

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1.1	Epidemiologic triangle model for Infectious diseases	3
1.2	Extraction of extracellular secondary metabolites from marine <i>Streptomyces</i> sp. and its biological activities	8
1.3	Biological activities of bioactive secondary metabolites from <i>actinomycetes</i>	11
1.4	Microbial metabolism for cellular structure biosynthesis	12
1.5	Inter relationship of primary and secondary metabolism in microbes	14
1.6	Steps involved in biosynthesis of secondary metabolites in <i>actinomycetes</i>	18
1.7	Bioactive secondary metabolites structures of Bonactin, Essramycin, Frigocyclinone, Chlorinated dihydroquinones from <i>Streptomyces</i> sp.	20
1.8	Bioactive secondary metabolite compounds reported in marine <i>Streptomyces</i> sp. possessing antibiotic and anticancer activity (Takahashi et al 1989, Nakamura et al 1977)	23

FIGURE NO.	TITLE	PAGE NO.
4.1	Marine <i>actinomyces</i> isolates obtained from Manora fort, Thanjavur, Tamilnadu, India (SSD01-SSD08)	95
4.2	Collection of marine samples and locations in the Manora fort, Thanjavur, Tamilnadu, India	95
4.3	Consolidation of primary screening of marine <i>actinomyces</i> isolates against bacterial human bacterial pathogens	97
4.3(a)	Antibacterial activity of marine <i>actinomyces</i> against <i>E.coli</i>	97
4.3(b)	Antibacterial activity of marine <i>actinomyces</i> against <i>B.subtilis</i>	97
4.4	Consolidation of primary screening of marine <i>actinomyces</i> isolates against human fungal pathogens	98
4.5	Consolidation of morphological characteristics of marine <i>actinomyces</i> isolates	100
4.6	Growth of marine <i>actinomyces</i> isolates on SCA medium	101
4.7	Genus level identification of marine <i>actinomyces</i> isolates (SSD01-SSD08)	102
4.8	SCA plates showing the potent marine isolate SSD08	103
4.9	Light microscopic view of the marine isolate	104

FIGURE NO.	TITLE	PAGE NO.
4.10	(SEM) Scanning electron micrograph of the marine isolate	105
4.11	Nucleotide sequence of <i>S. cirratus</i> SRP11	107
4.12	GenBank flatfile of <i>S. cirratus</i> SRP11	108
4.13	Distribution of 100 BLAST hit table for <i>S. cirratus</i> SRP11	109
4.14	Phylogenetic tree using Neighbor joining method for the identification of <i>S. cirratus</i> SRP11	109
4.15	Phylogenetic tree using Maximum likelihood method analysis for the identification of <i>S. cirratus</i> SRP11	110
4.16	Bootstrap concensus tree of <i>S. cirratus</i> SRP11 with 1000 replications using Neighbor-Joining method	110
4.17	Normal plot of residuals	119
4.18	Residuals vs Run	119
4.19	DFBETAS for Intercept vs Run	120
4.20	Response surface graphs using 3D surface plots and contour plots showing interaction effect of temperature and pH on secondary metabolites production	120
4.21	Response surface graphs using 3D surface plots and contour plots showing interaction effect of incubation period and pH on secondary metabolites production	121

FIGURE NO.	TITLE	PAGE NO.
4.22	Response surface graphs using 3D surface plots and contour plots showing interaction effect of agitation and pH on secondary metabolites production	121
4.23	Response surface graphs using 3D surface plots and contour plots showing interaction effect of salinity and pH on secondary metabolites production	122
4.24	Response surface graphs using 3D surface plots and contour plots showing interaction effect of incubation period and temperature on secondary metabolites production	122
4.25	Response surface graphs using 3D surface plots and contour plots showing interaction effect of agitation and temperature on secondary metabolites production	123
4.26	Response surface graphs using 3D surface plots and contour plots showing interaction effect of salinity and temperature on secondary metabolites production	123
4.27	Response surface graphs using 3D surface plots and contour plots showing interaction effect of agitation and incubation period on secondary metabolites production	124
4.28	Response surface graphs using 3D surface plots and contour plots showing interaction effect of salinity and incubation period on secondary metabolites production	124

