LIST OF FIGURES

• • · · · · · · · · · · ·

Fig. No.	<u>Title</u>	Page No.
1.	The raffinose series of oligosaccharides.	19
2.	Postulated pathway for the blosynthesis of the raffinose family of oligosaccharides.	22
3.	A biosynthetic scheme for lathyrogens.	39
4.	Pathway for the degradation of raffinose.	82
5.	Gene-enzyme relationship in raffinose metabolism by <u>E. coli</u> K ₁₂ harbouring the 'Raf' plasmid $\sqrt{D-1021}$.	97
6.	Generalized scheme for DNA cloning in E. coli.	[10
7.	The structure of pER-322 showing the unique cleavage sites.	112
8.	Sites for inhibition of nucleic acid synthesis by antibiotics and drugs.	117
9.	Detection of the oligosaccharides and their metabolites of unfermented and fermented L. sativus dhal samples, analysed by TLC method.	262
10.	Gas chromatogram of different oligosaccharides and their metabolites on a 50 cm long UCW-98 column.	270
11.	Detector response of IMS derivatives on a 50 cm UCW-98 column.	270
12.	Gas chromatograms of the oligosaccharides and their metabolites of unfermented and fermented L. sativus dhal samples.	274
13.	Growth curve of <u>Bacillus</u> <u>ap.</u> I in raffinose broth and utilization of raffinose.	287
14.	Growth curve of <u>Bacillus</u> sp. I in stachyose broth and utilization and stachyose.	288
15.	Crowth curve of <u>Bacillus ap.</u> 1 in melibiose broth and utilization of melibiose.	289
16.	Growth curve of <u>Bacillus</u> sp. I in sucrose broth and utilization of sucrose.	290

contd...

ı

• •

Fig. No.		Page No.
17.	Gas chromatograms of products of raffinose utiliza- tion by <u>Bacillus sp.</u> I.	2 9 6
18.	Gas chromatograms of products of melibiose utiliza- tion by <u>Bacillus sp.</u> I.	297
19.	Detection of products of melibiose and sucrose utilization by <u>Bacillus</u> sp. I, analysed by TLC method.	298
20.	Detection of products of raffinose utilization by <u>Bacillus gp.</u> I, analysed by TLC method.	298
21.	Effect of pH on the activity of crude \sim -galacto- sidage and invertage of <u>Eacillus</u> sp. 1.	304
22.	Effect of substrate concentration on the activity of crude ∞ -galactosidase and invertase of <u>Bacillus</u> sp. 1.	305
23.	Effect of period of incubation on the activity of crude \sim -galactosidase and invertage of <u>Bacillus</u> sp.I.	306
24.	Effect of crude enzyme concentration on \sim -galacto- sidase and invertage activity of <u>Bacillus</u> sp. 1.	307
.25.	Effect of temperature on the activity of crude ∞ -galactosidase and invertage of <u>Eacillus</u> sp. 1.	308
26.	Growth of <u>Bacillus sp.</u> I in presence of various sugars.	326
27.	Effect of carbon source on \sim -galactosidase production during growth of <u>Eacillus</u> sp. I.	327
28.	Effect of carbon source on \propto -galactosidase production during growth of <u>Bacillus</u> sp. I.	328
29.	Effect of carbon source on invertage production during growth of <u>Bacillus</u> sp. I.	329
30.	Effect of glucose during growth of <u>Bacillus</u> sp. I,, in raffinose broth.	331
31.	Effect of glucose on production of \sim -galactosidase, when <u>Bacillus sp.</u> I was grown in raffinose broth.	332
32.	Effect of glucose on production of invertage when <u>Bacillus ap.</u> I was grown in raffinose broth.	333
	cont	А.
١		**** *

.

÷

List of Figures (Contd..)

