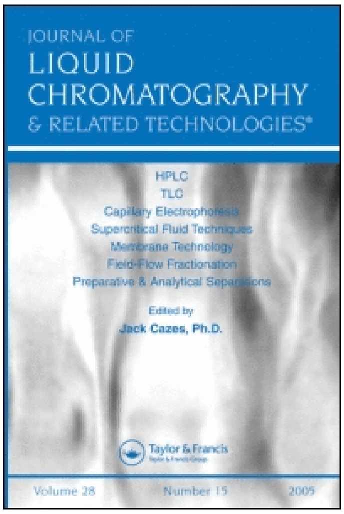

Journal of Liquid Chromatography & Related Technologies
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713597273

Thin-Layer Chromatographic Studies of 30 Organic Acids on Calcium Sulphate

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To cite this Article Gupta, S. , Rathore, H. S. , Ali, I. and Ahmed, S. R.(1984) 'Thin-Layer Chromatographic Studies of 30 Organic Acids on Calcium Sulphate', Journal of Liquid Chromatography & Related Technologies, 7: 7, 1321 — 1340

To link to this Article: DOI: 10.1080/01483918408074047

URL: http://dx.doi.org/10.1080/01483918408074047

JOURNAL OF LIQUID CHROMATOGRAPHY, 7(7), 1321-1340 (1984)

THIN LAYER CHROMATOGRAPHIC STUDIES OF 30 ORGANIC ACIDS ON CALCIUM SULPHATE

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ABSTRACT

Thin layer chromatographic behaviour of 30 organic acids on coatings of calcium sulphate and calcium sulphate containing charcoal, p-dimethylaminobenzaldehyde, flyash, silica gel G etc. has been studied. Farm chemicals: plant growth regulators (benzoic, cinnamic, gallic, β-naphthalene acetic, β-naphthoxy acetic and indole-3-acetic acids) and herbicides (phenoxy acetic acid) have been separated from one another and from several other organic acids.

INTRODUCTION

Thin layer chromatography is a versatile technique for the separation of organic acids. Several new coating materials (1,2) have been discovered and tested for separation. The older material, silica gel-coated glass plates developed in mixed solvent systems have widely been used for the separation of amino acids, benzoic acid, substituted benzoic acids and sorbic acids from fruit beverages, citric acid

0148-3919/84/0707-1321$3.50/0

cycle intermediates and lactic acid, esters of p-hydroxy benzoic acid, phosphoric acid etc. Ion-exchange thin layer chromatography has been used for the separation of tryptophan from an aminoacylase-N-acetyltryptophan reaction mixture (1). Most phenylthiohydantoin (PTH) and methylthiohydantoin (MTH) amino acid derivatives could also be separated from one another by this method. Thin layers of silica gel (3) containing silver oxide have been used for the separation of substituted benzoic, phthalic, maleic and fumaric acids. Thin layers of silica gel G F_{254} containing cellulose MN_{300} F_{254} (4) have been used for the separation of food preservatives. In our previous publications (5-8) it has been shown that papers impregnated with calcium carbonate/calcium sulphate have a great separation potential for organic acids. Therefore, now an attempt has been made to test the separation potential of calcium sulphate/calcium sulphate containing p-dimethylaminobenzaldehyde, methyl orange, starch, activated charcoal, calcium carbonate, flyash, silica gel G etc. coated glass plates. The results obtained are described in this paper.

EXPERIMENTAL

Apparatus and Materials: A Stahl apparatus with a universal applicator (adjustable thickness of the applied layers from 0-2.0 mm) (made in India), glass plates (20x4 cm), glass jars (25x5 cm) and temperature controlled electric oven were used.

Activated charcoal and acetone (E. Merck, India), ammonium vanadate (Riedel, Germany), benzene (Reechem, India), bromophenol blue and calcium sulphate dihydrate (S.M. Chemicals, India), carbontetrachloride, silica gel G and 1,4-dioxane (Glaxo Laboratories, India), p-dimethylaminobenzaldehyde (BDH, India), starch (NCL, India) of analytical grade and flyash 100-200 mesh (Thermal Power Station, Kasimpur, U.P., India) were used.

