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Effect of pH and Concentration of Phenol on Degradation Potential of Selected Bacterial Strains from Effluent Treatment Plant of Coir Industry, Kerala, India

Sowparnika* S., Rajani V. and Aswathy R.

PG Department of Environmental Sciences, All Saints' College, Thiruvananthapuram, Kerala, India

*Corresponding Author E-mail: sowbi93@gmail.com

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ABSTRACT

Phenols are highy toxic components that are being deposited at various areas by industrial activities and are seen in water bodies. Phenol-degrading bacteria exist widely in the environments. The aim of this study was to isolate bacterial strains capable of degrading phenol from effluent treatment plant of coir industry, Kerala and to study their phenol degrading capacity and growth when subjected to different pH. For the study, three different pH conditions were selected- pH5, pH7 and pH9. From the isolated bacterial strains, 5 most potent strains were selected for the study (Brucella sp, Aquaspirillum sp, Erwinia sp, Aeromonas sp and Moraxella sp). As the result of the study, it was clear that the selected 5 bacterial strains were able to survive and gave maximum degradation up to 800 mg/L phenol. The growth of bacteria and phenol concentration in the media showed the inverse proportion with each other. From the preliminary analysis, it can be observed that the most potent strains were Brucella sp and Aeromonas sp. When the pH of the medium was optimum, bacterial strains gave maximum degradation. At the same time, there observed a change in their growth and degradation potential with varying pH. Waste water from Coir industry contains a variety of substances including phenolic components. Their degradation mechanism was examined in a series of different phenol concentrations. Serial exposure to increasing level of phenol concentration can be used to determine acclimatisability of a particular isolate. Future studies should be carried out to isolate more potent useful microbes from various industrial effluents.

Key words: *Brucella sp, Coir Industry, Phenol degradation, pH*

INTRODUCTION

The influence of pH play a vital role in the phenol degradation, phenolic compounds are hazardous pollutants that are toxic to the natural ecosystem at very low concentration Biodegradation is the process by which organic substances are broken down into smaller compounds by the catalytic activity of living microbial organisms. The use of microbes as catalysts in the biodegradation of phenolic compounds has advanced significant in the recent decades.

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Biodegradation of phenol involves the complete mineralization of phenolic compounds to simple compounds like CO_2, H_2O and NO_3. Phenols are introduced in the environment in the waste water stream of several industrial operations, through its use as antimicrobial agent or as by-product of other pharmaceutical industries, or even waste incineration and as degradation product of other chlorinated xenobiotics[6]. Inspite of phenolic toxic properties, a number of micro-organisms can utilize phenol under aerobic conditions as sources of carbon and energy[4]. Biodegradation technologies most often take advantage of the ability of various bacteria to clean the environment bioremediation is constantly expanding.

MATERIALS AND METHODS

Samples from effluent treatment plant of paper industry were collected and serially diluted. Microbial enrichment was done using nutrient broth with different phenol concentrations (10, 20, 30, 40, 50 ppm). From the 50 ppm culture, organisms were collected and added to sorbitol agar medium with varying concentrations of phenol (200, 400, 600, 800 and 1000 ppm).

Estimation of Total Phenol

Estimation of total phenol was carried out[2]

Observation of Total Growth

The growth rates of the microbes were observed by spectrophotometric analysis.

Identification of Isolates

Biochemical characterization of selected bacterial isolates was done[2,3].

RESULTS AND DISCUSSIONS

It was observed that the rate of phenol biodegradation was significantly affected by pH, temperature of incubation and concentration of phenol which is used as a source of carbon and energy. Physiological parameters play a vital role in the growth and biodegradation behavior of any microorganism. Microorganism grows within a set range of physiological parameters but maximum growth is achieved only at the optimum conditions of these physiological parameters. Different physiological parameters that usually interfere in the biodegradation activity of a microbe are incubation temperature, pH of the medium, carbon source or source of energy, maximum toxicity of the xenobiotics, concentration of micro and macro nutrient. In the present study, phenol is the source of carbon and energy and hence the physiological parameters to be optimized in this study was the pH of the medium. The effect of substrate concentration on the growth of the microorganism was also studied at various initial concentration of phenol ranging from 200ppm to 1000ppm at pH 7 and incubation temperature of 35°C.