	Fig. No.		Page No.
	33.	Effect of rifampicin concentration on incorporation of ¹⁴ C labelled leucine into proteins during growth of <u>Bacillus sp.</u> I in raffinose broth.	335
	34.	Effect of rifampicin concentration on incorporation of ⁵ H-labelled uridine into RNA during growth of <u>Bacillus sp.</u> I in raffinose broth.	336
	35.	Effect of addition of rifampicin on growth of Bacillus sp. I in raffinose broth.	338
	36.	Effect of addition of rifampicin on induction of ∞ -galactosidase of <u>Bacillus</u> sp. I.	339
•	37.	Sephadex G-200 gel filtration profile of ∞ -galacto- sidase and invertage from <u>Bacillus</u> sp. I.	349
	38.	DEAE cellulose chromatography-I of \sim -galactosidase from <u>Bacillus</u> sp. I.	350
•	39.	DEAE cellulose chromatography-I of invertase from Bacillus sp. I.	350
	40.	Hydroxylapatite chromatography of ~-galactosidase from Bacillus sp. I.	351
	41.	Hydroxylapatite chromatography of invertage from <u>Bacillus sp</u> . I.	351
	42.	DEAE cellulose chromatography-II of ∞ -galactosidase from <u>Bacillus</u> sp. I.	353
	43.	DEAE cellulose chromatography-II of invertase from Bacillus sp. I.	353
	44.	QAE Sephadex chromatography of \sim -galactosidase from <u>Bacillus</u> sp. 1.	354
	45.	Effect of pH on the activity of purified \sim -galacto- sidage and invertage of Eacillus sp. 1.	355
	46.	Effect of temperature on the activity of purified \sim -galactosidase and invertase of <u>Bacillus</u> sp. 1.	358
	47.	Thermal stàbility of purified \propto -gelactosidase and invertase of <u>Bacillus sp. I</u> .	359
	48.	Effect of enzyme concentration on the activity of purified ∞ -galactosidase and invertase of <u>Bacillus</u> ap. I using ∞ -PNFG and sucrose as substrate respectively.	361
	•	cont	d

2 - 1 --

.

List of Figures (Contd...)

