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Phosphore - Phosphate

Analyse des Sols, Des Eaux et des Plantes

Damas

LE CENTRE ARABE
POUR LES ETUDES DES ZONES ARIDES ET DES TERRES SÉCHES
(ACSAD)

Le Centre Arabe
Pour les Etudes des Zones Arides & des Terres Sèches
ACSAD

No. 1600

Phosphore - Phosphate

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Foreword

The compilation of these abstracts has been carried out by the staff of soil laboratory using its own bibliography. Revision and up-dating shall be made whenever enough material is collected to justify a new edition . Furthermore, these abstracts are limited to common methods of analysis usually performed in laboratories of soil survey, soil conservation and general agriculture with special emphasis on soils of arid zones. Specific research topics have been excluded, though some papers dealing with interpretation of results or theoritical aspects of methods have been also reviewed.

Until now, six abstracts have been published: (Sulfate, Cation Exchange Capacity, Exchangeable Cation, Slinity gypsum (Two editions),Calcium, Magnesium, Potassium, Sodium and this one), some others are being prepared and they will be sent to all applicants. For each abstract a number is coded in a machine readable form for fast retrieval and we hope to publish them by computer printing in a near future.

Our main objective is to help the soil analyst in finding the publication which could be useful to him. To fulfill this expectation; the number of papers reviewed must be as high as possible. We would appreciate to receive from the readers reprints of their own which are available to us.

The KEYWORDS, CODE & ORDR references are used for bibliographic classification and automatic retrieval.

مقدمة

جمعت ملخصات هذه البحوث العلمية من قبل العاملين في مختبر الأراضي في المركز العربي ومن مكتبتهم الخاصة . وتتناول هذه الملخصات بالبحث بصورة خاصة طرق التحاليل الفيزيائية والكيميائية للتربة والمياه والنبات المتبعة عادة في مختبرات Soil Survey و Soil Conservation Service ومعظم النشرات العلمية التي تتعلق بالمناطق القاحلة . وقد تم استبعاد بعض المواضيع من جهة ، الا انه قد تم التركيز على المواضيع المتعلقة بتفسير النتائج والقسم العملي للطرق التحليلية بشكل خاص .

تم حتى الان اصدار ستة من ملخصات البحوث هذه ، تتعلق بالكبريت والكبريتات، التبادل الكاتيوني والسعة التبادلية للتربة، الملوحة والجبس (طبعتين) ، الكالسيوم — المغنزيوم — البوتاسيوم — الصوديوم واللواتي تحملن على التوالي الارقام — ٢٤٠٠ — ٣٤٠٠ — ٢٨٠٠ — ٢٨٠١ — ٤٠٠ — وتم ايضا تحضير مجموعة اخرى من هذه الملخصات ستصدر على التوالي وترسل الى الراغبين في الحصول عليها . وتحمل كل واحدة من هذه المختصرات رقما معينا يمكن قراءته اليا ، ونتطلع في القريب العاجل على استخدام العقل الالكتروني في تصنيفها .

ان الهدف الرئيسي لهذا العمل هو مساعدة العاملين في المختبرات في الحصول على طرق التحاليل الفيزيائية والكيميائية التي يمكن ان تكون مفيدة لهم بصورة سهلة واختيار المناسب منها حسب طبيعة العمل التحليلي الذين يقومون به .

اننا نرحب بجميع المقترحات والملاحظات على هذا العمل التي ستقدم لنا الفائدة في تحسين نوعيته ووضعه بالصورة الافضل .

ان الكلمات KEY WORDS - CODE - ORDR تستخدم من اجل التصنيف حسب الطريقة التي تم اعتمادها من قبل العاملين في مختبر الاراضي في المركز العربي

CODE : 1601-12/c-47-52-59-c/80
ORDR : 0553

Authors : ALEXANDER (T.G) - ROBERTSON (J.A)
Title : EDTA extractable phosphorus in relation to available and inorganic phosphorus forms in soils.
Public : Soil Science 114-1-1972.
Pages/ref: (69-72) / 10 refs.

Summary:

Method for extracting phosphorus from soil using EDTA. The method is tested on Canadian Soils.

x gm of soil were shaked for one hour with 20 x ml of 5mM EDTA, then phosphorus was determined in the extracts by the phosphomolybdic complex, after reduction with ascorbic acid using a spectrophotometer at 880 nm.

Available phosphorus was extracted from nine different soils by this method, and the pH values were studied for these extracts.

The method is said to be suitable as it is possible to know the relation Ca-P which is more important as the source of phosphorus available to plants than the relations Al-P and Fe-P extracted by Chang and Jackson procedure. The EDTA solution can be buffered at high pH value to chelate mainly Ca.

Tables :- Some parameters of the soil samples.
- Effect of EDTA concentration on the amount of P extracted at the soil/solution ratio of 1/10 for 1 hours.
- Effect of soil/solution ratio on the amount of P extracted with 5mM EDTA for 1 hours.
- Effect of time of extraction on the amount of P extracted at a soil/solution ratio of 1/10 with 5mM EDTA.
- Correlation between 5mM EDTA extractable P and other parameters of the soils.

Material : Spectrophotometer

Chemicals: EDTA - Ammonium molybdate - Antimony potassium tartarate- Ascorbic acid - Sulforic acid - distilled water.

Key words: P / COLOR / LABIL /

ALEX

CODE : 1601-18/46-47-54-59-c/80

ORDR : 0124

Auteur : XXX / ARIANA

Titre : Dosage du phosphore facilement mobilisable des sols

Public : Méthode de dosage utilisées au laboratoire de l'ARIANA, Ministère de l'Agriculture D.R.E.S Tunis - 1975.

Page/ref : 11 / 9 ref.

Résumé: Deux méthodes sont décrites:

1- Méthode Truog:

400ml de reactif de Truog $(NH_4)_2 SO_4 + H_2SO_4$ dans H_2O) sont ajoutés sur deux prises du même échantillon soit: 2gm et 5gm (2mm). Le mélange est agité 30min. Aprés filtration on prélève un volume de l'extrait et on ajoute 2ml de reactif molybdique de Duval on agite, puis on ajoute 3 gouttes de solution de chlorure stanneux. Aprés developement de la couleur bleue pendant environs 15min. le phosphore est determine au spectrophotomètre à 830 nm.

La courbe etalon est faite avec du phosphate monopotassique en solution d'extraction de Truog.

2- Méthode Olsen modifié:

Dans cette méthode le reactif d'extraction est une solution de bicarbonate de sodium pur et fluorure d'ammonium pur pH ajustée à 8,5 par l'addition de solution de NaOH 1N.