Growth and Total phenol in the medium with pH 5

The total phenol in the medium and growth of the selected bacterial strains were observed at different concentrations of the phenol containing medium with pH 5 (tables 1 to 5). In the medium with 200ppm, phenol degradation was highest for *Brucella* sp (0.0271), followed by *Aquaspirillum* sp (0.0299), *Erwinia* sp (0.0489), *Aeromonas* sp (0.0656) and *Moraxella* sp (0.0779) at 96hrs of incubation. In case of growth rate, the strain with maximum growth was noted for *Moraxella* sp at 72 hrs of incubation (0.0276) followed by *Erwinia* sp (0.0245), *Aeromonas* sp (0.0243), *Aquaspirillum* sp (0.0185) and *Brucella* sp (0.0147). In 400ppm medium, the highest phenol degradation was recorded by *Moraxella* sp at 72 hrs of incubation (0.0629) followed by *Aquaspirillum* sp (0.0268), *Erwinia* sp (0.0251), *Aeromonas* sp (0.0177) and *Brucella* sp (0.0130). The growth rate was observed maximum at 96 hrs of incubation in case of *Brucella* sp (0.0244), followed by *Aeromonas* sp (0.0195), *Aquaspirillum* sp (0.0135), *Moraxella* sp (0.0120) and *Erwinia* sp (0.0108) .

In 600ppm, highest phenol degradation was noted by *Erwinia* sp at 96 hrs of incubation (0.0482), followed by *Brucella* sp (0.0477), *Aquaspirillum* sp (0.0474), *Aeromonas* sp (0.0364) and *Moraxella* sp (0.0296). The highest growth rate was noted at 72hrs of incubation by *Brucella* sp (0.0242) followed by *Aeromonas* sp (0.0189), *Erwinia*

sp (0.0172), the least for *Aquaspirillum* sp and *Moraxella* sp (0.0166).In 800ppm phenol degradation was noted highest for *Aquaspirillum* sp at 96 hrs of incubation and the decreased by *Moraxella* sp (0.0540), *Erwinia* sp (0.0402) *Brucella* sp (0.0350), *Aeromonas* sp (0.0325). The strain with highest growth rate was identified as *Aquaspirillum* sp at 24 hrs of incubation (0.0230) followed by *Brucella* sp and *Moraxella* sp (0.0200) both having the same growth rate, then the least was noted by *Aeromonas* sp.

In 1000ppm the highest phenol degradation range was noted by *Erwinia* sp at 96 hrs of incubation (0.0694) followed by *Brucella* sp (0.0513) *Aquaspirillum* sp (0.0400), *Moraxella* sp (0.0388) and *Aeromonas* sp (0.0253) . Growth rate was observed to be highest at 96hrs of incubation by *Moraxella* sp (0.0300) and followed by *Erwinia* sp (0.0263), *Brucella* sp (0.0242), *Aeromonas* sp (0.0161) and *Aquaspirillum* sp (0.0159).

Growth and Total phenol in the medium with pH 7

The result of the study using the prescribed conditions is given in the tables 6 to 10. In 200 ppm medium, it was observed that *Brucella* sp showed highest phenol degradation at 48hrs hrs (0.0057) followed by *Aquaspirillum* sp (0.0119), *Erwinia* sp (0.0205), *Aeromonas* sp (0.0132) and *Moraxella* sp (0.0162).The least degradation was showed by *Aeromonas* sp for 24 hrs (0.0880) incubation. The growth rate was observed highest for *Aquaspirillum* sp at 72 hrs of incubation (0.0817) followed by *Aeromonas* sp (0.0777), *Brucella* sp (0.0768), *Moraxella* sp (0.0757) and *Erwinia* sp (0.0725). In 400ppm medium *Moraxella* sp showed highest phenol degradation at 48 hrs (0.0052) followed by *Aeromonas* sp (0.0065), *Erwinia* sp (0.0100), *Aquaspirillum* sp (0.0103) and *Brucella* sp (0.0139).The least degradation was observed for *Aeromonas* sp (0.0888) at 24hrs incubation. The growth rate was observed highest for *Aquaspirillum* sp at 72 hrs of incubation (0.0817) followed by *Aeromonas* sp (0.0777), *Brucella* sp (0.0768), *Moraxella* sp (0.0757) and *Erwinia* sp (0.0725).