 49. Effect of period of incubation on the activity of purified ∞-gelactosidage and invertage of <u>Bacillus gp. 1</u> 50. Effect of purified ∞-galactosidage concentration on hydrolysis of meliblose. 51. Effect of purified ∞-galactosidage concentration on hydrolysis of reffines and stackyose. 52. Effect of period of incubation on the hydrolysis of reffines and stackyose. 53. Effect of period of incubation on the hydrolysis of reffines and stackyose. 54. Effect of period of incubation on the hydrolysis of reffines and stackyose. 55. Effect of period of incubation on the hydrolysis of reffines and stackyose of <u>Bacillus gp. 1</u>. 54. Effect of ∞-FNFC concentration on the rate of its hydrolysis by ∞-galactosidage from <u>Bacillus gp. 1</u>. 55. Effect of radiose concentration on the rate of its hydrolysis by ∞-galactosidage from <u>Bacillus gp. 1</u>. 56. Effect of paramitrophenyl ∞D-fuection gp. 1. 57. Effect of stackyose concentration on the rate of its hydrolysis by ∞-galactosidage from <u>Bacillus gp. 1</u>. 58. Effect of paramitrophenyl ∞D-fuection enterate of its hydrolysis by ∞-galactosidage from <u>Bacillus gp. 1</u>. 59. Effect of paramitrophenyl ∞D-fuection enteration on the rate of its hydrolysis by ∞-galactosidage from <u>Bacillus gp. 1</u>. 58. Effect of paramitrophenyl ∞D-fuection enteration an the field see from <u>Bacillus gp. 1</u>. 59. Effect of paramitrophenyl ∞D-fuection galactosidage from <u>Bacillus gp. 1</u>. 50. Detection of products of stackyose, raffines and meliblose hydrolysis by ∞-galactosidage for the hydrolysis of ∞-FNC in the presence of inhibitor (gelactose). 60. Lineweaver Burk plot of ∞-galactosidage for the hydrolysis of ∞-FNC in the presence of inhibitor (gelactose). 61. Dixon plot of ∞-galactosidage of <u>Bacillus gp. 1</u> . 62. Dixon plot of ∞-galactosidage of <u>Bacillus gp. 1</u> . 63. Dixon plot of ∞-galactosidage of <u>Bacillus gp. 1</u> . <l< th=""><th>Fig. No.</th><th>ł</th><th>Page , No.</th></l<>	Fig. No.	ł	Page , No.
 on hydrolysis of melliblose. 51. Effect of purified ∝ -galactosidage concentration on hydrolysis of reffinese and stachyose. 52. Effect of period of incubation on the hydrolysis of melliblose by purified ∝ -galactosidage of <u>Bacillus gp</u>. I. 53. Effect of period of incubation on the hydrolysis of reffinese and stachyoge by purified ∞ -galacto- sidage of <u>Bacillus gp</u>. I. 54. Effect of ~-ENRG concentration on the rate of its hydrolysis by ∞ -galactosidage from <u>Bacillus gp</u>. I. 55. Effect of melliblose concentration on the rate of its hydrolysis by ∞ -galactosidage from <u>Bacillus gp</u>. I. 56. Effect of raffinese concentration on the rate of its hydrolysis by ∞ -galactosidage from <u>Bacillus gp</u>. I. 57. Effect of stachyoge concentration on the rate of its hydrolysis by ∞ -galactosidage from <u>Bacillus gp</u>. I. 58. Effect of paranitrophenyl -∞D-fucoside concentration on the rate of its hydrolysis by ∞ -galactosidage from <u>Bacillus gp</u>. I. 58. Effect of paranitrophenyl -∞D-fucoside concentration on the rate of its hydrolysis by ∞ -galactosidage from <u>Bacillus gp</u>. I. 59. Detection of products of stachyoge, raffinese and meliblose hydrolysis by purified ∞ -galactosidage from <u>Bacillus gp</u>. I. 59. Lineweaver Eark plot of ∞ -galactosidage for the hydrolysis of ∞ -Facillus gp. I. 59. Lineweaver Eark plot for the hydrolysis of ~-FNEG in the presence of inhibitor (mellibics). 60. Lineweaver Eark plot for the hydrolysis of ~-FNEG 61. Dixon plot of ∞ -galactosidage of <u>Bacillus gp</u>. I for the inhibition by mellibicse. 62. Dixon plot of ∞ -galactosidage of <u>Bacillus gp</u>. I for the inhibition by mellibicse. 	. 49.	purified ∞ -galactosidase and invertase of	362
 an hydrolysis of reffinese and stachyose. 52. Effect of period of incubation on the hydrolysis of melliblose by purified ≤ -galactosidase of Recillus sp. I. 53. Effect of period of incubation on the hydrolysis of raffinese and stachyose by purified ∠ -galactosidase of Recillus sp. I. 54. Effect of ~-FNFG concentration on the rate of its hydrolysis by ≈ -galactosidase from Recillus sp. I. 55. Effect of melliblose concentration on the rate of its hydrolysis by ≈ -galactosidase from Recillus sp. I. 56. Effect of raffinese concentration on the rate of its hydrolysis by ≈ -galactosidase from Recillus sp.I. 57. Effect of stachyose concentration on the rate of its hydrolysis by ≈ -galactosidase from Recillus sp.I. 56. Effect of stachyose concentration on the rate of its hydrolysis by ≈ -galactosidase from Recillus sp.I. 57. Effect of stachyose concentration on the rate of its hydrolysis by ≈ -galactosidase from Recillus sp.I. 58. Effect of period of stachyose, raffinese and melliblese hydrolysis by ≈ -galactosidase from Recillus sp.I. 58. Effect of products of stachyose, raffinese and melliblese hydrolysis by purified ∞ -galactosidase from Recillus sp.I. 59. Lineweaver Eark plot of ∞ -galactosidase for the hydrolysis of ∞ -FNRG in the presence of inhibitor (galactose). 60. Lineweaver Dark plot for the hydrolysis of ~-FNRG in the presence of inhibitor (galactose). 61. Dixon plot of ∞ -galactosidase of Recillus sp. I for the inhibition by galactose. 62. Dixon plot of ∞ -galactosidase of Recillus sp. I for the inhibition by mellibicse. 	50.		363