Flyash was dried at 100° in an electric oven before use. The principal ingredients (9,10) of flyash are silica, alumina and iron oxides. Lime and carbon are present in minor proportions. The actual composition of the flyash depends on the variety of coal used and degree of burning.

Aqueous or ethanolic solutions (0.1N) of the test materials were used. In case it was not possible to prepare 0.1N solutions a saturated solution was used.

Preparation of Plates: A slurry of calcium sulphate (I) obtained by mixing calcium sulphate (30 g) with distilled water (D W) (70 ml), was applied on the glass plates with the help of the applicator so that the thickness of calcium sulphate slurry would be 0.75 mm. The plates were first allowed to dry at room temperature and then in a temperature controlled electric oven at 110° for 1 hr. The plates of silica gel G (II) were also prepared by the same procedure using the slurry of silica gel G made by mixing 48 g of it with 100 ml of distilled water.

The procedure described above was also used to make plates of the following coatings.

Coating III: Calcium sulphate (30 g) + activated charcoal (0.3 g) + D W (70 ml).

Coating IV: Calcium sulphate (30 g) + activated charcoal (0.6 g) + D W (70 ml).

Coating V: Calcium sulphate (30 g) + activated charcoal (1.5 g) + D W (70 ml).

Coating VI: Calcium sulphate (30 g) + calcium carbonate (0.15 g) + D W (70 ml).

Coating VII: Calcium sulphate (30 g) + calcium carbonate (0.3 g) + D W (70 ml).

Coating VIII: Calcium sulphate (30 g) + calcium carbonate (0.6 g) + D W (70 ml).

Coating IX: Calcium sulphate (30 g) + p-dimethylaminobenzaldehyde (p-DAB) (1 ml of 10%) + D W (70 ml).

Coating X: Calcium sulphate (30 g) + flyash (0.3 g) + D W (70 ml).

Coating XI: Calcium sulphate (30 g) + flyash (0.6 g) + D W (70 ml).

Coating XII: Calcium sulphate (30 g) + flyash (1.5 g) + D W (70 ml).

Coating XIII: Calcium sulphate (15 g) + silica gel G (15 g) + D W (70 ml).

Coating XIV: Calcium sulphate (30 g) + silica gel G (0.3 g) + D W (70 ml).

Coating XV: Calcium sulphate (30 g) + silica gel G (1.5 g) + D W (70 ml).

Coating XVI: Calcium sulphate (30 g) + silica gel G (3.0 g) + D W (70 ml).

Coating XVII: Calcium sulphate (30 g) + silica gel G (4.5 g) + D W (70 ml).

Coating XVIII: Calcium sulphate (30 g) + starch (0.6 g) + D W (70 ml).

Coating XIX: Calcium sulphate (30 g) + starch (1.5 g) + D W (70 ml).

Coating XX: Calcium sulphate (30 g) + starch (3.0 g) + D W (70 ml).

Coating XXI: Silica gel G (12 g) + activated charcoal (0.5 g) + D W (25 ml).

Coating XXII: Silica gel G (12 g) + ammonium vanadate (0.5 g) + D W (25 ml).

Coating XXIII: Silica gel G (12 g) + bromophenol blue (0.5 g) + D W (25 ml).

Coating XXIV: Silica gel G (12 g) + calcium nitrate (3.0 g) + D W (25 ml).

Coating XXV: Silica gel G (12 g) + copper sulphate (1 ml of 0.1M) + D W (25 ml).

Coating XXVI: Silica gel G (12 g) + cresol red (0.5 g) + D W (25 ml).

Coating XXVII: Silica gel G (12 g) + p-DAB (1 ml of 10%) + D W (25 ml).

Coating XXVIII: Silica gel G (12 g) + flyash (0.5 g) + D W (25 ml).

Coating XXIX: Silica gel G (12 g) + resorcinol (1 ml of 10%) + D W (25 ml).

