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Prediction of Soil Sodicity (ESP) from SAR
Values in Various Soil Water Extracts

تقويم قلوية التربة من قيم الصوديوم المدمص في تخفيفات مختلفة

Thesis Submitted to Sudan University of Science and Technology in Partial
Fulfillment of the Requirements for M.Sc. Degree in Soil Science

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Dedication

.....To my lovely Father

.....To my lovely mother

To my Brothers and

....Sisters

....To my Friends

Love you all

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Abstract

This study was carried out at two locations i.e Sileit Agricultural Scheme and Kenana 4 ,the samples were taken from different depths. Ninety (90) soil samples were collected from the two areas to represent saline and non saline soils. Samples were tested for:

1. Exchangeable Sodium Percentage (ESP)
2. Total Soluble Salts (E.C.)
3. Sodium Adsorption Ratio value (SAR)
4. pH

The purpose of this study is to determine the relationship between ESP and SAR Values at different dilutions (saturated paste Extract, 1 : 2.5 and 1 : 5 soil : water suspension) .

This study is to reduce the high cost of measuring ESP which necessitates determination of cation exchange capacity (CEC), extractable sodium, and soluble sodium. They all require chemicals, valuable equipment and human efforts.

Statistical analysis was carried out and regression equations were developed between the measured values of ESP and SAR at different soil: water dilutions (paste extract, 1 :2.5 and 1:5) .Regression equations were then used to calculate ESP . The relationship between calculated and actually determined ESP values was highly significant for all the dilutions used, including the 1:5 soil: water ratio which is widely adopted in soil laboratories.

□□□□□□

أجريت الدراسة لمنطقة مشروع السليت الزراعي و كنانة 4 حيث أخذت العينات من أعماق مختلفة, جمعت العينات لتشمل أراضى ملحية وغير ملحية (90عينة) أجريت عليها التحاليل المعملية الآتية :-

1/ نسبة الصوديوم المتبادل.

2/ الأملاح الكلية الذائبة.

3/الصوديوم المدمص (عجينة مشبعة ، 1:2.5 ، 1:5).

4 / تفاعل التربة pH.

الهدف من الدراسة إيجاد علاقة بين الصوديوم المدمص على سطح حبيبات التربة و الصوديوم المتبادل في تخفيفات مختلفة (عجينة التشبع ، 1:5 ، 1:2.5) بغرض التخلص من التكلفة العالية لتقدير الصوديوم المتبادل حيث يتطلب ذلك تقدير السعة التبادلية الكتيونية و الصوديوم المتبادل و الصوديوم الذائب والتي يحتاج تقديرها إلي مواد كيميائية مرتفعة الثمن واستخدام أجهزة حساسة مع وجود مزيد من الجهد و الزمن .

أثبتت الدراسة انه يمكن إيجاد قيمة الصوديوم المتبادل من قيمة الصوديوم المدمص بعد استخدام المعادلات الناتجة من التحليل الإحصائي حيث تقاربت نتائج الصوديوم المتبادل المعملية مع النتائج الحسابية .

كما وأثبتت الدراسة انه يمكن استخدام العلاقة 1:5 في تقدير نسبة الصوديوم المتبادل وهي الأسهل تقديرا من الناحية العملية إذا ما قورنت بمستحضر نتائج العجينة المشبعة .