 of mellblose by purified ~-galactosidase of Bacillus sp. 1. 53. Effect of period of incubation on the hydrolysis of raffinose and stachyose by purified ~-galactosidase of Bacillus sp. 1. 54. Effect of ~-FNRG concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus sp. 1. 55. Effect of mellblose concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus gp. 1. 56. Effect of raffinose concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus gp. 1. 57. Effect of raffinose concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus gp. 1. 58. Effect of stachyose concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus gp. 1. 58. Effect of paranitrophenyl -c-D-fucoside concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus gp. 1. 58. Effect of paranitrophenyl -c-D-fucoside concentration on the rate of its hydrolysis by ~-galactosidase from Bacillus gp. 1. 58. Detection of products of stachyose, raffinose and mellblose hydrolysis by purified ~-galactosidase from Bacillus gp. 1. 59. Lineweaver Enrk plot of ~-galactosidase for the hydrolysis of ~-FNFG in the presence of inhibitor (galactose). 60. Lineweaver Enrk plot for the hydrolysis of ~-FNFG in the presence of inhibitor (galactose). 61. Dixon plot of ~-galactosidase of Bacillus sp. 1 375 for the inhibition by galactose. 62. Dixon plot of ~-galactosidase of Bacillus sp. 1 376 	51.	Effect of purified \sim -galactosidase concentration on hydrolysis of raffinose and stachyose.	363
 of raffinose and stachyose by purified ∠-galactosidase of <u>Bacillus sp. I</u>. 54. Effect of ∠-ENFG concentration on the rate of its hydrolysis by ∠-galactosidase from <u>Bacillus sp. I</u>. 55. Effect of melibiose concentration on the rate of its hydrolysis by ∠-galactosidase from <u>Bacillus sp. I</u>. 56. Effect of raffinose concentration on the rate of its hydrolysis by ∠-galactosidase from <u>Bacillus sp. I</u>. 57. Effect of stachyose concentration on the rate of its hydrolysis by ∠-galactosidase from <u>Bacillus sp. I</u>. 58. Effect of stachyose concentration on the rate of its hydrolysis by ∠-galactosidase from <u>Bacillus sp. I</u>. 58. Effect of paranitrophenyl <-D-fucoside concentration on the rate of its hydrolysis by ∠-galactosidase from <u>Bacillus sp. I</u>. 58. Detection of products of stachyose, raffinose and meliblose hydrolysis by purified ∠-galactosidase from <u>Bacillus sp. I</u>. 59. Lineweaver Eurk plot of ∠-galactosidase for the hydrolysis of <-ENFG in the presence of inhibitor (galactose). 60. Lineweaver Eurk plot for the hydrolysis of <-ENFG 374 in the presence of inhibitor (melibiose). 61. Dixon plot of ∠-galactosidase of <u>Bacillus sp. I</u> 375 for the inhibition by galactosidase of <u>Bacillus sp. I</u> 376 	52.	of melibiose by purified ~-galactosidase of	364
 hydrolysis by ∞-galactosidase from <u>Bacillus sp.</u> I. 55. Effect of melibiose concentration on the rate of its hydrolysis by ∞-galactosidase from <u>Bacillus sp.</u>I. 56. Effect of raffinose concentration on the rate of its hydrolysis by ∞-galactosidase from <u>Bacillus sp.</u>I. 57. Effect of stachyoge concentration on the rate of its hydrolysis by ∞ -galactosidase from <u>Bacillus sp.</u>I. 58. Effect of paranitrophenyl ~D-fucoside concentration on the rate of its hydrolysis by ∞ -galactosidase from <u>Bacillus sp.</u> I. 58. Detection of products of stachyoge, raffinose and melibiose hydrolysis by ∞ -galactosidase for the hydrolysis of ~-FNFG in the presence of inhibitor (galactose). 60. Lineweaver Burk plot for the hydrolysis of ~-FNFG in the presence of inhibitor (melibicse). 61. Dixon plot of ~-galactosidase of <u>Bacillus sp.</u> I for the inhibition by galactose. 62. Dixon plot of ~-galactosidase of <u>Bacillus sp.</u> I for the inhibition by melibicse. 	53.	of raffinose and stachyose by purified a -galacto-	364
