IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume 10, Issue 10 Ver. III (Oct. 2016), PP 01-03
www.iosrjournals.org

Effect of Sugar factory effluent on the Rhizosphere Mycoflora of Groundnut (Arachis hypogea, Linn)

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I. Introduction

In 1904, Hiltner introduced the term " rhizosphere" to designate that portion of the which is subjected to the specific influence of the plant root system and noted that this soil supported greater microbial activity than soil distant from the roots. The unique environment immediately surrounding the roots is called rhizosphere. It is the region around plant roots where simple sugars, amino acids and many other compounds are exuded by plant and made available to the microorganisms (Campbell, 1989). In the present study, attempt has been made to study effect of sugar factory effluent on the rhizosphere mycoflora at different period of growth (15, 30,,45 and 90 day) with different concentration of effluent (10,50, and 100%) and were compared with control. Studies by Hameed *et al.* (2002) showed that the fungal population was almost nil in the polluted habitat.

II. Materials and Methods

The seeds of *Arachis hypogea* Linn were grown in the earthenware pot containing black cotton soil and irrigated with different concentration of the effluent. Rhizosphere and soil mycoflora was studied by serial dilution plate technique at 15, 30, 45 and 90 days using Martin's Rose Begal Agar medium with different concentration of effluent (10, 50,100) and control in triplicate set.

III. Results and Duscussion

Qualitative Effect -

In the rhizosphere of *Arachis hypogea,* Linn., the population was found to be higher at 15 days growth period. Treatment of effluent gave reduction in the fungal population with the 100 percent effluent concentration at all the growth period. Sugar factory effluent reduces mycofloral population both in the rhizosphere and soil (Fig.-1). At 15 days highest microbial population was observed in 10 percent effluent treatment (Tables -1).

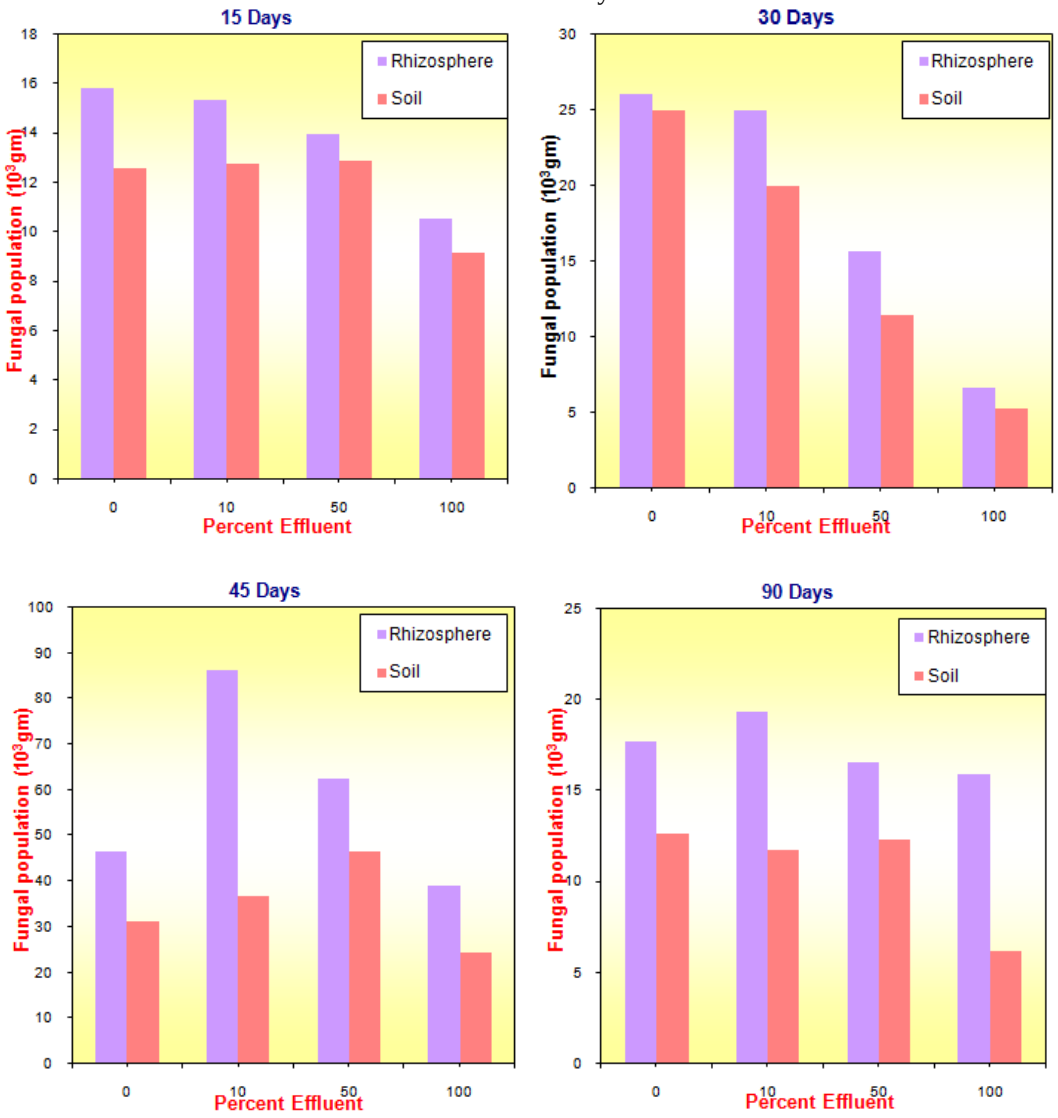
The average of all the growth period (Table-1) indicated that again the fungal population was found to be higher in the control without the treatment of effluent (Fig. 1). But with the treatment of effluent, the fungal population was decreased with the increase of sugar factory effluent both in the rhizosphere and soil (Fig. 1). The R/S ratio also corresponded accordingly (Fig.2).