A 10ml de solution d'extraction ajouter $5cm^3$ de solution d'acide borique 0,8 N ensuite 1ml de reactif de Duval et $5cm^3$ d'acide ascorbique à 10%, chauffer le melange dans un bain marie à 80°C pendant 45 min.laisser refroidir , determiner le P en utilisant colorimètre à 660 nm.

Materiel : Colorimètre - Spectrocolorimetre.

Produits : $SO_4(NH_4)_2$ - H_2SO_4 - Molybdate d'ammonium - HCl - chlorure stanneux - phosphore monopotassique - bicarbonate de sodium - fluorure d'ammonium - NaOH - acide borique - acide ascrobique.

Mots Clès: P / COLOR / LABIL /

CODE : 4601-25/c-49-54-58-c/80
ORDR : 0468

Authors : AYERS (Cora. W)
Title : Automated analytical technique for tobacco analysis.
Public : Technicon Int. symposium. Reprint by Techn. Int. Co. Ltd, London 1964.
Pages/ref: 11 / no ref.

Summary: The flow diagrams used to determine elements of tobacco by continuous flow colorimetry are described for four elements (Iron, Manganese, Phosphorus, Chloride.). Methods for extraction of Sodium and Potassium from tobacco leaves were also investigated during a collaborative test involving 16 laboratories. The methods tested were: 1) a simple aqueous extraction; 2) a dilute HCl extraction; 3) a column extraction; 4) (HNO_3 $HClO_4$) wet digestion. Flow diagrams are schematically as follows (flow rates are given in ml/min):

Iron:

- Sample (1,2)/Water (1,2)/13% Amonium thiocyanate (2x2,0)/ Single coil/Debubbler (2,0) to waste/480 nm-15 mm cell.

Manganes: (sampling by a double crook)

- Sample (1,2), Water (1,2) Sodium-periodate-phosphoric acid (2 x 2,0)/ Heating bath 95°C/ Debubbler 2,0/520 nm-55mm cell/.

Phosphorus:

- Sample (0,23)/ Amonium molyb. (2,0)/ Air (1,2) Amonium vanadate (2,0)/ 4 times delay coil/ Debubbler (2,0)/ 420 nm - 15 mm cell/.

Chloride:

- Sample (0,32) /Diluent (2,0)/ Air (1,2)/ Water (2,5)/ Water (2,5)/ Air (1,2)/ Dialyzer 37°C / Mercuric thiocyanate 50%/ ETOH (2 x 2,5)/ Mixing coil / Debubbler (2,0)/480 nm-15mm cell/

Tables :- Comparison of methods of extraction for potassium and sodium.
- Comparison of results of three methods on K_2O analysis of different tobacco parts.
- Variation of result with sampling rate.

Precision: An overall coefficient of variation between 1,5 and 5% was found for K at 3% level, Na at 250 ppm level, P at 0,25% level, Cl at 1% level, Fe at 220 ppm level, Mn at 80 ppm level

Material : Single channel continuous flow colorimeter - recorder - flame photometer (sodium and potassium) - automatic sampler.

Key Words: COLOR / Cl - Fe - Mn - P - K /.

AYE

CODE : 1602-01/45-47-57-59-c/80
ORDR : 0625

Authors : BACHE (B.W) - IRELAND (christina)
Title : Desorption of phosphate from soils using anion exhange resin.
Public : Journal of Soil Science 31-2-1980.
Pages/ref : (297-306) / 16 ref.

Summary: The transfer of phosphorus from soil to anion exchange resin is studied. The parameters studied are: type of resin time of contact, soil/resin ratio and ion competition.

Method: 2gm (30 mesh) air - dried soils in 100ml distilled water were shaked gently (20 r.p.m) at 22°C for times varing between 2 and 300hours. with strongly basic anion exchanger Dowex 21K in the Cl^- form and zerolit FF in the HCO_3^- form (trimethylbenzyl-ammonium fonctional group on a cross-linked polystyrene-divinylbenzene matrix.) Resins were separated by sieving and leached with 100ml portions of 1N NaCl and 10ml portions of 0.1N HCl. Then the phosphorus was determined in the leachate by Spectrophotometry (using 4cm all).

Effect of reaction time and effects of amount of resin and salt concentration were studied. A reaction time of 90hours was chosen to reach equilibrium. Anion competition was found to be important and the release of calcium by soil calcium phosphate was controlling factor of P desorption.

Tables :- Change in solution composition in relation to phosphate adsorbed by 4gm moist resins for three soils.
- Changes in total acidity and soluble Ca of soil resin suspensions in relation to phosphate adsorbed by Cl resin from soil B, 90hours reaction period.

Figures :- Phosphate adsorbed by resin as a fraction of time.
- Effect of Ca concentration in solution on adsorbed P.

Material : Spectrophotometer.

Chemicals : Dowex 21K in the Cl^- form and zerolit FF in the HCO_3^- form - NaCl - HCl - O-cresophtalein complexone - distilled water.

Key Words : RESIN / COLOR /

BACH

CODE : 1602-15/46-47-52-59-c/80
ORDR : 0565

Auteur : BOUYER - DABIN (B)
Titre : Fractionnement des differentes formes du phosphore du sol.
Public : I.D.E.R.T - BONDY (Roneo).
Pages/ref: 17 pages / 15 refs.

Résumé: Differentes methodes d'extraction et de determination des formes du phosphore du sol:
1 gm (2mm) du sol est agité 30min avec 50ml NH_4Cl 1N, centrifugé, decanté pour obtenir une solution contenant le phosphore soluble minéral qui n'est généralement pas dosé. Les residus des sols sont agités 1h. avec 50ml NH_4F 0,5 N, centrifugés, decantés pour obtenir une solution contenant le phosphate d'alumine qui peut être determiné en colorimetrie en melangeant 1ml de solution avec 15ml H_3BO_3 0,8 N, 2ml de solution sulfomolybdique et 3 gouttes de $SnCl_2$. Les residus de 2eme extraction sont lavés avec 25ml de solution saturée de NaCl, et avec 25ml H_2O distillée, puis agités 8 h. avec 50ml NaOH 0,1 N, centrifugés et decantés. La solution est traitée avec H_2SO_4 pour floculer le phosphate de fer qui peut être determiné en colorimetrie, en ajoutant à 5ml de la solution 3-4 gouttes de 2,4 dinitrophenol, NaOH 2 N, 2ml de solution sulfomolybdique et 3 gouttes $SnCl_2$.
Les residus des manipulations precédantes sont agités 1 h. avec 50ml de H_2SO_4 0,5 N, centrifugés, decantés pour obtenir une solution contenant le phosphate de chaux. La couleur est developpée comme dans le cas du phosphate de fer. Les residus de sol sont agités 15min avec 40ml de citrate de soude 0,3 N, portés à 80°C. 1 gm $Na_2S_2O_4$ est ajouté, aprés 30min, la suspension est contrifugée et le sol est lavé 2 fois avec 5ml NaCl. Les solutions recueillies sont oxydées avec H_2O_2, et séchées pour obtenir le phosphate de fer d'inclusion. Pour obtenir le phosphate d'alumine d'inclusion, les residus de sol sont agités avec NH_4F 0,5 N, centrifugés, decantés et le phosphate est determiné en colorimetrie.
Pour le dosage du phosphore organique : la différence de teneur entre deux extraits du P (extraction par HCl et NH_4F) traités avec H_2O_2 et sans traitement avec H_2O_2, donne le P organique.