 its hydrolysis by ∝-galactosidase from <u>Bacillus sp.I.</u> 56. Effect of raffinose concentration on the rate of its hydrolysis by ∝-galactosidase from <u>Bacillus sp.I.</u> 57. Effect of stachyose concentration on the rate of its hydrolysis by ∞ -galactosidase from <u>Bacillus sp.I.</u> 58. Effect of paranitrophenyl ~D-fucoside concentration on the rate of its hydrolysis by ∞ -galactosidase from <u>Bacillus sp. I.</u> 58. Effect of paranitrophenyl ~D-fucoside concentration on the rate of its hydrolysis by ∞ -galactosidase from <u>Bacillus sp. I.</u> 58. Detection of products of stachyose, raffinose and melibiose hydrolysis by purified ∠-galactosidase from <u>Bacillus sp. I.</u> 59. Lineweaver Burk plot of ~-galactosidase for the hydrolysis of ~-FNFG in the presence of inhibitor (galactose). 60. Lineweaver Burk plot for the hydrolysis of ~-FNFG in the presence of inhibitor (melibiose). 61. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 62. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 63. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 64. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 65. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 66. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 67. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 68. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 69. Jixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 61. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 62. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 63. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 64. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 65. Dixon plot of ~-galactosidase of <u>Bacillus sp. I</u> 	54.		366
 its hydrolysis by ~ -galactosidase from <u>Bacillus sp.I.</u> 300 57. Effect of stachyose concentration on the rate of its hydrolysis by ~ -galactosidase from <u>Bacillus sp. I.</u> 369 58. Effect of paranitrophenyl ~ D-fucoside concentration on the rate of its hydrolysis by ~ -galactosidase from <u>Bacillus sp. I.</u> 370 58. Detection of products of stachyose, raffinose and melibicase hydrolysis by purified ~ -galactosidase from <u>Bacillus sp. I.</u> 371 59. Lineweaver Eurk plot of ~ -galactosidase for the hydrolysis of ~ -FNFG in the presence of inhibitor (galactose). 60. Lineweaver Burk plot for the hydrolysis of ~ -FNFG in the presence of inhibitor (melibiose). 61. Dixon plot of ~ -galactosidase of <u>Bacillus sp. I</u> 375 for the inhibition by galactose. 62. Dixon plot of ~ -galactosidase of <u>Bacillus sp. I</u> 376 	55.		.I. 367
 hydrolysis by ∞ -galactosidase from <u>Bacillus sp. I.</u> 58a. Effect of paranitrophenyl ~D-fucoside concentration on the rate of its hydrolysis by ∞ -galactosidase from <u>Bacillus sp. I.</u> 58b. Detection of products of stachyose, raffinose and melibiose hydrolysis by purified ~ -galactosidase from <u>Bacillus sp. I.</u> 59. Lineweaver Eurk plot of ~-galactosidase for the hydrolysis of ~ -FNFG in the presence of inhibitor (galactose). 60. Lineweaver Burk plot for the hydrolysis of ~ -FNFG 374 in the presence of inhibitor (melibiose). 61. Dixon plot of ~ -galactosidase of <u>Bacillus sp. I</u> 375 for the inhibition by galactose. 62. Dixon plot of ~ -galactosidase of <u>Bacillus sp. I</u> 376 for the inhibition by melibiose. 	56.		368
 on the rate of its hydrolysis by ~ -galactosidase from Bacillus sp. I. 58b. Detection of products of stachyose, raffinose and melibiose hydrolysis by purified ~ -galactosidase from Bacillus sp. I. 59. Lineweaver Eurk plot of ~ -galactosidase for the hydrolysis of ~ -FNFG in the presence of inhibitor (galactose). 60. Lineweaver Eurk plot for the hydrolysis of ~ -FNFG 374 in the presence of inhibitor (melibicse). 61. Dixon plot of ~ -galactosidase of Bacillus sp. I 375 for the inhibition by galactose. 62. Dixon plot of ~ -galactosidase of Bacillus sp. I 376 	57.	Effect of stachyose concentration on the rate of its hydrolysis by \sim -galactosidase from <u>Eacillus</u> sp. I.	369
 melibiose hydrolysis by purified ∠ -galactosidase from <u>Facillus sp.</u> 1. 59. Lineweaver Eurk plot of ∞ -galactosidase for the hydrolysis of < -FNFG in the presence of inhibitor (galactose). 60. Lineweaver Eurk plot for the hydrolysis of < -FNFG 374 in the presence of inhibitor (melibiose). 61. Dixon plot of ∞ -galactosidase of <u>Bacillus sp. I</u> 375 for the inhibition by galactose. 62. Dixon plot of ∞ -galactosidase of <u>Bacillus sp. I</u> 376 for the inhibition by melibiose. 	588.	on the rate of its hydrolysis by \propto -galactosidase	370
 hydrolysis of ~-FNPG in the presence of inhibitor (galactose). 60. Lineweaver Burk plot for the hydrolysis of ~-FNFG 374 in the presence of inhibitor (melibiose). 61. Dixon plot of ~-galactosidase of Bacillus sp. I 375 for the inhibition by galactose. 62. Dixon plot of ~-galactosidase of Bacillus sp. I 376 for the inhibition by melibiose. 	58 b .	melibiose hydrolysis by purifiedgalactosidase	371
 in the presence of inhibitor (melibiose). 61. Dixon plot of ∝ -galactosidase of Bacillus sp. I 375 for the inhibition by galactose. 62. Dixon plot of ∝ -galactosidase of Bacillus sp. I 376 for the inhibition by melibiose. 	59.	hydrolysis of ~- FNPG in the presence of inhibitor	373
for the inhibition by galactose. 62. Dixon plot of ∝-galactosidase of <u>Bacillus sp.</u> I 376 for the inhibition by melibioge.	60.	Lineweaver Burk plot for the hydrolysis of \sim -PNFG in the presence of inhibitor (melibiose).	374
for the inhibition by melibioge.	61.	Dixon plot of ∞ -galactosidase of <u>Bacillus</u> sp. I for the inhibition by galactose.	375
	62.		376
- Contdaaa	-	` CC	ntd