Coating XXX: Silica gel G (12 g) + thymol blue (0.5 g) + D W (25 ml).

In all cases slurry was made as mentioned above except p-DAB and resorcinol. In these cases first the slurry was made and then ethanolic solution of p-DAB or resorcinol was added to it. After a thorough mixing the slurry so obtained was coated on the plates.

Spotting of Test Solution: Test solution was spotted on the plate with the help of a fine capillary. The plates were kept at room temperature (30°) for 15 min for the removal of solvent and then developed in a solvent system. For tailing, the front limit (RI) and the rear limit (RT) were measured while for other acids R_f values were taken as usual.

$$R_f = \frac{\text{Distance travelled by substance (cm)}}{\text{Distance travelled by solvent front (10 cm)}}$$

Test Solutions and their Detection: The acids on the plates were detected by the reported procedure summarized below:

(1) Alanine, (2) arginine HCl and (3) l-aspartic acids were detected by 1% aqueous ninhydrin solution; (4) acetic, (5) adipic, (6) ascorbic, (7) barbituric, (8) benzoic, (9) cinnamic, (10) citraconic, (11) citric, (12) formic, (13) fumaric, (14) gallic, (15) hippuric, (16) indole-3-acetic, (17) malic, (18) maleic, (19) β-naphthaleneacetic, (20) β-naphthoxyacetic, (21) nicotinic, (22) oxalic, (23) oxaloacetic, (24) phenoxyacetic, (25) quinic, (26) salicylic, (27) sulphamic, (28) tartaric, (29) trans-aconitic

and (30) trichloroacetic acids were detected by 1% ethanolic alkaline bromophenol blue solution.

RESULTS

Various separations of the acids under study on different coatings are possible, some of them are summarized below. R_f values are given in parentheses that follow the number of the acid, marked in the experimental section.

Coating I: 9(0), 19(0) and 20(0) from 1(1.0), 2(1.0), 4(1.0), 5(0.8), 6(1.0), 7(1.0), 8(1.0), 10(1.0), 11 (1.0), 12(1.0), 13(0.85), 14(1.0), 15(0.85), 17(1.0), 18(1.0), 21(1.0), 22(1.0), 23(1.0), 24(1.0), 25(1.0), 27(1.0), 28(1.0), 29(1.0) and 30(1.0).

Coating II: 2(0.6) from 3(0.15), 4(0-1), 5(0-2.5), 6(0-2), 7(0-1.5), 8(0-2), 9(0-1), 10(0-2), 11(0-3.5), 12(0-1), 13(0-3.3), 15(0-0.7), 16(0-2), 17(0-1), 18(0-1), 19(0-0.5), 20(0), 21(0-1.5), 22(0-4.5), 23(0-2.5), 24(0-4), 25(0-0.5), 26(0-1), 27(0-1), 28(0-1), 29(0-1) and 30(0-1).

Coating III: 2(1.0), 3(1.0), 6(1.0), 27(1.0), 28(0.9) and 30(0.9) from 7(0-6), 8(0-6), 16(0-5), 19(0) and 20(0-2.5).

Coating IV: 22(1.0), 27(1.0) and 30(0.8) from 7(0-3), 8(0-3), 9(0-2), 10(0-3), 15(0-2), 16(0-5), 19(0-1), 20(0-1), 23(0-3) and 26(0-3.5).

Coating V: 3(0-7), 22(1.0) and 27(1.0) from 7(0-2), 8(0-3), 9(0), 10(0-2.5), 11(0-3.5), 13(0-3), 14(0-2.5), 15(0-1), 16(0), 18(0-3), 19(0), 20(0), 21(0-3), 23(0-1), 24(0-3), 26(0-2) and 29(0-2.5).

<u>Coating VI</u>: 1(1.0) and 2(1.0) from 3(0), 4(0), 7(0-2), 9(0-2), 10(0-2), 12(0), 15(0-3), 16(0-4), 18(0-2), 19(0), 20(0-2),21(0-4), 22(0-4), 23(0), 24(0-3), 25(0-5), 26(0-5), 29(0-4) and 30(0-2).

