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TLC SEPARATION OF SOME CARBAMATES ON METAL SALT
IMPREGNATED LAYERS

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ABSTRACT

A suitable TLC separation scheme for the carbamates - Carbaryl, Bendiocarb, Carbofuran, Baygon, Ziram, Zineb, Aldicarb, MIPC, BPMC, on silica gel plates impregnated with 1 % zinc acetate and using the developer system of benzene-ethyl acetate (50:10) has been worked out.

INTRODUCTION

Kirchner (1) has reviewed the work on TLC separation of carbamates upto 1971, a reference to which shows that impregnation technique has not been used to affect the separation of this class of compounds. Van Hoof and Heyndrickx (2) in 1974 reported the TLC separation of carbamates after their Hydrolysis and Coupling with NBD-Cl. Guley and Karakaya (3) separated seven carbamates on plain silica gel and alumina plates while Davis

(4) in 1979 separated some carbamates on high performance TLC plates. Recently Schmid (5), and Tewari and Ranjeet Singh (6) reported the separation of this class of compounds on plain silica gel plates.

This paper presents an improved TLC separation and identification scheme for nine closely related carbamates on impregnated plates.

EXPERIMENTAL

The TLC plates (thickness 0.5mm) were prepared by spreading a slurry of a mixture of silica gel G (50g) and varying amounts of metal salt solution. The plates were activated at 60°C for 24h. All the reagent used were of Analytical grade.

The carbamates were supplied by (Rallis India Ltd., Bayer India Ltd., Union Carbide Bhopal etc.) and were used after crystallisation. All carbamates, except zineb and ziram, were prepared in Acetone, while zineb and ziram were prepared in pyridine.

The solution of carbamates was applied to the layer by means of micropipettes manufactured by Clay Admas (U. S. A.). After development the plates were sprayed with suitable reagents. In case of

Carbaryl, Bendiocarb, Carbafulan and Baygon the spots were located by a saturated solution of ceric sulphate in 60 % H_2SO_4 and rest by iodine vapours.

The various impregnants tried were: zinc acetate, zinc sulphate, cadmium acetate, manganese acetate. The most suitable solvent system was found to be Benzene-ethylacetate (50:10). No change in hR_f value was observed when mixture of carbamates was applied.

RESULTS AND DISCUSSION

The hR_f values obtained for carbamates on different plates are given under (Table 1). From this data it is apparent that the best separation is obtained on 1 % zinc acetate-impregnated plate. On this plate the spots are not only well separated but also the size of the spots is minimal.

Further, a comparison of the hR_f values on plain silica gel plate with those on zinc acetate-impregnated plate shows that the hR_f value is slightly decreased on impregnated plate and the tailing is considerably reduced. This suggests that there is rather weak interaction between the

TABLE I

Carbamate	On plain silica	hR _f a				Detection limit (ng)
		zinc acetate	Zinc sulphate	Cadmium acetate	Manganese acetate	
Carbaryl	55	48	51	53	38	224
Bendlocarb	57	53	53	56	43	448
Carbafuran	45	43	37	55	40	224
Baygon	47	40	41	51	38	448
Ziram	88ST	82	83ST	87	87ST	14
Zineb	22T	10	11ST	10	12	112
Aldicarb	23	22	22	-	20	7
MIPC	62	57	58	56	56	28
BPMC	68	62	61	60	61	56

a - hR_f values are average of two or more identical runs, 10 cm in 25 minutes

ST - Slight tailing

T - Tailing.

carbamate and the impregnant. The exact nature of this interaction is being investigated.

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