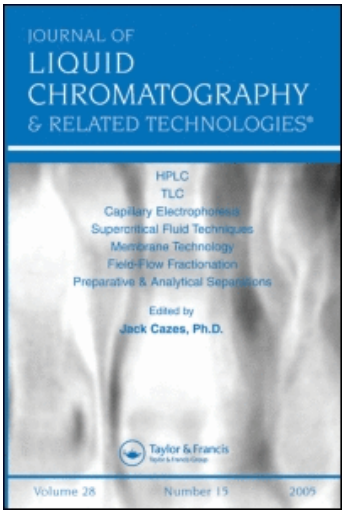

Journal of Liquid Chromatography & Related Technologies
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713597273

TLC Separation and Identification of Essential Oil Constituents on Silica Gel Plates

R. Bhushan[a]
[a] Chemistry Department, University of Roorkee, Roorkee, India

To cite this Article Bhushan, R.(1982) 'TLC Separation and Identification of Essential Oil Constituents on Silica Gel Plates', Journal of Liquid Chromatography & Related Technologies, 5: 6, 1097 — 1102
To link to this Article: DOI: 10.1080/01483918208067571
URL: http://dx.doi.org/10.1080/01483918208067571

JOURNAL OF LIQUID CHROMATOGRAPHY, 5(6), 1097-1102 (1982)

TLC SEPARATION AND IDENTIFICATION OF ESSENTIAL OIL CONSTITUENTS ON SILICA GEL PLATES

R. Bhushan
Chemistry Department
University of Roorkee
Roorkee 247672 India

ABSTRACT

A chromatographic method for the separation and identification of the volatile flavouring constituents of different essential oils is reported. The essential oil was isolated from three plants by means of steam distillation and solvent extraction methods. The chromatostrips were prepared with silica gel, developed in petroleum ether and sprayed with suitable reagents when various zones were indicated and identified.

INTRODUCTION

Thin layer chromatography has been used extensively for arnica oils(1), terpenes of seaweed(2), Patchouli oil(3) and many others. The use of silicic acid CHROMATOSTRIPS for the separation of essential oil components has been described by Kirchner, Miller and Keller(4,5). Reitsema(6) modified the procedure for peppermint oil.

TABLE- 1

Results of Micro Reactions of Essential Oil on TLC

Oil Source	Compound	UV	Fluorescein bromine	2,4-DNP	Conc. H_2SO_4	CrO_3 Oxid.	hR_f obsvd	hR_f lit(6)
Pinus								
	Camphene	-	+	-	+Brown		84	85
	-pinene	-	+	-	+Brown		83	83
	B-pinene	-	+	-	+Purple		80	80
	Limonene	-	+	+	+Brown		41	40
	-terpeniol	-	+	-	+Green		29	30
	Borneol	-	+	-	+Purple		20	20

Eucalyptus							
	Phellandrene	-	+	-	+Brown	60	60
	Piperitone	+	+	+Orange	+Brown	55	55
	1,8-Cineole	-	-	-	+Green	49	50
	Terpeneol	-	+	-	+Purple	29	30
Citrus							
	-terpinene	-	+	-	+Green	63	63
	Limonene	-	+	-	+Brown	41	41
	Citral	+	+	-	+Green	43	45
	Linalool	-	+	-	-	36	36
	Carveol				Carvone		
	Geraniol				Citral		

It is possible to carry out microreactions in order to obtain valuable clues as to the identify of a compound, on the TLC plate.

The advantages of the micro reactions on TLC may be looked into as (i) positive identification of the compound (ii) considerable time saving and requirement of a small amount of compound and, (iii) formation of a derivative, if required, may be readily checked without resorting to extensive purification, recrystallization etc.

The present communication deals with the study of essential oils of (i) Pinus longifolia Roxb., (ii) Eucalyptus citriodora Hook, and (iii) Citrus reticulata Blanco.

EXPERIMENTAL

The essential oil from above three plants was obtained. The oils were subjected to TLC on 20x10 cm^2 silica gel (BDH) plates of 0.25 mm thickness, using petroleum ether as developing solvent. Different locating agents were used on separate Chromatograms and the results are recorded in Table 1.

(i) P. longifolia: The Pinus oleoresin was collected (60 g.) by chipping the tree at about 3-4 feet height and making an incision 3-4 inches deep. The steam distillation of oleoresin gave an oil (10 ml). Refractive index of the oil at 26°C was found to be 1.389, lit(7), 1.4691.

It was interesting to note that the Pinus wood rosin (residue after isolation of oil) gave positive tets for protein and not the carbohydrates. The protein hydrolysed by 6N HCl in a sealed glass tube at 140° for 18 hrs and subsequent paper chromatography in BuOH-AcOH-H_2O (4:1:5) followed by spraying with ninhydrin (0.2 percent in acetone) showed the presence of five amino acids viz. His, Ala, Met, Ile and Try.

(ii) E. citriodora: Finely divided leaves (250 g) were extracted with petroleum ether (40°-60°) at room temperature for 3 hours and the petroleum ether was removed under reduced pressure at 45° to give the oil (12 ml). The oil was found to contain phellandrine and the cineole content by phosphoric acid method (8) was found to be 60 percent. Refractive index of the oil at 26° was 1.4710, lit(8), 1.4600 at 20°.

(iii) C. reticulata: The fresh C.reticulata peels (500 g) were cut into small pieces, grounded and subjected to steam distillation. The oil was dried with anhydrous sodium sulphate (15 ml). Refractive index of the oil at 26°C was 1.403, lit(7), 1.475.

ACKNOWLEDGEMENTS

Thanks are due to Dr.S.P.Srivastava, Professor and Head for providing the necessary facilities.

REFERENCES

1. Gruner,S., Spaich, W., Arch.Pharm., 287, 243 (1954).

2. Katayama,T., Bull.Japan Soc.Sci. Fisheries, 21, 412 (1955).

3. Drummond,H.M., Perfumery Essent. Oil Record, 51, 484 (1960).

4. Kirchner,J.G., Miller,J.M., Keller,G.J., Anal.Chem., 23, 420 (1951).

5. Miller,J.M., Kirchner,J.G., Anal.Chem.,25, 1107 (1953).

6. Reitsema,R.H., Anal.Chem., 26, 960 (1954).

7. Guenther, E., The Essential Oil -III, IV, D. Van Nostrand Inc., N.J., (1952).

8. Kirchner,J.G., Thin layer Chromatography, Wiley Interscience Pub., Toranto (1978).