

POTASSIUM FIXATION IN RELATION TO SOIL PARENT MATERIAL AND WEATHERING STAGE IN PAKISTAN

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ABSTRACT

Twenty four soil series, representing the parent materials: less and moderately weathered alluvium; limestone; shale and sandstone; diorite, granite, and granodiorite; and less and moderately weathered loess were investigated for K fixation in relation to clay mineral composition and characteristics. Potassium fixation was determined by equilibrating the soil with 1 g K per kg soil for one month with alternate wetting and drying cycles. The moderately weathered alluvial soils and the diorite, norite, granite, and granodiorite derived soils had the highest K fixation. The less weathered alluvium and limestone derived soils had the lowest K fixation. Also, the less weathered alluvial soils had lesser K fixation than the moderately weathered alluvial soils. Potassium fixation varied from 400 to 870 mg kg⁻¹ in moderately weathered alluvial soils and from 240 to 870 mg kg⁻¹ in diorite and norite derived soils. The soils derived from limestone mostly released K or fixed a little K. However, the limestone derived soils which had mixture of shale fixed 80 to 400 mg K per kg soil. Potassium fixation in loess soils varied from 200 to 750 mg kg⁻¹. In the sandstone derived soils (Balkassar) K fixation ranged from 500 to 600 mg kg⁻¹. Potassium fixation had no correlation with total clay content as usually thought. Potassium fixed and K extractable with 1N NH₄OAc were negatively correlated. The results have been explained in relation to mineralogical composition of these soils.