In 600ppm medium, *Aquaspirillum* sp showed highest phenol degradation at 48hrs incubation (0.0021) followed by *Aeromonas* sp (0.0089), *Moraxella* sp (0.0093), *Erwinia* sp (0.0126) and *Brucella* sp(0.0170). The growth rate was observed to be highest for *Aquaspirillum* Sp at 72 hrs of observation (0.0817) followed by *Aeromonas* sp (0.0777), *Brucella* sp (0.0768), *Moraxella* sp (0.0757) and *Erwinia* sp (0.0725). In 800ppm medium, *Erwinia* sp showed highest phenol degradation at 48hrs incubation (0.0092) followed by *Brucella* sp (0.0108), *Aquaspirillum* (0.0153), *Aeromonas* sp (0.0226) and *Moraxella* sp (0.0230). The least phenol degradation was shown by *Brucella* sp (0.0971) at 24 hrs of incubation. The growth rate was observed to be highest for *Aquaspirillum* sp at 72 hrs of incubation (0.0817) followed by *Aeromonas* sp (0.0777), *Brucella* sp (0.0768), *Moraxella* sp (0.0757) and *Erwinia* sp (0.0725). In 1000ppm medium the phenol degradation rate was highest for *Erwina* sp (0.0061) followed by *Aeromonas* sp (0.0064), *Aquaspirillum* sp (0.0076) *Brucella* sp (0.0091) and *Moraxella* sp (0.0106) . The growth rate was observed highest for *Moraxella* sp at 72 hrs of incubation (0.0738) followed by *Brucella* sp (0.0718), *Aquaspirillum* sp (0.0592), *Erwinia* sp (0.0649) and *Aeromonas* sp (0.0640).

Growth and Total phenol in the medium with pH 9

In 200ppm medium, phenol degradation was found to be the high during 48hrs of incubation (tables11 to15) .The highest phenol degradation was for *Aquaspirillum* sp (0.0096) followed by *Aeromonas* sp (0.0104), *Brucella* sp (0.0108) , *Moraxella* sp(0.0121), and *Erwinia* sp (0.0125). The highest growth rate was observed at 72hrs hrs by *Erwinia* sp (0.0185) and followed by *Aquaspirillum* sp (0.0130), *Moraxella* sp (0.0129), *Aeromonas* sp (0.0093), and *Brucella* sp (0.0070). In 400ppm medium , the highest phenol degradation was indicated at 96 hrs by *Aeromonas* sp (0.0120), followed by, *Brucella* sp (0.0138), *Moraxella* sp (0.0145), *Aquaspirillum* sp (0.0170), and *Erwinia* sp

(0.0190) .When growth rate was put to accord , the highest degradation was shown by *Moraxella* sp (0.0191) at72hrs of incubation and then decreased by *Aeromonas* sp (0.0165), *Erwinia* sp (0.0067), *Aquaspirillum* sp (0.0066), and *Brucella* sp (0.0058). In 600ppm medium, the highest phenol degradation was indicated at 48 hrs by *Brucella* sp (0.0123), followed by, *Aquaspirillum* sp (0.0131), *Erwinia* sp (0.0163), *Moraxella* sp (0.0175), and *Aeromonas* sp (0.0223). Growth rate was observed highest at 24 hrs by *Moraxella* sp (0.0220) followed by, *Aquaspirillum* sp (0.0157), *Erwinia* sp (0.0124), *Aeromonas* sp (0.0121) and *Brucella* sp (0.0075) . At low (4.0) or high (9.0) pH values acids or bases can penetrate into cells more easily, because they tend to exist in undissociated form under these conditions and electrostatic force cannot prevent them from entering cells[5]. The optimum pH for phenol degradation is 7.0 for *Pseudomonas putida* NICM 2174 [1].