<u>Coating IX</u>: 9(0), 19(0) and 20(0) from 1(1.0), 2(0.9), 3(1.0), 4(1.0), 5(1.0), 6(1.0), 7(1.0), 8(1.0), 10(1.0), 11(1.0), 12(1.0), 13(0.8), 14(1.0), 15(1.0), 17(1.0), 18(1.0), 21(1.0), 22(1.0), 23(1.0), 24(0.65), 25(1.0), 27(1.0), 28(1.0), 29(1.0), and 30(1.0).

<u>Coating X</u>: 16(0-5) and 24(0.7) from 6(1.0), 10(1.0), 11(1.0), 14(1.0), 15(1.0), 17(1.0), 18(1.0), 22(1.0), 25(1.0), 27(1.0), 28(1.0), 29(1.0) and 30(1.0).

<u>Coating XIII</u>: 1(0.85), 2(0.4) and 3(0.7) from 4(0), 5(0-2), 6(0-1), 7(0), 8(0-0.5), 9(0), 10(0), 11(0), 12(0), 13(0), 15(0), 16(0), 17(0), 18(0), 19(0), 20(0), 21(0), 22(0), 23(0), 24(0), 25(0), 27(0), 28(0), 29(0) and 30(0).

<u>Coating XIV</u>: 9(0) and 19(0) from 1(1.0), 2(1.0), 3(1.0), 5(0.9), 6(1.0), 7(1.0), 8(0.8), 10(1.0), 11(1.0), 13(0.9), 15(0.8), 17(0.8), 18(5-10), 21(6-10), 22(1.0), 23(1.0), 25(1.0), 27(1.0), 28(1.0), 29(1.0) and 30(1.0).

<u>Coating XVIII</u>: 19(0) from 6(1.0), 11(1.0) and 21(1.0).

<u>Coating XXI</u>: 1(0.85) from 4(0-1), 5(0-1), 6(0-1.5), 7(0-1), 8(0-1), 9(0-0.5), 10(0-1), 11(0-1.5), 12(0-1),

13(0-3), 15(0-1), 16(0-2), 17(0-1), 18(0-1), 19(0), 20(0-0.5), 21(0), 22(0), 23(0), 24(0-0.5), 26(0-1), 27(0-1), 28(0-1), 29(0-1) and 30(0-1).

Coating XXIII: 1(0.9) and 2(0.5) from 4(0-1.5), 6(0-1.5), 19(0), 21(0-2), 22(0-1), 25(0-1) and 26(0-2).

Coating XXIV: 1(0.7) and 2(0.6) from 4(0-1), 6(0-1), 19(0), 21(0-2), 22(0-1), 25(0-1) and 26(0-2).

Coating XXV: 1(0.8) and 2(0.45) from 4(0-1), 5(0-1.5), 6(0-1.5), 7(0), 8(0-1), 9(0-1.5), 10(0-1), 11(0-1.5), 12(0-0.5), 13(0-2), 15(0), 16(0-1.5), 17(0-1), 18(0-1.5), 19(0), 20(0), 21(0-1), 22(0-2), 23(0-1.5), 24(0-2), 25(0-1.5), 26(0-2.5), 27(0-2), 28(0-2), 29(0-2.5) and 30(0-2).

Coating XXVI: 1(0.8), 2(0.4) from 4(0-1), 6(0-1), 19(0), 21(0-1), 22(0-1) and 25(0-0.5).

Coating XXVII: 1(0.85), 2(0.4) and 3(1.0) from 4(0-1), 5(0-1.5), 6(0-2), 7(0), 8(0-1), 9(0-0.8), 10(0-0.8), 11(0-1.5), 12(0-0.7), 13(0-2), 15(0), 16(0-1.5), 17(0-1), 18(0-1), 19(0-0.4), 20(0-0.5), 21(0-1), 22(0-1), 23(0-1), 24(0-1), 25(0-0.8), 26(0-1.7), 27(0-1.8), 28(0-1.8), 29(0-1) and 30(0-1.3).