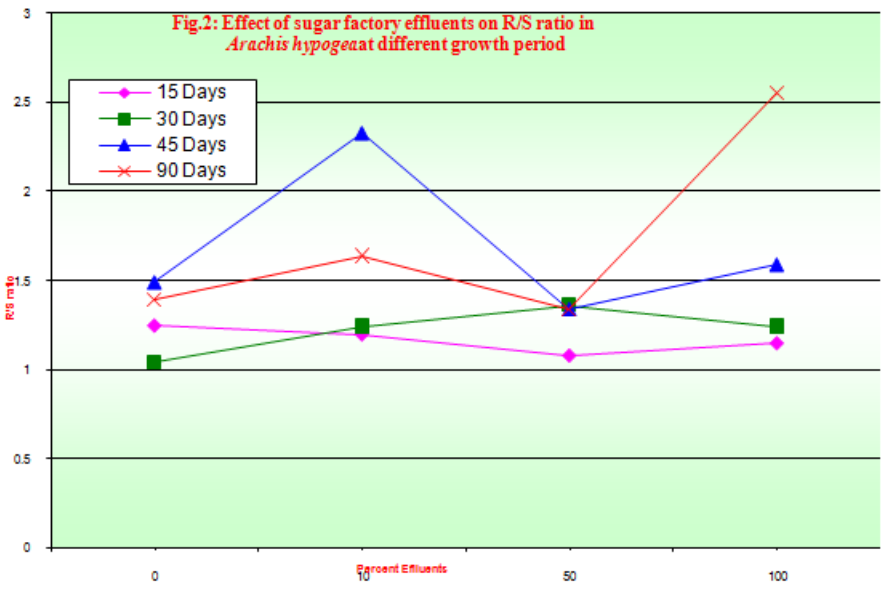
Table -1: Effect of sugar factory effluent on rhizosphere mycoflora of Arachis hypogea

Effluent (%)	Growth period (days)					
		15	30	45	90	Average
Rhizosphere	0*	46.46**	17.73	15.83	26.08	26.52
	10	86.36	19.33	15.38	24.98	36.51
	50	62.69	16.57	13.99	15.66	27.22
	100	39.04	15.92	10.55	6.66	18.03
Soil	0	31.14	12.69	12.61	24.97	20.33
	10	36.91	11.75	12.77	20.03	20.36
	50	46.46	12.34	12.89	11.45	20.78
	100	24.46	6.22	9.16	5.33	11.29
R / S	0	1.49	1.39	1.25	1.04	1.29
	10	2.33	1.64	1.20	1.24	1.60
	50	1.34	1.34	1.08	1.36	1.28
	100	1.59	2.55	1.15	1.24	1.63

* Fungal population (10^3 / gm)
** Concentration of effluent

Fig.1: Fungal population (10^3gm) in the rhizosphere of *Arachis hypogeal* grown in effluent treated soils at 15, 30. 45 and 90 days





Quantitative Effect -

Altogether 13 species of fungi were recorded from the rhizosphere and soil from the groundnut at different periods of growth (Table-2). There was lot of variation in their occurrence both in the rhizosphere and soil. The variation was also recorded between the different concentration of effluent. Here again the species like *A. niger, A. flavus, A. fumigatus, A. terreus, Rhizoctonia bataticola* and *Rhizopus stolonifer* were recorded to be dominant as their occurrence were found to be more times in different concentration and growth period. *A. nudulans, A. ustus, Cladosporium oxysporum, Curvularia lunata, Helminthosporium* sp., were found to be rare in their occurrence. When the results were compared on the basis of average, it was noted that *A. niger, A. flavus, A. nudulans, A. fumigatus, F. oxysporum, Penicillium funiculosum, Rhizopus stolonifer* were reduced in their occurrence in the rhizosphere or soil at 100 percent effluent. On the other hand *Aspergillus flavus, A. fumigatus, A. ustus, Fusarium oxysporum,* and *Penicillium funiculosum,* showed their reduction in the rhizosphere.

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