In 800ppm medium, highest phenol degradation was during 24 hrs by *Brucella* sp (0.0109), then by *Aquaspirillum* sp (0.0154) *Aeromonas* sp (0.0182), *Erwinia* sp (0.0202), and *Moraxella* sp (0.0233). Growth rate was highest for *Aeromonas* sp at 72hrs of incubation (0.0180) then by *Moraxella* sp (0.0158), *Brucella* sp (0.0087), *Erwinia* sp (0.0082), and *Aquaspirillum* sp (0.0074). When 1000ppm medium, was considered phenol degradation was highest at 72 hrs of incubation by *Erwinia* sp (0.0088) followed by *Brucella* sp (0.0089) ,*Aeromonas* sp (0.0110) *Moraxella* sp (0.0123), and *Aquaspirillum* sp (0.0177) .When the growth rate was observed the highest degradation capacity was attained by *Aquaspirillum* sp at 24 hrs of incubation (0.0237) followed by *Erwinia* sp (0.0233) , *Aeromonas* sp (0.0216) , *Brucella* sp (0.0215) , and *Moraxella* sp (0.0073) .

Table 1- Total Phenol and Growth in medium with 200ppm phenol (pH-5)

Strains	**Total Phenol (720nm)**				**Growth (600nm)**			
	24	48	72	96	24	48	72	96
Brucella sp	0.0270	0.0115	0.0273	0.0271	0.0090	0.0082	0.0147	0.0149
Aquaspirillum sp	0.0091	0.0084	0.0327	0.0299	0.0090	0.0072	0.0185	0.0169
Erwinia sp	0.0120	0.0111	0.0333	0.0489	0.0150	0.0145	0.0245	0.0188
Aeromonas sp	0.0220	0.0125	0.0280	0.0656	0.0130	0.0179	0.0243	0.0147
Moraxella sp	0.0230	0.0200	0.0572	0.0779	0.0189	0.0187	0.0276	0.0189

Table 2 - Total Phenol and Growth in medium with 400ppm phenol (pH-5)

Strains	**Total Phenol (720nm)**				**Growth (600nm)**			
	24	48	72	96	24	48	72	96
Brucella sp	0.0210	0.0166	0.0130	0.0327	0.0170	0.0105	0.0122	0.0244
Aquaspirillum sp	0.0190	0.0189	0.0268	0.0246	0.0140	0.0163	0.0111	0.0135
Erwinia sp	0.0172	0.0166	0.0251	0.0319	0.0121	0.0127	0.0108	0.0108
Aeromonas sp	0.0200	0.0218	0.0177	0.0238	0.0063	0.0073	0.0142	0.0195
Moraxella sp	0.0130	0.0166	0.0629	0.0318	0.0090	0.0093	0.0093	0.0120

Table 3 - Total Phenol and Growth in medium with 600ppm phenol (pH-5)

Strains	**Total Phenol (720nm)**				**Growth (600nm)**			
	24	48	72	96	24	48	72	96
Brucella sp	0.0300	0.0294	0.0368	0.0477	0.0110	0.0105	0.0242	0.0104
Aquaspirillum sp	0.0390	0.0370	0.0345	0.0474	0.0080	0.0086	0.0166	0.0110
Erwinia sp	0.0219	0.0204	0.0208	0.0482	0.0060	0.0067	0.0172	0.0118
Aeromonas sp	0.0240	0.0229	0.0377	0.0364	0.0112	0.0111	0.0189	0.0106
Moraxella sp	0.0310	0.0273	0.0413	0.0296	0.0105	0.0101	0.0166	0.0112

Table 4 - Total Phenol and Growth in medium with 800ppm phenol (pH-5)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0350	0.0219	0.0298	0.0350	0.0200	0.0077	0.0169	0.0087
Aquaspirillum sp	0.0315	0.0310	0.0323	0.0650	0.0230	0.0104	0.0066	0.0150
Erwinia sp	0.0221	0.0170	0.0165	0.0402	0.0205	0.0111	0.0141	0.0124
Aeromonas sp	0.0405	0.0366	0.0404	0.0325	0.0190	0.0113	0.0123	0.0171
Moraxella sp	0.0238	0.0167	0.0598	0.0540	0.0200	0.0154	0.0196	0.0202

