



University of Zabol

Graduate School

Faculty of Soil and Water

Department of Rangeland and Watershed Management

**Thesis Submitted for the degree of Master of Science in
Watershed Management**

Title

**Microbial Diversity Response to Erosion-Induced Soil Physical and
Chemical Properties Changes in Dehbakri Watershed, Kerman
Province**

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The effect of erosion on soil yield and microbial communities is unclear. Lack of sufficient information in this area is a major obstacle to the actual assessment of erosion on natural ecosystem services and rehabilitation of degraded environments. In this study, the relationship between microbial and changes in physical and chemical properties of soil from water erosion in Dehbakri basin (Kerman province) was investigated. Two sites of Chehel-Tan forest and range-forest lands of Gavor in the basin were selected. Soil sampling (depth 0-30cm) based on a completely randomized design along the main slope of each site using transects (two transects) in four positions including no erosion, low erosion, moderate and severe erosion in the plot (3 plots in each situation) were performed (48 samples in total). The predominant erosion of the basin was rill type. Soil physical and chemical parameters including bulk density, soil moisture content, acidity, organic carbon, nitrogen and total phosphorus, ammonium (NH_4^+), nitrate (NO_3^-), available phosphorus and potassium, net mineralized carbon, net mineralized nitrogen for soil yield evaluation was measured. Soil microbial indexes including soil enzyme activity, microbial biomass carbon and nitrogen, microorganism population, soil microbial quotient and basal microbial respiration were measured at each site. Data were analyzed by one-way analysis of variance with three replications using SPSS.ver 20 software. The results showed that soil erosion had no significant effect on soil acidity, net mineralized carbon, available phosphorus and ammonium ($p>0.01$). Soil erosion caused significant changes in site edaphic properties and reduced soil multifunctional properties. At both sites, the maximum content of soil moisture, organic nitrogen, organic carbon, total phosphorus, available potassium and ammonium belonged to non-erosive plots and with increasing the degree of erosion, the values of these parameters showed a significant decrease ($p<0.01$). Soil erosion had no significant effect on net mineralized nitrogen at study sites ($p>0.01$). However, the highest amount of net mineralized nitrogen was measured in non-erosive plots and the lowest values were measured in plots with sever erosion. In general, the reduction of factors affecting soil fertility was greater in the Chehel-tan site compared to the Gavor site, and soil erosion had a greater effect on reducing soil nutrients. The results showed that the amount of all biological parameters measured in soils with severe erosion was significantly lower than soils without erosion and low erosion.

Keywords: Soil Biological Characteristics, Dissolved Organic Carbon, Enzyme Activity, Soil Microbial Population