Materiel :- Colorimetre.

Produits : NH_4Cl - NH_4F - NaCl - NaOH - H_2SO_4 - Citrate de soude - H_2O_2 - $SnCl_2$ - H_3BO_3 - 2,4 Dinitrophénol - NH_4OH - Molybdate d'ammonium- H_2O distillée.

Mots Clés: P / COLOR /.

BOUY

CODE : 1602-15/45-47-55-59-c/80

ORDR : 0126

Authors : BOWMAN (R.A) - OLSEN (S.R)

Title : A reevaluation of phosphorus 32 and resin methods in a calcareous soils.

Public : Soil Science of America Journal 43-1-1979.

Pages/ref : (121-124) / 20 ref.

Summary: The purpose of the paper was to evaluate the feasibility of using the resin extractable P and the isotope 32P methods to estimate labil phosphorus in soils.

1)- To 200 gm of (2mm) soil sample a stock solution of KH_2PO_4 was added to obtain different concentrations of phosphorus/gm soil. The mixture was left during three weeks to reach equilibrium.

2)- 2 gm of resin for each gr. of soil was used to obtain extractable phosphorus by resin method, phosphomolybdate-ascorbic acid method was used to determine the concentration of phosphorus 31 using a spectrophotometer.

Total exchangeable phosphorus (TEP) by 32P isotope method was calculated accoriding to the equation TEP = A/S where A is initial activity/gm soil added and S is final specific activity 32P/31P in solution.

Equilibration time was studied by measuring the activity (32P) during different times, the effect of soil/solution ratio was studied also by resin-exchangeable phosphorus method, and the effect of different salt solutions on phosphorus extraction was studied by resin method.

Tables :- Physical and chemical characteristics of soil used.
- Effects of added - P on the 32P and resin-extractable P content.
- Effect of equilibration times on the specific activity ratio and labil P values.
- Effects of solutions/soil ratio (in water and 0,01M $CaCl_2$) on the labil values.
- Effects of water and dilute salts on pH, Ec, solid and solution phase P at 0,1 and 2 g of anion exchange resin.

Material : Spectrophotometer - 32P counter.

Chemicals : Exchange resin - Phosphomolybdate - Ascorbic acid - Radio active 32P.

Key Words : P / RADIO / RESIN / LABIL /.

CODE : 1601-18/45-47-57-59-c/80
ORDR : 0701

Authors : BREWSTER (J.L)- GANCHEVA (A.N) - NYE (P.H)
Title : The determination of desorption isotherms for soil phosphate using low volumes of solution and an anion exchange resin.
Public : Journal of Soil Science 26-4-1975.
Pages/ref: 14 (364-377) / 22 ref.

Summary: To determine the desorption isotherms for soil phosphate, two methods were used:

1 - Desorption by differents volumes of 0,1 M calcium nitrate solution mixed with soil to obtain mixture ranging between 1 to 500ml per gr of soil sample. PH was adjusted to that of the soil solution using $Ca(OH)_2$ or HCl. After 24 hours contact time, the solution was filtered and P measured.

2 - Resin method: 0,01 to 4 gm of anion exchange resin De-acidite FF-IP(quarternay ammonium, 14-52 mesh) in chloride form were added to 2 gm of moist soil sample, 6 ml of 0,01 M $Ca(NO_3)_2$ at pH=7 and the mixture was shaked for 24 **hs**. at 25°C, centrifuged at 1200 g (25°C) for 30 min, filtered.
The resin was separated from soil by wet-sieving using distilled H_2O, then 20 ml of boiling 1 M Na_2SO_4 solution were added to the resin, decanted after 30 min, and collected. This operation was repeated 5 times.

Truog and Meyer method was used to determine phosphate in the first separated solution, and total phosphate desorbed from the soil and adsorbed by the resin. This method was applicated on 4 soil samples. A linear relation was found between the quantity of P adsorbed/gm of ovendry soil(ΔP) and the concentration of P in solution (C).

Tables :- Relations: $\ln C = a + b\,\Delta P$ for four soils.

Figures :- Soil sample-solution desorption, resin desorption for phosphate in 0,01 M $Ca(NO_3)_2$ for four soils.
- Effect of solution desorption and resin desorption on(i) the lime potential of the equilibrating solution (ii) the mono-calcium phosphate potential.

Key Words: P / RESIN / LABIL /.

CODE : 1604-01/46-47-54-59-c/80

ORDR : 0566

Auteur : DABIN (P) - BRION (J.C) - MOREAU (D)

Titre : Dosage du phosphore dans divers extraits de sol.

Public : Cahier ORSTOM - Serie Pedologie - III N° 4 - 1965.

Pages/ref: 18 (349-366) / 5 refs.

Résumé:

a)- Dosage du phosphore total:

1 - Par attaque nitrique: Ajouter 10ml HNO_3 pur à 1 gm du sol bouillir 5 heures, amener à sec, ajouter 50ml H_2SO_4 1N, filtrer.

2 - Par fusion alcaline: Mélanger 2 gr de carbonate double de sodium et potassium et 0,5 gr sol dans un creuset-platine, porter au rouge, refroidir et neutraliser par H_2SO_4.

b)- Dosage du phosphore avec assimilable par la methode de "Truog":

Agiter 1/2 h un mélange de 1 gm de sol dans 200ml H_2SO_4 0,002N pH=3,5 filtrer, determiner en colorimetrie, le developpement de la couleur est realisé par le mélange sulfomolybdique (solution Duval), l'acide ascorbique 10 gm/l.

Manifold: (pour a) et b); debits en ml/mm.).

Ech. (3,9)/ Air (1,2)/ H_2SO_4 1,65 N (2,0):/ Bobine / Reactif sulfomolybdique (1,2) / Bobine / Ac. Ascorbic 6 gr/l (2x2,9)/ 2 Bobines / Bain marie 85° / Cuve 10 mm 660 nm./ Lavage H_2SO_4N(2,9)

c)- Fractionnement du phosphore:

Les formes différentes du phosphore facilement et difficilement deplaçable son determinées d'après la methode de CHANG et JACKSON.