Table 5 - Total Phenol and Growth in medium with 1000ppm phenol (pH-5)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0310	0.0309	0.0558	0.0513	0.0119	0.0125	0.0234	0.0242
Aquaspirillum sp	0.0240	0.0239	0.0330	0.0400	0.0210	0.0064	0.0250	0.0159
Erwinia sp	0.0208	0.0208	0.0448	0.0694	0.0143	0.0065	0.0211	0.0263
Aeromonas sp	0.0125	0.0127	0.0515	0.0253	0.0120	0.0092	0.0242	0.0161
Moraxella sp	0.0220	0.0230	0.0210	0.0388	0.0176	0.0070	0.0110	0.0300

Table 6 - Total Phenol and Growth in medium with 200ppm phenol (pH-7)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0144	0.0057	0.0220	0.0101	0.0631	0.0063	0.0768	0.0708
Aquaspirillum sp	0.0461	0.0119	0.0190	0.0086	0.0634	0.0072	0.0817	0.0752
Erwinia sp	0.0687	0.0205	0.0153	0.0094	0.0630	0.0068	0.0725	0.0618
Aeromonas sp	0.0880	0.0132	0.0265	0.0153	0.0579	0.0054	0.0777	0.0739
Moraxella sp	0.0737	0.0162	0.0206	0.0135	0.0540	0.0051	0.0757	0.0755

Table 7 - Total Phenol and Growth in medium with 400ppm phenol (pH-7)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0647	0.0139	0.0168	0.0087	0.0477	0.0064	0.0658	0.0324
Aquaspirillum sp	0.0482	0.0103	0.0144	0.0093	0.0576	0.0067	0.0744	0.0694
Erwinia sp	0.0863	0.0100	0.0218	0.0108	0.0598	0.0056	0.0713	0.0329
Aeromonas sp	0.0888	0.0065	0.0178	0.0134	0.0587	0.0054	0.0754	0.0355
Moraxella sp	0.0067	0.0052	0.0277	0.0120	0.0623	0.0051	0.0709	0.0574

Table 8 - Total Phenol and Growth in medium with 600ppm phenol (pH-7)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0772	0.0170	0.0181	0.0106	0.0534	0.0083	0.0755	0.0672
Aquaspirillu sp	0.0194	0.0021	0.0169	0.0132	0.0613	0.0079	0.0774	0.0706
Erwinia sp	0.0832	0.0126	0.0259	0.0172	0.0554	0.0065	0.0680	0.0673
Aeromonas sp	0.0702	0.0089	0.0209	0.0078	0.0582	0.0078	0.0688	0.0488
Moraxella sp	0.0507	0.0093	0.0096	0.0080	0.0566	0.0090	0.0694	0.0434

Table 9 - Total Phenol and Growth in medium with 800ppm phenol (pH-7)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0971	0.0108	0.0250	0.0111	0.0577	0.0051	0.0734	0.0681
Aquaspirillum sp	0.0314	0.0153	0.0230	0.0103	0.0574	0.0080	0.0740	0.0630
Erwinia sp	0.0163	0.0092	0.0187	0.0124	0.0557	0.0052	0.0833	0.0762
Aeromonas sp	0.0890	0.0226	0.0248	0.0192	0.0561	0.0065	0.0686	0.0647
Moraxella sp	0.0820	0.0230	0.0188	0.0140	0.0555	0.0058	0.0715	0.0488

Table 10 – Total Phenol and Growth in medium with 1000ppm phenol (pH-7)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0923	0.0140	0.0149	0.0091	0.0554	0.0076	0.0718	0.0694
Aquaspirillum sp	0.0233	0.0077	0.0188	0.0076	0.0559	0.0084	0.0592	0.0465
Erwinia sp	0.0563	0.0063	0.0333	0.0061	0.0552	0.0070	0.0649	0.0677
Aeromonas sp	0.0572	0.0069	0.0200	0.0064	0.0549	0.0072	0.0640	0.0631
Moraxella sp	0.0652	0.0134	0.0190	0.0106	0.0594	0.0060	0.0738	0.0434

Table 11- Total Phenol and Growth in medium with 200ppm phenol (pH-9)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0271	0.0108	0.0345	0.0143	0.0139	0.0080	0.0084	0.0080
Aquaspirillum sp	0.0112	0.0096	0.0300	0.0131	0.0102	0.0090	0.0130	0.0106
Erwinia sp	0.0154	0.0125	0.0249	0.0406	0.0070	0.0085	0.0185	0.0123
Aeromonas sp	0.0105	0.0104	0.0369	0.0181	0.0095	0.0090	0.0093	0.0122
Moraxella sp	0.0143	0.0121	0.0135	0.0305	0.0142	0.0118	0.0129	0.0085