FIGURE NO.	TITLE	PAGE NO.
4.29	Response surface graphs using 3D surface plots and contour plots showing interaction effect of salinity and agitation on secondary metabolites production	125
4.30	Over all Perturbation plot for secondary metabolite production	125
4.31	Effect of pH on metabolites production	129
4.32	Antimicrobial activities of metabolites in different pH	130
4.33	Effect of temperature on metabolites production	131
4.34	Antimicrobial activities of metabolites in different temperatures	131
4.35	Effect of incubation period on metabolites production	132
4.36	Antimicrobial activities of metabolites in different incubation period	133
4.37	Effect of agitation on metabolites production	134
4.38	Antimicrobial activities of metabolites in different agitation speed	135
4.39	Effect of salinity on metabolites production	136
4.40	Antimicrobial activities of metabolites in different salinity	137
4.41	Growth curve of <i>S. cirratus</i> SRP11	138
4.42	Extraction set up of secondary metabolites from <i>S. cirratus</i> SRP11 using Chloroform	139

FIGURE NO.	TITLE	PAGE NO.
4.43	UV visible spectrum of crude chloroform extract of secondary metabolites of <i>S. cirratus</i> SRP11	141
4.44	FTIR spectrum of crude chloroform extract of secondary metabolites of <i>S. cirratus</i> SRP11	142
4.45	GC-MS chromatogram of bioactive compounds from marine <i>S. cirratus</i> SRP11	142
4.46	Separation of antibacterial compound using TLC	146
4.47	Separation of antifungal compound using TLC	146
4.48	Antibacterial activity of the crude extract by TLC-Bioautography	147
4.49	Antifungal activity of the crude extract by TLC-Bioautography	147
4.50	Bactericidal activity of crude extract against <i>M. smegmatis</i>	148
4.51	Fungicidal activity of crude extract against <i>C. tropicalis</i>	149
4.52	MTT cytotoxicity assay of crude extract of <i>S. cirratus</i> SRP11 on NIH 3T3 cell line using chloroform and ethyl acetate	150
4.53	Percentage of anticancer activity of crude extracts of <i>S. cirratus</i> SRP11 on HT 29 cells	151
4.54	Percentage of anticancer activity of crude extract of <i>S. cirratus</i> SRP11 on HeLa cells	152

FIGURE NO.	TITLE	PAGE NO.
4.55	In vitro cytotoxicity assay (MTT assay) for the evaluation of the anticancer activity in HT-29 cells using different concentrations crude chloroform extract of <i>S. cirratus</i> SRP11	153
4.56	In vitro cytotoxicity assays (MTT assay) for the evaluation of the anticancer activity in HeLa cells using different concentrations of crude chloroform extract of <i>S. cirratus</i> SRP11	153
4.57	DNA fragmentation of cancer cells after 72 h of incubation with 250 µg/ml crude extract of <i>S. cirratus</i> SRP11. Apoptotic DNA fragmentation was qualitatively analyzed by agarose gel electrophoresis. Lane 1:100 kb DNA ladder, Lane 2: Control DNA, Lane 3: 250 ug/ml extract treated HT- 29 cells, Lane 4: 250 ug/ml extract treated HeLa treated cells	158
4.58	HIF-1 α concentration in HT-29 and HeLa cells after 72 h of incubation with <i>S. cirratus</i> SRP11 crude extract (5 µl/ml) in comparison with untreated cells (control)	159
4.59	DPPH scavenging and total antioxidant activity of different concentration of crude extract of <i>S. cirratus</i> SRP11 compared with control as Ascorbic acid	161

FIGURE NO.	TITLE	PAGE NO.
4.60	Metal chelating activity of different concentrations of crude extract of <i>S. cirratus</i> SRP11	163
4.61	ABTS radical scavenging activity of different concentration of chloroform extract of <i>S. cirratus</i> SRP11	164
4.62	Superoxide radical scavenging activity of different concentration of chloroform extract of <i>S. cirratus</i> SRP11	165
4.63	Nitric oxide-scavenging activities of different concentrations of chloroform extract of <i>S. cirratus</i> SRP11	166
4.64	Effect of thermal stability of crude chloroform extract of <i>S. cirratus</i> SRP11	167
4.65	Effect of pH on the stability of crude chloroform extract of <i>S. cirratus</i> SRP11	168
4.66	Effect of Shelf life of crude chloroform extract of <i>S. cirratus</i> SRP11	169