Coating XXVIII: 1(1.0) and 2(0.8) from 4(0), 5(0), 6(0), 7(0), 8(0), 9(0), 10(0), 11(0), 12(0), 13(0), 15(0), 16(0), 17(0), 18(0), 19(0), 20(0), 21(0), 22(0), 23(0), 24(0), 25(0), 26(0), 28(0), 29(0) and 30(0).

Coating XXIX: 1(1.0) and 2(0.65) from 4(0-1), 5(0-1), 6(0), 7(0), 8(0-1), 9(0-1), 10(0-1), 11(0-1), 12(0-1), 13(0-2.5), 15(0), 16(0-1), 17(0-1), 18(0-1), 19(0-1), 20(0), 21(0-1), 22(0-2), 23(0-1.5), 24(0-1), 25(0-1), 26(0-1), 27(0-2), 28(0-2), 29(0-1) and 30(0-1).

Coating XXX: 1(0.9) and 2(0.55) from 4(0-1), 6(0-1), 14(0-1.5) and 21(0-1.5).

Separations achieved are recorded in tables 1, 2, 3 and 4.

DISCUSSION

Organic acids are naturally occurring materials that exist in different parts of the plants and animals. Some of the organic acids (11) are used as herbicides and plant growth regulators and they drain into water generally during monsoon period. Some acids (11) are toxic/mutagenic/carcinogenic to human beings, animals as well as aquatic organisms. Therefore, there is a growing interest in the development of new and inexpensive methods of the analysis of organic acids.

It seems that silica gel G has a very high adsorption capacity for acids. Therefore, most of the acids either have very low R_f values or they tail. Charcoal and flyash show the same behaviour. Flyash is an inexpensive and easily available material. Papers (9,10) describing its utility for the purification of water have been published. Calcium sulphate is a good coating material for the separation

TABLE 1: Separations Achieved on Plates Coated with Calcium Sulphate in Distilled Water.

Sl. No.	Acid	Separated from
1.	Cinnamic(0)	Adipic(0.9), alanine(1.0), ascorbic(1.0), barbituric(6-10), citraconic(1.0), citric(1.0), fumaric(0.85), hippuric(1.0), malic(1.0), maleic(1.0), nicotinic(1.0), oxalic(1.0), oxaloacetic(1.0), sulphamic(1.0), tartaric(1.0), and trans-aconitic(1.0) acids.
2.	β-Naphthaleneacetic(0)	Adipic(1.0), alanine(1.0), ascorbic(1.0), barbituric(1.0), citraconic(1.0), citric(1.0), formic(1.0), fumaric(0.85), gallic(1.0), hippuric(1.0), malic(1.0), maleic(1.0), nicotinic(1.0), oxalic(1.0), oxaloacetic(1.0), quinic(1.0), sulphamic(1.0), tartaric(1.0), trans-aconitic(1.0), and trichloroacetic(1.0) acids.
3.	β-Naphthoxyacetic(0)	Adipic(1.0), alanine(1.0), arginine HCl(0.9), ascorbic(1.0), barbituric(0.9), citraconic(1.0), citric(1.0), gallic(0.8), hippuric(0.8), maleic(1.0), nicotinic (0.8), oxalic(1.0), oxaloacetic (1.0), quinic(0.9), sulphamic (1.0), tartaric(1.0), trans-aconitic(1.0) and trichloroacetic (1.0) acids.

TABLE 2: Separations Achieved on Plates Coated with Calcium Sulphate in Organic Solvents.