Table 12- Total Phenol and Growth in medium with 400ppm phenol (pH-9)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0169	0.0152	0.0184	0.0138	0.0139	0.0092	0.0058	0.0130
Aquaspirillum sp	0.0200	0.0154	0.0200	0.0170	0.0136	0.0124	0.0066	0.0118
Erwinia sp	0.0174	0.0217	0.0180	0.0190	0.0066	0.0190	0.0067	0.0083
Aeromonas sp	0.0139	0.0156	0.0203	0.0120	0.0135	0.0110	0.0165	0.0058
Moraxella sp	0.0240	0.0184	0.0250	0.0145	0.0170	0.0162	0.0191	0.0063

Table 13- Total Phenol and Growth in medium with 600ppm phenol (pH-9)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0247	0.0123	0.0158	0.0200	0.0075	0.0071	0.0052	0.0068
Aquaspirillum sp	0.0184	0.0131	0.0180	0.0153	0.0157	0.0130	0.0057	0.0105
Erwinia sp	0.0146	0.0163	0.0150	0.0235	0.0124	0.0138	0.0049	0.0088
Aeromonas sp	0.0145	0.0223	0.0179	0.0214	0.0121	0.0131	0.0078	0.0201
Moraxella sp	0.0227	0.0175	0.0139	0.0356	0.0220	0.0063	0.0120	0.0110

Table 14- Total Phenol and Growth in medium with 800ppm phenol (pH-9)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0109	0.0171	0.0119	0.0249	0.0086	0.0133	0.0087	0.0084
Aquaspirillum sp	0.0154	0.0177	0.0121	0.0192	0.0130	0.0073	0.0074	0.0090
Erwinia sp	0.0202	0.0206	0.0157	0.0307	0.0158	0.0121	0.0082	0.0090
Aeromonas sp	0.0182	0.0228	0.0206	0.0201	0.0166	0.0061	0.0180	0.0121
Moraxella sp	0.0233	0.0168	0.0262	0.0281	0.0137	0.0106	0.0158	0.0093

Table 15- Total Phenol and Growth in medium with 1000ppm phenol (pH-9)

Strains	Total Phenol (720nm)				Growth (600nm)			
	24	48	72	96	24	48	72	96
Brucella sp	0.0345	0.0301	0.0089	0.0220	0.0215	0.0146	0.0056	0.0094
Aquaspirillum sp	0.0336	0.0141	0.0177	0.0265	0.0237	0.0134	0.0082	0.0093
Erwinia sp	0.0289	0.0343	0.0088	0.0156	0.0233	0.0231	0.0075	0.0071
Aeromonas sp	0.0291	0.0147	0.0110	0.0377	0.0216	0.0132	0.0095	0.0084
Moraxella sp	0.0307	0.0113	0.0123	0.0295	0.0073	0.0102	0.0109	0.0094

CONCLUSION

With urbanization and extensive industrialization, the pollution of the environment with man-made (synthetic) organic compounds has become a major problem. Huge quantity of waste water generated from human settlement and industrial sectors find their way to natural water bodies. Phenol is a major pollutant being discharged from the effluents of various sources. They mix in the water bodies and make them unusable. So it is very urgent to remove these pollutants from the environment so that their unfavorable impact can be reduced. One among different methods of treatment of waste water is biodegradation using micro organisms. This study was an attempt to isolate and identify some selected bacterial strains from effluent treatment plant of coir industry, Kerala. The effect of varying pH and phenol concentrations was also observed. As the result of the study, it was clear that the selected 5 bacterial strains were able to survive and gave maximum degradation up to 800 mg/L phenol. The growth of bacteria and phenol concentration in the media showed the inverse proportion with each other. It was also noted that when pH changes, growth slightly decreases. It was observed that, the selected stains gave maximum results in the medium with standard pH (pH 7). As a future perspective, this study can be extended with more phenol degrading bacterial strains so that better degraders can be identified and used for bioremediation. It will be a possible solution for treating wastewater containing phenol and related pollutants

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