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CONTENTS

Chapter-1 Introduction	(1-11)
1.1. Biosensor	2
1.1.1 History	2
1.1.2 Definition	3
1.1.3 Components of Biosensor	3-4
1.1.4 Characteristics of Biosensor	4
1.1.5 Classification of Biosensor	4-6
1.2. Applications of Nanotechnology in Biosensor	6
1.2.1 Nanoparticles in Biosensor application	7
1.2.1.1 Silica Nanoparticles	7-8
1.2.1.2 Silver Nanoparticles	8
1.3. Cholesterol	8-9
1.3.1 Cholesterol oxidase	9-10
1.3.2 Principle of cholesterol detection	10
Chapter-3 Characterization Techniques	(11-26)
3.1 XRD (X-Ray diffraction)	11
3.2 SEM (Scanning Electron microscope)	15
3.3 FTIR (Fourier Transform Infrared Spectroscopy)	17
3.4 DLS (Dynamic Light Scattering)	20
3.5 UV-Visible Spectroscopy	24
Chapter-2 Materials and Methods	(27-32)
2.1. Materials	27
2.2. Methods	27
2.2.1 Preparation of Phosphate Buffer solution	27
2.2.2 Preparation of Stock solution of Cholesterol	28
2.2.3 Preparation of Cholesterol oxidase solution	28
2.2.4 Preparation of Horseradish peroxidase solution	29
2.2.5 Preparation of 4-Aminoantipyrene solution	29
2.2.6 Preparation of solution for UV-Vis Spectroscopy	29
2.2.7 Synthesis of Silver Nanoparticles	29

2.2.8 Preparation of solution of Cholesterol and silver nanoparticle for UV-Vis Spectroscopy	30
2.2.9 Synthesis of Silica nanoparticles	30
2.2.10 Preparation of 6N HCl	31
2.2.11 Synthesis of Si-OH	31
2.2.12 Synthesis of SiOH - Silane	31
2.2.13 Synthesis of Silica* (Si-OH+Silane) + Dye	31
2.2.14 Preparation of Cholesterol Solution and Silica*+ Dye for UV-Vis Spectroscopy	32
2.2.15 Preparation of KBr pellets	32
Chapter-4 Results and discussions	(33-50)
4.1 X-Ray Diffraction analysis	33
4.2 Energy Dispersive X-Ray analysis	34
4.3 Scanning Electron microscope analysis	35
4.4 Fourier Transform Infrared Spectroscopy analysis	36
4.5 Dynamic Light Scattering studies	37
4.6 UV-Visible Spectroscopy studies	42
Chapter-5 Conclusion	(51)
References	(52-55)

List of Figures

- 1.1 Components of Biosensor
- 1.2 Classification of Biosensor
- 1.3 Structure of Cholesterol
- 1.4 Structure of Cholesterol oxidase
- 2.1 Schematic representation of synthesis of silica nanoparticles
- 2.2 KBr pellets
- 3.1 XRD instrument
- 3.2 Goniometer
- 3.3 Bragg's diffraction
- 3.4 Sem instrument
- 3.5 SEM working
- 3.6 FTIR Instrument (PerkinElmer Spectrum BX)
- 3.7 FTIR working
- 3.8 Schematic working of FTIR
- 3.9 DLS instrument
- 3.10 DLS working
- 3.11 Zeta potential
- 3.12 Electromagnetic spectrum
- 3.13 UV-Vis Spectrophotometer
- 3.14 UV-Vis Spectrophotometer working
- 4.1 XRD pattern of silica nanoparticle
- 4.2 EDX spectrum of silica nanoparticle
- 4.3 Scanning Electron Micrograph (SEM) of silica nanoparticles
- 4.4 FTIR spectra of SiO₂ nanoparticles with silane Binding
- 4.5 DLS of silica nanoparticle
- 4.6 DLS of silver nanoparticle
- 4.7 DLS of various modification on silica nanoparticle
- 4.8 Attachment of Dye with silica* in different medium
- 4.9 Zeta Potential of silica nanoparticle in colloidal solution
- 4.10 Zeta Potential of silver nanoparticle in colloidal solution
- 4.11 Colloidal silver nanoparticles

- 4.12 Absorption spectrum of Silver nanoparticle
- 4.13 Different concentration of cholesterol coloured solutions
- 4.14 Absorption spectrum of different concentrations of cholesterol
- 4.15 Absorption spectrum of different concentrations of cholesterol containing silver nanoparticle.
- 4.16 Comparison of absorption spectrum of different concentration of cholesterol without Silver nanoparticle Vs with Silver nanoparticle.(*Cholesterol concentrations containing silver nanoparticle)
- 4.17 Linear fitting of the absorbance by normal cholesterol and cholesterol containing silver
- 4.18 Comparison of sensitivity between the samples containing silver nanoparticle and one without it.
- 4.19 Absorption spectrum of different concentrations of cholesterol with normal dye
- 4.20 Absorption spectrum of different concentrations of cholesterol containing dye attached to silica nanoparticle*.
- 4.21 Linear fit of absorbance by Dye and Dye+ silica*(modified silica nanoparticle)
- 4.22 Sensitivity comparison by Dye and Dye+silica*

List of Tables

1. Preparation of stock solution of Cholesterol
2. Preparation of solution for UV-Vis Spectroscopy
3. Preparation of solution of silver nanoparticle and Cholesterol for UV-Vis Spectroscopy
4. Preparation of Cholesterol Solution and Silica*+Dye for UV-Vis Spectroscopy
5. Comparison of sensitivity by different materials

List of Abbreviations

DNA- deoxyribonucleic acid
pH- Power of hydrogen ion
°C- degree celcius
M- molarity of solution
nm- nanometre
NPs- nanoparticles
AgNPs- Silver nanoparticles
H₂O₂ - - hydrogen peroxide
HDL- high-density lipoproteins
LDL- low-density lipoproteins
kDa- kilodalton
U/mg- units/milligrams
gm- grams
ml- millilitre
mg- milligram
mg/dl- milligram/decilitre
µl- microlitre
N- normality
mins- minutes
rpm- revolutions per minute
KeV- kilo electron volt
2D- two dimensional
cm⁻¹- per centimetre
mV- milivolt

Abstract

A biosensor comprises a biorecognition molecule immobilized over a signal transducer to give a reagentless analytical device. The biorecognition molecules, such as enzyme, antibody, sequence of DNA, peptide or even a microorganism, provide the biosensor with its selectivity for the target analyte so that the molecule of interest can be picked out by the biosensor from a matrix of many other molecules. The fundamental property of biosensor is its sensitivity of detecting even a small amount of sample and by the use of nanoparticles the sensitivity has been increased with faster response time.

So, the main aim of any biosensor is to have high sensitivity and various nanoparticles like silver and silica, which have tendency to increase the sensitivity has been used.

Silver nanoparticle has excellent electrical conductivity and optical properties. Silver nanoparticle is effective in the H_2O_2 reduction as, it enhances the reducing capability of H_2O_2 and hence increases the sensitivity of detection of cholesterol.

Silica nanoparticles are hydrophilic and biocompatible in biological environment. Dye-conjugated with silica nanoparticles have been sensitive in detecting even a very small amount of cholesterol. Their flexible conjugation, excellent photostability, and ultrasensitivity make them a powerful tool in bioanalysis. Hence dye conjugated with silica nanoparticle enhances the sensitivity by enhancing the colour the of solution also the stability of dye was greatly enhanced in presence of silica nanoparticles.