Materiel :- Colorimetre en continu.

Produits : HNO_3 - H_2SO_4 - Reactif Sulfomolybdique - Acide Ascorbique - $(NH_4)_2$ - SO_4 - KH_2PO_4 .

Mots Clés: P / COLOR /.

DABI

CODE : 1604-01/46-47-54-59-c/80

ORDR : 0132

Auteur : DABIN (B) - PELLOUX (P) - GAVINELLI

Titre : Analyse du phosphore dans les sols.

Public : ORSTOM (Roneo) non publié.

Pages/ref: (1-39)/.

Résumé:- Phosphore total:

3 methodes d'extraction:

1- Fusion alcaline: Chauffer au rouge 1gm de sol (0,2m/m)+5gm CO_3KNa, 1/2 h., neutraliser après refroidissement dans 50ml H_2SO_4.

2- Attaque nitroperchlorique: Chauffer doucement 1gm (0,2mm) de sol avec 2ml HCl (d=1,61)+10ml HNO_3 (d=1,38), filtrer, laver avec H_2SO_4 1N .

3- Attaque nitrique: Chauffer lentement 1gm de sol (0,2mm)+10ml HNO_3 (d=1,38) pendant 5 h. amener à sec, reprendre le residu avec H_2SO_4 1N, filtrer, laver avec H_2SO_4 1N .

Le dosage est fait par volumetrie, colorimetrie manuelle, ou colorimetrie automatique.(les debits sont donnés en ml/min). Manifold pour le dosage automatique: Echantillon (3,9)/ Air (1,2)/ Melange sulfomolybdique (1,2)/ Acide Ascorbique 6gm/l (2,9)/H_2SO_4 1,65 N (2)/ Bain marie 85°C double-délai/ Cellule 10mm - 660nm)/ Lavage H_2SO_4 1 N (2,9).

- Phosphore assimilable (Methode de Truog):

Agiter 1/2 h. 2gm de sol avec 400ml/min H_2SO_4 0,002 N pH=3, filtrer. Le dosage est fait en colorimetrie manuelle ou automatique à 660nm. Pour le dosage automatique, manifold: Echantillon (3,4)/ Air (2)/ Melange sulfomolybdique (1,2)/ Acide Ascorbique 10g/l (1,2)/ Bain marie 85°C double-délai/ Cellule 10mm - 660nm /.

- Fractionnement des formes du phosphore du sol:

Pour obtenir les formes differentes de phosphore, la methode "CHANG et JACKSON" est utilisée. Les methodes d'extraction et de dosage du phosphore dans les sols des regions tempérées et tropicales sont indiquées aussi.

Materiel :- Colorimetre automatique.

Produits : HNO_3 - H_2SO_4 - Acide perchlorique - CO_3KNa - KH_2PO_4 - Reactif Sulfomolybdique - Acide Ascorbique - NH_4Cl - NH_4F - NaOH - H_2O Distillée.

Mots Clés: P / COLOR / LABIL /.

DABI

CODE : 1604-05/46-47-54-59-c/80

ORDR : 0561

Auteur : DEWIS (J) - FREITAS (F)

Titre : In:Méthodes d'analyse physique et chimique des sols et des eaux: chap. III : Dosage du phosphore : Extraction au fluorure d'ammonium - acide chlorhydrique.

Public : FAO Bulletin pédologique N° 10 - 1970.

Pages/ref: (166-167).

Résumé:

La methode colorimetrique utilisant le reactif de Bray et Kurtz pour l'éxtraction du phosphore des sols neutres on acides est présentée en détail pour l'analyste des sols.

Extraction: 2 gm (0,2mm) de sol séché à l'air sont agités avec 50ml de solution de fluorure d'ammonium 0,03 N dans l'acide chlorhydrique 0,025 N. Cette solution est supposée extraire le phosphore dit "adsorbé". Pour l'extraction du phosphore adsorbé plus le phosphore soluble dans l'acide, le titre de l'acide chlorhydrique dans la solution précédante est augmenté à 0,1 N.

Agiter 1 min pour extraire le phosphore dit "absorbé" et 40 sec.pour l'extrait du phosphore adsorbé-plus-soluble dans l'acide; filtrer après agitation. On developpe la couleur sur 5 ml de cet extrait en ajoutant 5 ml de solution de molybdate d'ammonium 1% dans l'acide sulfurique 4N et 0,25ml de chlorure stanneux 0,1 M. La solution étalon de phosphore est préparée à partir de phosphate monopotassique et la lecture se fait à 660 nm.

Materiel :- Colorimetre ou spectrocolorimetre.

Produits : NH_4F - HCl - H_2SO_4 - Molybdate d'ammonium - Chlorure stanneux.

Mots Clès: P / COLOR / LABIL /.

DEWI

CODE : 1604-09/46-49-54-59-c-/80
ORDR : 0133

Auteur : DIDIER de St. AMAND - ZUCKERMAN (L)
Titre : Méthodes de fractionnement et dosage des constituants phosphorés végétaux.
Public : ORSTOM - Documentations Techniques N° 8 - 1968
Pages/ref: 13 (5-17) / 16 refs.

Résumé: 1) Dosage du phosphore acido-soluble total:

Les tissus sont séchés à froid en lyophiliseur à 6°C sous vide, et broyés à froid. L'extraction est faite avec une solution de l'acide trichloroacétique 8%. Pour developper la couleur bleue ajouter à 1ml de l'extrait 25ml d'un mélange d'alcool isobutylique et de benzène, puis 5ml de reactif, molybdique, agiter 30 sec., prélever 10ml de la phase supérieure, ajouter 10ml du mélange H_2SO_4 éthanol et 1ml de la solution chlorure stanneux, doser en colorimetrie à 770 nm.

Dosage des fractionnement de l'ensemble acido-soluble:

Le phosphore minéral est determiné à partir de l'extrait trichloracetique et le dosage s'effectue directement sans digestion, le reactif silicotungstique est ajouté pour précipiter les protéines aprés l'addition du mélange alcool-benzène comme precedemment.

Les methodes du dosage du phosphore phytique, nucléotides et non nucléotides solubles, et l'acido-soluble labile sont montrées.

2) Dosage de fractions sur le residu:

Aprés elimination de l'acide trichloracetique on peut extraire et doser le phosphore lipidique, nucléique, et protéique.

Materiel :- Colorimètre - Lyophiliseur.

Produits : Alcool isobutylique - Benzène - Molybdate d'ammonium - H_2SO_4 - $SnCl_22H_2O$ - HCl - Ethanol - Silicate de sodium - Tungstate de sodium - KH_2PO_4 - H_2O distillée .

