infrared spectroscopy
GNPs	Gold nanoparticles
HCG	Human chorionic gonadotropin
ICT	Immunochemistry
LFA	Lateral flow assays
NPs	Nanoparticles
POC	Point-of care
SEM	Scanning electron microscopy
TEM	Transmission electron microscopy
STM	Scanning Tunneling Microscope
UV/visible	Ultraviolet and visible spectrometry
XRD	X-ray Diffractometer

Abstract

An Immunochromatography (ICT) bio-detector facilitates low-cost, rapid identification of various analytes at the point of care. The ICT cell consists of a porous membrane containing immobilized ligands at various locations. Through the action of capillary forces, samples and reporter particles are transported to the ligand site. A mathematical model for assays is constructed and used to study the performance of the ICT under various operating concentration of particles and analytes. The model provides insights into certain experimental observations including the reduction in the level of the detected signal and the contrast. The model can be used to test rapidly and inexpensively various operating conditions assist in the device's design. The research is focused on green synthesis methods to synthesis gold nanoparticles using cheap and nontoxic chemicals, ecofriendly and safer then study the particle size and concentration for capability to be used in the devices design. From TEM results the sizes of particles are 15 and 20 nm that mean can be used for sensing.

المستخلص

الحساس الحيوي المناعي يمثل طريقه ذات تكلفه اقل وسريعه لمختلف التحاليل في نقاط الرعايه الاولى. ويتكون اساسا من غشاء مثقب يحتوى مركبات في اماكن مختلفه. عن طريق القوى الشعريه تنتقل العينه والجسيمات الي اماكن المركبات في الغشاء. تم تصميم النموذج الرياضي للحساس لدراسه كفاءته عند استخدام تراكيز مختلفه من الجسيمات والمواد المراد تحليلها. يوضح النموذج الاعتبارات العامه لتجارب تصنيع الحساس بما فيها عدم وضوح الاشاره والتباين . وهو طريقه سريعه وغير مكلفه لكل الاعتبارات التي يجب مراعاتها في تصميم الحساس. في هذا البحث تم التركيز علي الطريقه الحيويه لتصنيع جسيمات النانو بطريقه رخيصه ملائمه للبيئه من دون استخدام مواد سامه وامنه, دراسه حجم وتركيز الجسيمات وجد من دراسه نتيجته المجهر الالكتروني النافذ ان حجم الجسيمات 15 و20 وهو ملائم لتصميم الحساس .