Sl. No.	Acid	Separated from	Solvent system
1.	Benzoic(1.0)	Alanine(0), arginine HCl(0), ascorbic(0), l-aspartic(0), barbituric(0), citraconic(0), citric(0), formic(0), fumaric(0), gallic(0), hippuric(0), indole-3-acetic(0-5), malic(0), maleic(0), nicotinic(0), oxalic(0), oxaloacetic(0), quinic(0), sulphamic(0), tartaric(0), and trans-aconitic(0) acids.	Benzene
2.	Cinnamic(1.0)	Acetic(0), adipic(0), ascorbic(0), barbituric(0), citraconic(0-3), citric(0), formic(0), fumaric(0), gallic(0), hippuric(0), malic(0), maleic(0), nicotinic(0), oxalic(0), oxaloacetic(0), quinic(0), sulphamic(0), tartaric(0), and trans-aconitic(0) acids.	Benzene

continued

TABLE 2: continued

Sl. No.	Acid	Separated from	Solvent system
3.	β-Naphthalene-acetic(1.0)	Acetic(0), adipic(0), alanine(0), arginine HCl(0), ascorbic(0), l-aspartic(0), barbituric(0), citraconic(0), citric(0), formic(0), fumaric(0), gallic(0), hippuric(0), indole-3-acetic(0), malic(0), maleic(0), nicotinic(0), oxalic(0), oxaloacetic(0), quinic(0), tartaric(0), and trans-aconitic(0) acids.	Benzene
4.	Acetic(0)	Adipic(1.0), ascorbic (1.0), barbituric(1.0), benzoic(1.0), cinnamic (1.0), citraconic(1.0), indole-3-acetic(1.0), malic(1.0), β-naphthoxy-acetic(1.0), and salicylic (1.0) acids.	1,4-Dioxane
5.	Formic(0)	Adipic(1.0), ascorbic (1.0), barbituric(1.0), benzoic(1.0), cinnamic (1.0), citraconic(1.0), indole-3-acetic(1.0), malic(1.0), β-naphthoxy-acetic(1.0), and salicylic(1.0) acids.	1,4-Dioxane

TABLE 3: Separations Achieved on Plates Coated with Calcium Sulphate Containing Other Materials in Distilled Water

Sl. No.	Acid	Separated from	Material coated
1.	Cinnamic(0)	Adipic(0.8), ascorbic (0.8), barbituric(1.0), benzoic(0.65), citraconic(0.9), citric(1.0), formic(1.0), fumaric (0.8), gallic(0.9), hippuric(0.8), malic (0.9), maleic(0.9), nicotinic(1.0), oxalic (1.0), oxaloacetic(0.9), phenoxyacetic(0.65), quinic(0.9), sulphamic (1.0), tartaric(0.9), trans-aconitic(1.0) and trichloroacetic(0.9) acids.	Calcium sulphate (30 g) + p-DAB (1 ml of 10%)
2.	β-Naphthalene-acetic(0)	Acetic(0.9), adipic (0.75), ascorbic(1.0), barbituric(0.9), benzoic(1.0), citraconic (1.0), citric(1.0), formic(1.0), fumaric (0.8), gallic(0.9), hippuric(1.0), malic (0.9), maleic(1.0),	Calcium sulphate (30 g) + p-DAB (1 ml of 10%)

continued

TABLE 3: continued

Sl. No.	Acid	Separated from	Material coated
	β-Naphthalene-acetic(0)	nicotinic(1.0), oxalic (1.0), oxaloacetic(1.0), phenoxyacetic(0.9), quinic(1.0), sulphamic (1.0), tartaric(1.0), trans-aconitic(1.0) and trichloroacetic(1.0) acids.	
3.	β-Naphthoxy-acetic(0)	Adipic(0.9), ascorbic (0.9), barbituric(0.8), benzoic(0.8), citraconic(0.9), citric(0.7), fumaric(0.8), hippuric (0.8), malic(0.7), maleic(0.9), oxalic (0.9), oxaloacetic(0.7), phenoxyacetic(0.7), quinic(0.9), sulphamic (0.9), tartaric(0.7) and trans-aconitic(0.7) acids.	Calcium sulphate (30 g) + p-DAB (1 ml of 10%)
4.	Indole-3-acetic(0)	Ascorbic(0.7), malic (1.0), maleic(1.0), sulphamic(1.0), oxalic (1.0) and quinic(0.9) acids.	Calcium sulphate + 1% flyash