Mots Clés: P / PLT / LABIL / COLOR /

CODE : 1605-12/45-47-54-59-c/80

ORDR : 0136

Authors : EL-RASHIDI (M.A) VAN DIEST (A) EL-DAMATY (A.H)

Title : Phosphorus Determination in highly calcareous soils by the use of an anion exchange resin .

Public : Plant and soil 42 - 1975 .

Page/ref : 273 - 286 / 12 ref .

Summary: The anion exchange resin method was tested on ten soils of Egypt and was correlated with phosphorus uptake by barley plants. On preliminary studies of these soils,phosphorus was fractionated into water soluble, aluminium P, iron P, calcium P, by the Chang & Jackson method. Organic forms of phosphorus were also determined .

Method: For extracting available P from soil samples, 2gr of soil are shaken with 2gr of strongly basic resin.Soil was ground in order to pass through a finer sieve than the resin grains. Suspension of soil in resin was shaken during times varying from 1 to 72 hours . Soil and resin were separated by sieving. Phosphorus is leached out of the resin by 100ml of 10% NaCL solution. Phosphorus is then measured colorimetrically.A parralel experiment was conducted in pots using 800gr of soils and barley seeds, which were cropped after one month .

The rate of P release from soil to resin increased rapidly during the first 24 hours to become almost constant after 72 hours. This last values may be considered as being the capacity of the soil to release phosphorus. This values lie from 10 to 60 ppm for the soil investigated .

The study of the rate of release suggested that two forms of phosphorus, one rapidly released, another one slowly released exist.

Furthermore, the resin extractable P was highly correlated with the NH_4CL extractable P, fraction.The Ca-P fraction showed no correlation with resin-P at any equilibration period tested .

Tables : - Phosphorus released by the soils at different equilibration periods expressed as ppm (weight basis).

- Relationship between NH_4CL- + AL-P and resin-P .
- Suggested curves representing the amount of phosphorus released from EL-Nijila soil after different equilibration periods .

Key Words: P / RESIN :

CODE : 1608-05/c-47-52:59-c/80

ORDR : 0537

Authors : HERNANDO (V)

Title : The problem of phosphorus in Spanish calcareous soils.

Public : ISMA Symposium, N° 70 June 1977.

Pages/ref: (47-62) / 26 ref.

Summary:

A solution used since 1952 in Spanish Laboratories for the extraction of available phosphorus in calcareous soils was compared with electro-ultrafiltration (E.U.F) and Olsen's method.

The solution, used at 1/100 soil/solution ratio, contains (per 500 ml) 0,1 gm $CaCO_3$ - 0,088 gm $MgCO_3$ - 0,5 ml H_2SO_4 20%- and 2,45 ml acetic acid 98%. It was shaked 5 min with 5 gr of soil.

The method is said to be convenient because the moderate value of pH (3,25) does not solubilizes the phosphorus which is not taken up by the plant at lower values. In the other hand the correlation found between the available P extracted by this method and the absorption of the P by lettuce plant, was similar to methods of Burriel - Hernando's, Olsen and E.U.F . The rate of P release from the solid phase of soils, to the soil solution in relation with the rate of uptake of P by plant was studied (p.54-60). The refixation of phosphorus on the soil during the contact time (5 min) is said to be minimal.

Figures :- Solubility of different form of Ca phosphate.
- Correlation between the P extracted with Burriel and Hernando's technique and the absorption of the P by the wheat.
- Correlation between available P extracted by Hernando technique and the absorption of P by lettuce plants and in (E.U.F) and Olsen's method.
- Residual effect of superphosphate.(correlation of P uptake in field experiment) of extracted P in function of soil/solution ratio.
- Photograph of the device based in the study of uptake by plant in relation with release of P from soils.

Chemicals: $CaCO_3$ - $MgCO_3$ - H_2SO_4 - Acetic Acid.

Key Words: P / PRETR / LABIL /.

HERN

CODE : 1608-05/46-47-54-59-c/80
ORDR : 094

Authors : HESSE (P.R.)
Title : In: Méthod of soil analysis: chapter 10: Available phosphorus.
Public : FAO N° AGON/SF / SYR - 67/522. Nov. 1974
Pages/ref: (17-18).

Summary:

The Olsen's method for the extraction and the determination of available phosphorus in calcareous soil is described.

Extraction: 5 gm (2mm) soil sample are shaked with 100ml of sodium hydrogen carbonate (N/2, pH 8.5) for 30min, then filtered. If organic matter is present a few mgr. of activated carbon are added to the extracting solution.

Dosage: 10ml of extracting solution are shaked with 5ml of dilute sulphuric acid for 1 hour then 20ml of distilled water, and 5ml of ammonium molybdate solution are added.

The mixture is shaked during 30 sec. with 6 drops of $SnCl_2$.

The concentration of phosphorus is determined by measuring the transmittance at 660 nm after 10 minutes.

Standard phosphorus solutions are made with potassium dihydrogen phosphate.

Material :- Colorimeter with 660 nm filter or Spectrocolorimeter.

Chemicals: $NaHCO_3$ - Activated carbon - Sulphuric acid - Ammonium molybdate - $SnCl_2$ - Potassium hydrogen phosphate.

Key Words: P / COLOR / LABIL /.

HESS

CODE : 1608-09/46-47-54-59-c-80
ORDR : 0137

Authors : HISLOP (J), COOKE (I.J).

Title : Anion exchange resin as a mean of assessing soil phosphate status: A laboratory technique .

Public : Soil Science, 105, 1968 .

Page/ref : 8 - 11/ 8 ref .

Summary: An anion exchange resin can be used to extract available soil phosphorus of agricultural soils. The resin does not alter the composition of the soil during the experimental procedure and good correlation is obtained with Olsen's bicarbonate method for calcareous and non calcareous soil samples .

Method: A representative sample is passed through 0,5m/m sieve.About 1gr of soil is shaken with 5ml of strongly basic exchanger in a bottle filled with 100ml. of distilled water. Shaking time is 16 hours at 25°c ± 1°c. soil and resin are separated by sieving. The resin is transferred into a 10m/m int.diam.column. Extraction of PO_4^{3-} fixed on the resin is done by 50ml of 7% Na_2SO_4 solution at 2,5ml mn^{-1} . Phosphorus is measured in the leachate in a continuous flow colorimeter using the following flow diagram:(flow rates are given in ml/mm, concentrations of reagents are not given).

Air (1,2)/ Molybdate (2,5)/ sample (2,0)/ Double mixing coil/ Ascorbic acid(0,32)/ Double mixing coil/water bath 95°c/colorimeter 625nm/repump to waste(3,4)/.

The resin is regenerated by 60gr/1 NaCL solution until the effluent is free from sulfate .

