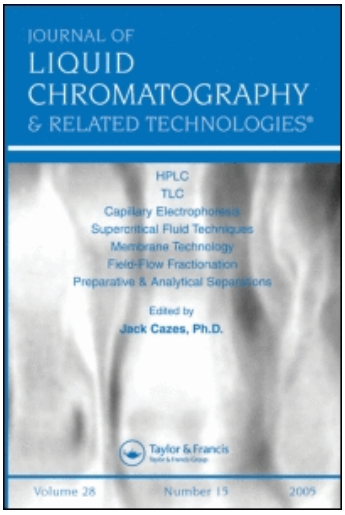

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Mahendra P. Sharma[a]; R. K. Swami[a]
[a] Alternate Hydro Energy Centre University of Roorkee, Roorkee, India

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RAPID TLC SEPARATION OF SOME CLOSELY RELATED 1-(2-BENZOTHIAZOLYL)-3-METHYL-5-PHENYL PYRAZOLE DERIVATIVES

Mahendra P. Sharma* and R. K. Swami
Alternate Hydro Energy Centre
University of Roorkee
Roorkee 247667, India

ABSTRACT

Some closely related 1-(2-Benzothiazolyl)-3-methyl-5-phenyl pyrazole derivatives have been separated by TLC on silica gel-G. Most suitable solvent systems tried are (A) Pet. ether (40^{o}-60^{o})-Benzene (1:3) and (B) cyclohexane: ethylacetate (50:3).

INTRODUCTION

The pyrazole heterocycles have attracted much attention during the last three decade or so, due to their varied pharmaceutical importance as anti-inflammatory agents[1,2] alongwith bacteriostatic, antifungal, antidiabetics, antineoplastic[3] and anti-cancer agents[4].

The introduction of substituted benzothiazolyl moiety results in the formation of compounds which may be expected to show high anti-inflammatory and antidiabetic activities. In the light

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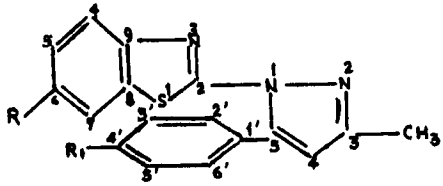
of these important uses plans were made to synthesize various pyrazole derivates in these laboratories. Keeping in view the pharmaceutical importance of these compounds, it was further considered worthwhile to carry out separation of these compounds by TLC, as little or no information was available on separation and identification of such compounds by TLC. The TLC data obtained from the study may thus be helpful in improving their separation and in their identification during the evaluation of drug. The general structure of substituted benzothiozolyl pyrazole derivatives is:



where R and R_1 are different substituents

EXPERIMENTAL

The glass plates 20 x 20 cm., were coated with silica gel-G (BDH grade) with the help of a Stahl applicator (thickness 0.2 mm). These plates were dried and activated at 110°c for 4 hrs. and stored in a desiccator. All the pyrazole derivatives were synthesised in the laboratory and recrystallised before use.

A 1% solution of each compound was prepared in benzene and 1 µl of solution (corresponding to 10µg of each compound) was spotted 2.0 cm. from the edge of TLC plate with a micropipette. The chromatograms were developed with solvent system (A) Pet.ether(40°-60°): Benzene (1:3) and (B) cyclohexane: Ethylacetate (50:3) separately until this solvent front had travelled 16 cm. However, in addition to the (A) and (B), other solvent systems have also been tried such as Pet. ether: Ethylacetate (40:0.5). n-Hexane: Benzene: Chloroform (1:4:1) and n-Hexane: Benzene: Chloroform (5:5:1), but system (A) and (B) were found more suitable for rapid separation of these compounds, as no tailing was observed for any of the compounds of the series. About 60 minutes were usually required for the development of the plate.

