

## Contents

Acknowledgment	i
Abstract	ii-vi
Abstrak	vii-xi
Abbreviation	xii-xiii

### **Chapter 1 Introduction**

1.1	Immunoassay	1
1.2	Basic principle of labelled immunoassay	2
1.3	Separation of bound and free reactants	3-4
1.4	Solid phase immunoassays	5-7
1.5	Objective of the project	7-9
1.6	Natural rubber latex : Production, Properties and Composition	9-11
1.6.1	Introduction	9
1.6.2	The production of natural rubber latex concentrates	9
1.6.3	Composition	10-11
1.7	The structure of immunoglobulin	11-13
	References	14- 17

### **Chapter 2 Binding studies of Anti-HBs, HBsAg, HCVAg and anti-T4 on solid phase**

2.1	Introduction	18-20
2.2	Materials and experimental methods	21-29
2.2.1	Materials and reagents	21-24
2.2.2	Experimental procedure	24-29
2.3	Results	29-39
2.4	Discussion	40-66
2.4.1	General discussions	40-47
2.4.2	Driving forces of antigen and antibody adsorption at NR and PP solid phases	47-53
2.4.3	Immobilisation of antigen and antibody on PP and NR surfaces	53-62
2.4.4	Assay of immobilised antigen and antibody on uncoated PP and NR surfaces	63-66
	AFM image and Scanning electron mirographs	67-116
2.5	Conclusion	117-118
	References	119-124

**Chapter 3 Effect of acid, PBS, water washes and trypsinisation on NR coated tubes**

3.1	Introduction	125-126
3.2	Materials and experimental methods	126-129
3.2.1	Materials	126
3.2.2	Experimental methods	126-129
3.3	Results	129-148
3.4	Discussion	149-158
3.4.1	Effect of pH on the percent binding of $^{125}\text{I}$ anti-HBs and $^{125}\text{I}$ HBsAg immobilised on NR coated and PP surfaces	149-150
3.4.2	Effect of washing and trypsinisation	150-157
3.4.3	Formation of aggregates on NR surfaces AFM images and SEM micrographs	157-158 159-162
3.5	Conclusion	163-164
	References	165-167

**Chapter 4 Effect of concentration of adsorbate**

4.1	Introduction	168
4.2	Materials and experimental methods	169
4.2.1	Materials	169
4.2.2	Experimental methods	169
4.2.3	Calculation	169-171
4.3	Results	172-179
4.4	Discussion	180-189
4.5	Conclusion	190
	References	191-195

**Chapter 5 Effect of precoating on NR and PP surfaces**

5.1	Introduction	196-197
5.2	Materials and experimental methods	197-199
5.2.1	Materials	197-198
5.2.2	Determination of precoating concentration	198
5.2.3	Experimental methods	199
5.3	Results	199-224
	AFM images and Scanning electron micrographs	225-238
5.4	Discussion	239-251
5.4.1	General discussion	239-240
5.4.2	Immobilisation of proteins on solid surfaces	241-243
5.4.3	Effect of precoating	243-248
5.4.4	Effect of precoating on specific binding of anti-HBs and	248-251

5.4.4	Effect of precoating on specific binding of anti-HBs and HBsAg - a comparison between PP and NR surfaces	248-251
5.5	Conclusion	252
	References	253-254
<b>Chapter 6 Effect of blocker</b>		
6.1	Introduction	255-256
6.1	Materials and experimental methods	256-257
6.2	Materials	256
6.2.2	Experimental methods	256-257
6.2.3	Determination of precoating concentration	257
6.3	Results	257-269
6.4	Discussion	270-276
6.5	Conclusion	277
	References	278-280
<b>Chapter 7 Kinetics of antigen-antibody reactions at solid-liquid interfaces</b>		
7.1	Introduction	281
7.2	Materials and experimental methods	282-292
7.2.1	Materials	282
7.2.2	Experimental methods	282-292
7.3	Results	293-324
7.3.1	Re-equilibration	293
7.3.2	Dissociation of labelled anti-HBs and HBsAg from solid phase	293
7.3.3	Dissociation of labelled anti-HBs and HBsAg from HBsAg and anti-HBs immobilised surface	294
7.3.4	Kinetics studies	294-298
7.3.5	Calculation	299-300
	Tables and Graphs	301-325
7.4	Discussion	326-335
7.4.1	Percent binding of labelled anti-HBs (HBsAg) on PP/NR surface immobilised with HBsAg (anti-HBs)	325-330
7.4.2	Low binding activity of immobilised HBsAg and anti-HBs on NR surface as compared to PP immobilised surface	330-335
7.5	Conclusion	336
	References	337-339
<b>Chapter 8 Concluding Remarks</b>		
	Appendix	340-343
		344