Tables : - Diagram of leaching tube used./Manifold for the determination of phosphate .
- Correlation between amounts of phosphate extracted by three techniques (citric acid-/Bicarbonate/Resin).

Precision: - Correlation(n=20) between 1% citric acid(CA),resin(R)and bicarbonate(O) were:

(R,O)r=0877;(CA,R)r=0,898;(CA,O)r=0,933.(non.calc.soils)

(R,O)r=0,830;(Ca,r)r=0,417(NS);CA,O)r=0,331(NS) (non.calc.soils)

-The extraction was not complete after 16 hours of shaking with glasshouse soils.

Material : - Strongly basic resin - sieve - chromatographic column - thermostatic-water shaking bath - spectro colorimeter (det. of PO_4).

Chemicals: Amonium Molybdate - Ascorbic Acid - Sulf.Acid.

Key Words: P/RESIN / COLOR / LABIL /.

HISL

CODE : 1611-09/42-c-54-c-c/80
ORDR : 0138

Authors : KIRKBRIGHT (G.F) SMITH (A.M) WEST (T.S)
Title : An Indirect Sequential Determination of Phosphorus and Silicon by Atomic-Absorption Spectrophotometry.
Public : The Analyst 92 - 1096 - 1967.
Pages/ref: 411 - 413 /

Summary:

Phosphorus and Silicon are converted into phosphomolybdic acid H_3PO_4 $(MoO_3)12$ and silicomolybdic acid $H_4SiO_4(MoO_3)12$ respectively. The first compound is extracted selectively into isobutyl-acetate,the second one into butanol. The Molybdenium is measured by Atomic absorption at 313,2 nm in a nitrous-oxide / acetylene flame. Each atom of P (or Si) being combined with twelve atoms of Mo, the method is called amplification procedure: The same solution is used for both P and Si determinations.

The best conditions for the extraction of phosphomolybdic acid are:

- Acid concentration HCl 0,96 M.
- Molybdate reagent 0,0024 M.
- Isobutyl-acetate / solution ratio 10 ml / 25 ml.
- Final was being of isobutyl-acetate is done with 10 ml HCl 2M.

For silicon the conditions are:
- HCl conc. 0,15 M with Molybdate 0,0024 M.

Figures :
- Effect on net absorbance for 20 micrograms of silicon of volume of ammonia solution used to adjust acidity before silicon extraction.
- Effect on net absorbance for 16 micrograms of silicon of molarity of hydrochloric acid used to wash the butanol phase.

Chemicals: Amonium molybdate tetrahydrate-sodium silicate HF-NH_4 OH-HCl-isobutyl-acetate - butanol (i or n not specified).

Key Words: P / Si / AAS / MO /.

KIRK

CODE : 1611-18/46-50-54-58-c/80
ORDR : 0139

Auteurs : KREMPF (G) - MILLION (D) .
Titre : L'ion Phosphate dans les roches phosphatées.
Public:in: Methodes d'analyses utilisées au Departement de geologie
Université Louis PASTEUR. Strasbourg 1975
Pages/ref: 13 - 15

Résumé: La roche est attaquée par une mélange $HNO_3/HCLO_4$ qui fait passer l'ion phosphate en solution . On dose le phosphate sans reduction en mesurant l'absorbance du complexe phosphomolybdique à 460nm. Le montage utilisé en colorimetrie en continue est le suivant :(debits en ml/mm).

Air(0,6)/ diluant (1,6)/ echantillon I(0,16)/ bobine/ debullage - reprise(1,60)/ Air(1,0)/ HNO_3 1/2 ou echantillon(II)(0,23)/ bobine de melange 50gr/l Molybdate(0,23)/ 2,5% Metavanadate dans HNO_3 2% (0,23)/double bobine/ bain-marie / colorimetre 460nm /repompage(1,20)/.

Le traitement des roches est decrit en detail on utilise les entrées (I) ou (II) suivant que l'echantillon contient plus ou moins de 4% de P_2O_5 dans la roche initiale .

Precision: On peut doser jusqu'a 40% de P_2O_5 au niveau de 35,2% de P_2O_5 l'ecart sur quatre mesures ne depasse pas 0,4% .

Mots clés: P / COLOR / ROCHES /

KREM

CODE : 1613-03/46-49-54-58-c/80
ORDR : 0702

Authors : MAC CRACKEN (M.S) - MALMSTADT (H.V)
Title : Reaction-rate method for the determination of phosphorus in agricultural products.
Public : TALANTA 26 - 1979.
Pages/ref: 5 (467-4717) / 17 ref.

Summary: The method presented is based on the rate of formation of the molybdene blue complex during 5 sec.; for sample preparation, a mixture of 1,5 gm grain and feed sample, 9.42gm 95.5% Potassium sulfate, 4.5% Mercuric oxide, and 15 ml of Sulfuric acid was digested for 45 min at 410°C in a block digestor then cooled and ajusted to 250 ml.

Phosphorus was determined by colorimeter at 650nm the color was developped by phosphomolybdenum method. The rate of reaction was followed. Factors affecting the determination of phosphorus were studied and the results found were as follows: Concentration of ascorbic acid to provide maximum sensitivity: 0,03 M - Sulfuric acid concentration 0,1 M. Measuring time:5sec. after a 2 sec. delay .

Tables :- Effect of ascorbic acid concentration.
- Choice of delay and measurement time.
- Effect of acid loss during digestion.
- Effect of amount of mercuric oxide.
- Precision study for optimized conditions.
- Typical working curve.
- Comparison of stopped-flow-method with official AOAC method.

Figures :- Reaction rate curves for different H_2SO_4 concentration in the Mo reagent.
- Reaction rate curve for a P standard.
- Reaction rate curves for 20 mg/250 ml P standard and a blank.

Material : Automatic spectrophotometer - Filter 650 nm - Block digestor - Computer.

Chemicals: Dipotassium hydrogen phosphate - H_2SO_4 - Ascorbic acid - Sodium molybdate dihydrate.

Key Words: P /PLNT / COLOR / TOTAL /.

CODE : 1615-23/46-47-54-59-c/80
ORDR : 0145

Authors : OWENS (L.B) NELSON (DW) SOMMERS (L.E)
Title : Determination of inorganic phosphorus in oxalate extracts of soils .
Public : S.S.S.A.J. 41-1-1977
Page/ref : 2 (148-149)/ 8 refs

Summary: The method is meant to eliminate the interference of oxalate during the developpment of the blue color which is used in the colorimetric method for the determination of inorganic phosphorus in soils . The phosphorus was extracted from soil as follow :

1gm of air-dried soil (< rmm) was treated twice during 1h with 35ml oxalate extracting solution, then the volumes were mixed and made up to 100ml.