continued

TABLE 3: continued

Sl. No.	Acid	Separated from	Material coated
5.	Oxalic(1.0)	Indole-3-acetic(0-2.5) and phenoxyacetic (0-2.5) acids.	Calcium sulphate + 5% charcoal
6.	Alanine(0.9)	Arginine HCl (0.6) and l-aspartic(0.7) acids.	Calcium sulphate + silica gel G (1:1)

of organic acids because most of the acids move in the form of single spot, three acids remain at the point of application and only two acids, aspartic and salicylic, tail (coating I). The separation potential of calcium sulphate can be further enhanced by mixing it with other materials such as activated charcoal, calcium carbonate, flyash and p-DAB (coatings III-XX). Some important separations achieved are discussed below.

Results recorded in tables 1, 2, 3 and 4 indicate that plant growth regulators (naturally occurring inhibitors) benzoic and cinnamic acids are separated from alanine, barbituric, citric, fumaric, gallic, hippuric, indole-3-acetic and trans-aconitic acids

TABLE 4: Separations Achieved on Plates Coated with Silica gel G (12 g) Containing p-DAB (1 ml of 10%) in Distilled Water

Sl. No.	Acid	Separated from
1.	Alanine(0.85)	Acetic(0), adipic(0), ascorbic(0), l-aspartic(1.0), benzoic(0), cinnamic(0), citraconic(0), citric(0), formic(0), fumaric(0), hippuric(0), indole-3-acetic(0), malic(0), maleic(0), β-naphthaleneacetic(0), β-naphthoxyacetic (0), nicotinic(0), oxalic(0), oxaloacetic(0), phenoxyacetic(0), quinic(0), salicylic(0), sulphamic(0), tartaric(0), and trans-aconitic(0) acids.
2.	Arginine HCl (0.6)	Acetic(0), adipic(0), ascorbic(0), l-aspartic(1.0), benzoic(0), cinnamic(0), citraconic(0), citric(0), hippuric(0), indole-3-acetic(0), malic(0), maleic(0), β-naphthaleneacetic(0), β-naphthoxyacetic(0), nicotinic(0), oxalic(0), oxaloacetic(0), phenoxyacetic(0), quinic(0), salicylic(0), sulphamic(0), tartaric(0), trans-aconitic(0) and trichloroacetic(0) acids.

continued

TABLE 4: continued

Sl. No.	Acid	Separated from
3.	l-Aspartic (1.0)	Benzoic(0), cinnamic(0), citraconic(0), citric(0), formic(0), hippuric(0), indole-3-acetic(0), malic(0), maleic(0), β-naphthaleneacetic(0), β-naphthoxyacetic (0), nicotinic(0), oxalic(0), oxaloacetic(0), phenoxyacetic(0), quinic(0), salicylic(0), sulphamic(0), tartaric(0), trans-aconitic(0) and trichloroacetic(0) acids.

etc. on calcium sulphate coating in benzene; plant growth regulators (auxins) β-naphthaleneacetic and β-naphthoxyacetic acids are separated from alanine, benzoic, ascorbic, citric, fumaric, gallic, hippuric, sulphamic acids etc. on calcium sulphate containing p-DAB coating in distilled water and indole-3-acetic acid is separated from ascorbic, maleic, sulphamic, oxalic acids on calcium sulphate containing flyash coating in distilled water; herbicide, phenoxyacetic acid is separated from cinnamic, β-naphthaleneacetic, β-naphthoxyacetic acids on calcium sulphate containing p-DAB coating in distilled water; aminoacids, arginine HCl, alanine and aspartic acid are separated from benzoic, cinnamic, citric, fumaric, indole-3-acetic, β-naphthaleneacetic, β-naphthoxyacetic, phenoxyacetic, salicylic, oxalic acids etc. on silica gel G containing p-DAB coating in distilled water.

These results suggest the possible use of the above coatings in separation and identification of several organic acids.

ACKNOWLEDGEMENT

The authors are thankful to Professor Mohsin Qureshi, Chairman, Chemistry Section, Z. H. College of Engg. & Tech., Aligarh Muslim University, Aligarh for providing research facilities.

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