

Sand Minerals, Amorphous Aluminosilicates, Free Iron Oxides And Nutrient Status In Wadi Bishah Basin Soils

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Abstract. Wadi Bishah basin is one of the important drainage systems in the southwestern region of Saudi Arabia. Characteristics of different soil units were quite variable as a result of the source of parent materials and other factors. This research was carried out to understand the relationship between sand mineralogy, amorphous materials and some plant nutrients in wadi Bishah basin soils. The results indicated that content of free Fe:203, MnO₂ and total amorphous aluminosilicates were higher in residuum soils followed by flood plain and wadi bottom soils. The contents were relatively higher in flood plain soils of the southern parts compared with the northern parts of the wadi. Light minerals constitute between 85.4 - 96.9% of sand fraction, while heavy minerals constituted from 3.1-14.6%. Quartz was the dominant mineral > 90% in light mineral fraction followed by feldspars 1.1- 4.3% and mica less than 7.7%. Opaque and non-opaque minerals were higher in residuum soils and flood plain soils in southern part of the wadi. The dominant minerals are amphiboles, pyroxenes and non-opaque minerals. Results indicated also that available Fe, Mn and Cu in flood plain soils range from low in subsurface layers to high or medium in surface layer while available Zn and P were relatively low. Residuum soils have relatively low extractable micronutrient levels compared with flood plain or wadi bottom soils. Correlation coefficients data indicated that free Fe & Mn oxides and amorphous Si & Al components have little or no effects on the availability of nutrients. Mica, pyroxene and amphibole in the sand fraction indicated a significant positive correlation with the available nutrients. No correlation was obtained with available Zn.

Key words: *Free oxides, sand mineralogy, amorphous materials, nutrients.*