To one mililiter of the above extract, 1ml 61% ammonium-molybdate and 5ml of Mixed phosphorus reagent were added for developping the blue color. The absorbance was measured using a spectrophotometer at 850nm .

Standards solutions were prepared in mixing different concentration of phosphorus (as KH_2PO_4) to equal parts of oxalate extracting solution and 6% of ammonium molybdate .

For good linearity between absorbance and phosphorus concentration, the optimum ratio of Molybdate to Oxalate was taken 1,23:1(2,51:1 after mixed phosphorus reagent.)

Tables :- Effect of Oxalate and Molybdate on the developpment of the Molybdenum blue complex in the abscence of P.
- Effect of Oxalate and Molybdate on color developpment in P standard solutions .
- Recovery of P from Oxalate extracts of soils .

Material:- Spectrophotometer 850 nm

Chemical:a) Oxalate solution: 24,9gr ammonium Oxalate + 12,6gr oxalic-acid/1 (final PH=3,25) .
b) Mixed phosphorus reagent: H_2SO_4(55,5ml/1), ammonium molybdate (4,8gr/1) K-Sb-tartrate (1,097gr/1) ascrobic acid(10,56gr/1) .

Key Words: P / COLOR / LABIL /

OWEN

CODE : 1618-21/c-47-55-59-c/80

ORDR : 0146

Authors : RUDD (C.L)- FRENCH (R.J)

Title : Comparison of extraction methods for the determination of available soil phosphorus.

Public : Agricultural Record 3 - 1976

Pages/ref: 5 (36-40) / 12 ref.

Summary: The purpose of the study was to evaluate which method is the most reliable to evaluate available phosphorus in surface soils with free lime in arid environement(pH 7 to 8, $CaCO_3$ 1% to 8%). In each method the phosphorus concentration, eqaul to 50 to 300 ppm was determined using a continuous flow colorimeter and ammonium molybdophosphate complex with ascorbic acid reduction and measuring the absorbance at 810 nm. Total phosphorus was determined after acid digestion. Nine methods were tested. The method using $NaHCO_3$ had the smallest coefficient of variation while the P extracted was greater by 30% compared with extraction by (HCl + NH_4F). However the phosphorus extracted with $NaHCO_3$ was best correlated with plant response to fertilizer during one year, but not during four years in the same experimental sites.

Tables :
- Soil characteristics.
- Details of the nine soil phosphorus extraction methods.
- Mean concentration of available P extracted by nine methods from 14 soils.
- The distribution of coefficients of variation of available P extracted by nine methods.
- Crossed correlation coefficient for linear relationship between available P determined by nine methods.
- Effect of free lime on the mean concentration of available P extracted by $NaHCO_3$ and (HCl + NH_4F).

Figures :
- Distribution of coefficients of variation for the mean values of available P extracted at each site by 2 methods of analysis.

Chemicals: Ammonium molybdophosphate complex - Ascorbic acid - $NaHCO_3$ - HCl - NH_4F - H_2SO_4 - $NaOH$ - CH_3COOH - $CaCl_2$ - Amberlite IRA 400 resin .

Key Words: P / PRECS / LABIL /.

CODE : 1619-15/46-47-54-58-c/80

ORDR : 0148

Authors : XXX/SCS

Title : Soil survey laboratory methods and procedures for collecting soil samples: Determination of total phosphorous in soil.

Public : Soil survey investigation report N° 1 - USDA 1972.

Page/ref : (49-50) / 1 ref.

Summary: Spectrophotometric method for the determination of total phosphorus in soils after digestion with perchloric acid. The digestion step was made as follow:

2gm(100 mesh) of oven dryed soil were mixed with $HClO_4$ (30ml 60%) and boiled until the soil color changed into white, then the soil was boiled 20 minutes more to insure complete extraction of phosphorus. (Soils containing high percentage of organic matter should be treated with HNO_3 and HCl to destroy O.M.).

To determine phosphorus in the extract the classical molybdovanadate method was used without reduction step to develop the color, then the absorbance was read using a spectrophotometer tuned at 460 nm.

0 to 5 ppm standard solutions were prepared using KH_2PO_4 solutions.

Precision:- The extraction with perchloric acid should be complete on most common phosphate minerals.

- The presence of chloride slow down color development.

Material : Spectrophotometer 460 nm.

Chemicals: $HClO_4$ - HNO_3 - HCl - $(NH_4)_6 MO_7 O_{24}. 4H_2O$ - NH_4VO_3 - KH_2PO_4 - distilled water.

Key Words: P / COLOR / TOTAL /.

CODE : 1619-09/45-47-55-59-c/80

ORDR : 0147

Authors : SIBBESEN (E)

Title : An investigation of the anion exchange resin method for soil phosphate extraction.

Public : Plant and soil 50 - 1958

Pages/ref: 17 (305-321)/ 26 ref.

Summary:

Four variables were studied during the process of extraction of phosphate using different kinds of resin and different techniques of extraction.

Experiment 1: (Study of the type of resin: Eight different resins in chloride-form).An amount equivalent to 6,0 meq was used to extract the phosphorus from 2 gr of soil (on different types of soils, pH ranging from 3,6 to 7,3). The pH of the soil suspension and the shaking time were studied.

Experiment 2: (Chloride-bicarbonate-hydroxyl and sulfate forms of substitution).The amount of resin and soil was same as in method 1, and shaking time was 24 hs, the pH and phosphate concentration extracted by these resins were studied. Hydroxyl form was found to extract more P.

Experiment 3: In this method, the amount of soil, resin, and anionic form of the resin, were varied successively.

Experiment 4: In this experiment the resin method was compared with other methods of extraction of available phosphorus. The resin used was in chloride form and carbonate form. 4,00 gr of soil sample were used, and time shaking was 24 hs.
The exchange with bicarbonate-subtituted resin gave a better correlation with plant uptake than other forms even for calcareous soil. Resin method was compared with eight different conventional methods (L value, E value, Al solutions, Na zeolithe, $CaCl_2$, P potential H_2SO_4) (1).

Tables :- Properties of 8 resins.
- P extracted from various amount of 4 soils by resin in Cl-form and HCO_3-form.
- pH of different soil-solution after 24 extraction with resin Dowex 1x8 in 4 combination of Cl-form and HCO_3-form.

Figures :- P extracted from 4 soils by 8 resins Cl-form.
- pH of 4 soils after 24 hs shaking with 8 resins Cl-form.
- P extracted from 4 soils by resins in Cl-form HCO_3-form OH-form and SO_4-form.

Key Words: P / RESIN /.

ÇODE : 3519-15/47-54-59-c-63/80
ORDR : 0399

Authors : SOLTANPOUR (P.N)- WORKMAN (S.M) & SCHWAB (A.P)

Title : Use of inductively-coupled plasma spectrometry for the simultaneous determination of macro and micro-nutrients in NH_4HCO_3 - DPTA extracts of soils.

