

Abstract

Dust storms are a natural process in desert regions that occurred as result of powerful winds function on soil surface, and it causes suspension of fine soil particles in the air. The aim of this study is assessment of physico-chemical characteristics and amounts of some nutrient elements associated with airborne dust in the Sistan Plain, and also determination of microbial population and their identification. Twenty five Siphon dust samplers were fixed in 4 meter highs approximately on the roof houses in the cities of Sistan region, and airborne dust sampling was done monthly from early 22 May until late 22 September in 2015. Soil samples from erodible or suitable for erosion topsoils were taken (20 samples) during 4 days survey in different parts of Hamoun wetlands (as main sources of airborne dust). After that pH, EC, organic matter, soil texture and amount of soil nutrient elements including P, K, Na, Ca and Mg were analyzed, and also the microbial population of the airborne dust was determined by using Petri dish culture method. In order to indentification of microbes types, microbes DNA was extracted and purified, and to determine gene sequences, the samples was sent to Macrogene Institute in South Korea.. The maximum amount of nutrient elements associated with airborne dust in all regions was Ca (average 772.35 ton/total area), and second elements is Mg (656.93 ton/total area). The minimum amount was P (total average 1.44 ton/total area). The highest amount of enrichment ratio related to P (6.09) and the lowest enrichment ratio related to Mg (0.81). Maximum aerobic bacteria population was observed in Nimrouz city (average CFU 6880000) and maximum anaerobic bacteria population was observed in Hirmand city (average CFU 236250). Maximum aerobic fungi population was observed in Hamoun city (average CFU 3208.3) and maximum anaerobic fungus population observed in Zahak city (average CFU 2166.7). The most frequent type of bacteria was *Bacillus* sp and fungi was *Penicillium* sp in this study. Results showed soil textures of Hamoun wetlands beds are suitable for erosion and its chemical properties showed salinization and alkalization and loss of vegetation cover. Airborne dust characteristics reflected ablation source conditions. It seems, the main challenge in Sistan region is land degradation caused by drought, salinization and alkalization and nutrient elements loss by wind erosion and consequently reduces soil fertility and vegetation cover. In the other hand high variety and amount of microbial population associated with airborne dust could be harmful and dangerous for in this region. It seems ecological danger of land degradation will increase quickly by occurrence of dust storm and this issue is the main and principle threaten for Sistan region ecosystem.

Keywords: 120 – day winds, Dust loading, Dust storms, Hamoun wetland, Population of bacteria and fungi ,Loss of nutrient elements,



University of Zabol
Graduate school
Faculty of Water and Soil
Department of Soil Sciences

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**Assessment of Biological Characteristics of
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Elements in the Sistan Plain**

Supervisor:

Ali Shahriari (Ph.D)

Advisors:

Ebrahim Shirmohammadi (M.Sc)

Bahman Fazeli-nasab (M.Sc)

By:

Masoud Ali-Soufi

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