TABLE - 1

TLC data for the separation of 1-(6-substituted-2-benzothiazolyl)-3-methyl-5-phenyl pyrazole derivatives

S. No.	R	R_1	M.P. °C	R_f x 100 A	R_f x 100 B	Detection limit (g)
1.	-Cl	-H	132	69	65	3.0
2.	$-OCH_3$	-H	128	26	24	3.0
3.	$-CH_3$	-H	144	49	47	3.5
4.	-H	-H	118	44	46	3.5
5.	-Cl	$-OCH_3$	143	43	34	3.0
6.	$-OCH_3$	$-OCH_3$	140	16	12	2.0
7.	$-CH_3$	$-OCH_3$	146	21	22	3.5
8.	-H	$-OCH_3$	214	11	32	1.0
9.	-Cl	-Br	154	18	20	2.0
10.	$-OCH_3$	-Br	164	23	13*	2.0
11.	$-CH_3$	-Br	150	46*	21	1.5
12.	-H	-Br	130	30	47	3.5
13.	-Cl	-Cl	196	67	49	3.5
14.	$-OCH_3$	-Cl	182	35	26	3.5
15.	$-CH_3$	-Cl	172	55	52	3.0
16.	-H	-Cl	180	58	23	2.5

Solvent system

(A) Pet.ether (40^o-60^o): Benzene (1:3).

(B) Cyclohexane: Ethylacetate (50:3).

* Veryslight tailing.

The chromatogram was visualised by spraying the plate with acidic ceric sulphate solution and subsequent heating at 100°c for 10 minutes. The colour of the resultant spots was yellow to brown. It is also found that Rf values possess good reproducibility in different identical runs in solvent system (A) and (B).

RESULT AND DISCUSSION

The TLC data on the separation of pyrazole derivatives are given in Table 1. Each R_f value represents the mean of five identical runs. Each series of five determinations showed only very minute variations, enough to be neglected, and are within experimental error. The limits varies from 1 μg to 3.5 μg. Only silica gel-G was employed for separation as adsorbent. The heating of the plate hardly affected the chromatogram but best separation was achieved when the plate was heated at 100°c for 20 minutes.

Several other solvent systems referred elsewhere in this communication have been tried but the chromatogram obtained had the disadvantage of incomplete separation of some of these compounds which will be a serious handicap in analytical studies. Sharp free tailing were observed only with n-Hexane: Benzene: Chloroform (5:5:1). However, increasing proportions of chloroform gave higher R_f values. Solvent systems (A) and (B) have been found to be most suitable, as all of the compounds separated well enough from each other to achieve quantitation of these materials by TLC. Therefore, it may be concluded that R_f values obtained with solvent systems (A) and (B) are adequate for the separation and identification of the compounds of interest. TLC separation is a rapid and versatile tool in the hands of analytical chemists.

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REFERENCES

1. Kota, K; Hori, M.; Ohtani, O; Ohmo, S.; Izumi, K.; Kitami Kado, T.; Asai, H. and Sugiura, S. "Synthesis and anti-inflammatory and hypnotic activity of 5-Alkoxy-3-(N-Substituted carbamoyl)-1-phenyl pyrazoles". J. Med. Chem. 20, 80 (1977).

2. Singh, S.P.; Prakash, O.; Tomar, R.K. and Sawhney, S.N. "Synthesis and anti-inflammatory activity of some 2-(3'-Aryl-5'-amino-1'-pyrazolyl)-benzothiazoles and benzimidazoles". Ind. J. Chem. 16B, 733 (1978).

3. Garg, H.G. and Singh, P.P. "Potential antidiabetics III-4-Arylhydrazono-1-carbamoyl-3-methyl-2-pyrazolin-5-ones and 4-Arylazo-1-(2, 4-Dinitrophenyl)-3-methyl-5-phenyl-pyrazoles". J. Med. Chem. 11, 1104 (1968).

4. Kost, A.N. and Grandberg, I.I. "Progress in Pyrazole chemistry-Advances in Heterocylic Chemistry". Academic Press, New York, Vol.6 (1966).