Public : Soil Science Society of America Journal 43 - 1979.

Pages/ref: (75-78) / 7 ref.

Summary:

ICP was used to measure P, K, Zn,Fe, Cu, Mn on twenty six soil extracts. All soils were slightly basic and their organic matter percentage varied from 0,8 to 2,2. Extracting solution was 1M amonium hydrogen carbonate and M/200 DTPA solution.Results were compared with molybdate blue colorimetry for phosphorus and atomic absorption spectrometry for cations.

Results are expressed in terms of regressions equations of ICP on AAS methods for cations. Equation $y=bx + a$ gave values close to zero for a,and b values close to 1 except for Cu (ICP = 0,26 + 0,85 AAS). The deviation being attributed to AAS and to the use of integrated time measurement (10 sec.) in ICP. The intercept to zero was significantly different for phosphorus indicating that colorimetry and ICP give different results. The assumption that ICP measures inorganic plus organic forms of phosphorus was tested on six soils and verified. The high temperature used in plasma disscociates organic phosphorus compound.

Tables :
- Texture, pH, O.M values for soils used.
- AAS parameters used for K, Zn, Fe, Cu, Mn.
- ICP parameter used for simultaneous determination of P, K, Zn, Fe, Cu, Mn.
- Mean values and mean r.s.d of elements determined by ICP and AAS.
- Phosphorus in ashed and non ashed amonium-hydrogen carbonate, DPTA extracts of soils.
- Recovery of P from sodium phytate added to soils and to extracting solutions.

Precision: R.s.d is 0,8 to 1,6% for Zn, Fe, Cu, Mn at levels varying from 2 to 9 ppm; 1,2% for P at 17 ppm level and 3% fro K at 360 ppm level.

Material : AA Spectrophotometer.ICP - optical emission spectrometer.

Key Words: TRAN / PLASMA / SOIL EXTRACTS / PHOSPHORUS /.

SOLT

CODE : 1620-01/46-47-54-58/80

ORDR : 0149

Authors : TANDON(H.L.S)- CESCAS(M.P.)- TYNER(E.H.)

Title : An acid-Free Vanadate-Molybdate reagent for the determination of total phosphorus in soils.

Public : Soil Sci. Soc. Am. Proc. 32 - 1968

Page/ref : (48-51)/ 9 refs.

Summary: Spectrophotometric method for the determination of total phosphorus in soils after digestion with $HClO_4$.

1gr 60 mesh of soil was digested with 15ml of 72% $HClO_4$ into micro Kjeldahl flasks. After 60min of digestion 15ml of distilled water were added and the soil solutions well mixed and filtered .

The acid-free vanadate-Molybdate reagent used for color developping is :(NH_4- Molybd. 10gr/1, NH_4 vanad. 0,5gr/1).

- The transmittance is measured using a spectrophotometer at 440nm.
- The blank used in the method was made by digestion $HClO_4$ in the same manner as in soil digestion:

Standards solutions were prepared with KH_2PO_4 (0,215gr/1,i.e50ppmP)

The method is said to be better than vanadate Molybdate method because no interference of Fe^{+3} appeared .

(NH_4-Molybdate 10gr/1, Ammonium vanadate 0,5gr/1)

Tables :- Comparison of two methods for the determination of total P in soils
- Effect of treatments made during the $HClO_4$ digestion for elimination of dichromate color interference in filtrates of soils containing Cr.

Figures :- Effect of acid concentration on the stability of the molybdivanado-phosphoric complex .
- Iron (Fe^{+3}) interference in the analysis for P by two spectrophotometeric methods .

Material : Kjeldahl flasks - electric microdigestion unit - spectrophotometer 440nm .

Chemicals: $HClO_4$ - $(NH_4)_6 Mo_7O_{24} \cdot 4H_2O$ - NH_4VO_3- meta - KH_2PO_4 -

Key Words: P / COLOR / TOTAL /

CODE : 0420-15/42-c-54-58-c/80

ORDR : 0040

Authors : TOMSON (M.B) - BARONE (J.P) & NANCOLLAS (G.H)

Title : Precise calcium phosphate determination.

Public : Atomic Absorption Newsletters 5-16-1977.

Pages/ref: (117-118) / 5 ref.

Summary:

Calcium and phosphate are determined in the same solution using an AA Spectrophotometer with a Ca hollow cathod lamp as a light source for AA of Ca (422,7 nm) and molecular absorption of phosphate (maximum at 420 nm). The method is said to be more precise than conventional separate calcium and phosphorus determination for assessing calcium phosphate concentrations.

Calcium chloride solution were prepared from calcium carbonate and HCl, passed through H - cation resin and concentration checked by acid titration.

Tables :- Absorbance of calcium and phosphate mixed solutions and corresponding relative standard deviation from 0,1 to 1 meq/l varies between 0,16 and 0,37%.

Precision: Careful C_2H_2 pressure regulation is recommended to avoid flame noise in Ca determination.

Material : AA Spectrophotometer - Adapted 1 cm quartz cell.

Chemicals: Lanthanum oxyde - Calcium carbonate - Amonium molybdate - Amonium vanadate - Potassium dihydrogen phosphate .

Key Words: CALCIUM / PHOSPHORUS / AAS-METHODS / RESIN /.

TOMS

CODE : 1626-21/45-47-54-59/80
ORDR : 0556

Authors : ZUNINO (H) AGUILERA (M) PEIRANO (P)
Title : A modified resin exchange method for measurement of available phosphate in soils derived from volcanic ash .
Public : Soil Science 114-5-1972
Page/ref : 2(404-405)/ 9 refs.

Summary: The method described in this paper allows the use of exchange resin for the determination of available phosphate in volcanic ash-derived soils without a separation step between the soil and the resin spheres . 1-2gr of field-moist soil are placed in a plastic bottle using a scoop.

5ml of Dowex 2 x-4, 20-50 mesh , CEC=3,4meq/gm,saturated in chloride are added to the bottle bagged in a cloth bag mode of synthetic fibre ; 50 ml of distilled water are added to the bottle and the bottle is shaked 16hs at 25°C .

After removing the bag of resin, washing and decanting the small particles of soil, the resin is eluted with 1N KCL - solution .

P was determined with photometer at 660nm using chloromolibdic acid method for color developping.

Table :- Available phosphate extracted by an anion exchange resin:Correlation coefficient with added P for four samples and three P levels.

Material :- Synthetic fibre phosphorus bag - Spectro/colorimeter .

Chemicals:- Dowex 2, x-4, 20-50 mesh, - KCL-.

Key Words: RESIN / LABIL / P /

ZUNI