•

<u>List</u>	of Figures (Contd)	
Fig. No.		Page No.
63.	Dixon plot of \sim -galactosidase of <u>Bacillus</u> sp. I for the inhibition by raffinose.	377
64.	Effect of substrate (sucrose or maltose) concentra- tion on the rate of its hydrolysis by invertase of <u>Bacillus sp.</u> I.	390
65.	Effect of raffinose concentration on the rate of its hydrolysis by invertage of <u>Bacillus</u> sp. I.	391
66.	SDS-polyacrylamide disc gel electrophoresis of purified \sim -galactosidase from <u>Bacillus sp.</u> 1.	394
67.	SDS-polyacrylamide disc gel electrophoresis of purified invertage from <u>Bacillus</u> sp. I.	395
68.	Molecular weight determination of native \sim -galactosidase of <u>Bacillus sp. 1</u> , by analytical gel filtration ;	
	(a) gel filtration through a column of sephadex G-200	397
	(b) gel filtration through a column of Sepharose-68.	• 398
69.	IR spectrum of neurotoxin (ODAP).	408
70.	TLC of different ODAP preparations.	408
71.	Growth of ODAP hydrolysing bacteria in ODAP broth.	416
72.	Growth of ODAP hydrolysing bacteria in DAPA broth,	417
73.	Growth of ODAP hydrolysing bacteria in exalate broth.	418
74.	Postulated pathway for the degradation of ODAP in Streptococcus sp. I.	428
75.	Effect of crude enzyme concentration on activity of ODAP hydrolysing enzymes of <u>Streptococcus</u> sp. I.	432
76.	Effect of period of incubation on the activity of ODAP hydrolysing enzymes of <u>Streptococcus</u> sp. 1.	433
77.	Effect of substrate concentration on the activity of ODAP hydrolysing enzymes of <u>Streptococcus</u> sp. I.	434
78.	Effect of pH on the activity of ODAP hydrolysing enzymes of <u>Streptococcus</u> <u>sp.</u> 1.	435
	Cc	mtd

•

•

Fig. No.		Page No.
79.	Effect of temperature on the activity of ODAP hydrolysing enzymes of <u>Streptococcus</u> sp. I.	436
80.	Effect of glucose on growth and degradation of ODAP by <u>Streptococcus</u> sp. I.	459
81.	Production of ODAP hydrolysing enzymes when bacteria were grown in ODAP broth.	469
82,	Production of ODAP hydrolysing enzymes when bacteria were grown in DAPA broth.	470
83.	Agarose gel electrophoretic patterns of plasmid DNA preparation from bacterial strains-(1).	474
84.	Agarose gel electrophoretic patterns of plasmid DNA preparation from bacterial strains(II)	474
85.	Agarose gel electrophcretic pattern of DNA prepara- tions digested with restriction enzymes.	493
86.	Agarose gel electrophoretic patterm of Pst-I restri- ction digestion of pBR-322 and recombinant pER-322.	495
87.	Activity staining of raffinose induced and meliblose induced \sim -galactosidase of <u>Bacillus</u> sp.I after polyacrylamide disc gel electrophoresis.	499
88.	Double immunodiffusion of raffinose induced and melibiose induced \propto -galactosidase with anti-raf- \propto -galactosidase with ant	1 .501
89.	Immuno precipitation curves with \propto -galactosidage from <u>Bacillus</u> sp. I.	502

. **X**

,

.

.