TABLE 38

R_F VALUES OF SOME COMPOUNDS RELATED TO PHENYLALANINE MUSTARD

(A. P. MARTINEZ, W. A. SKINNER, W. W. LEE, L. GOODMAN AND B. R. BAKER *J. Am. Chem. Soc.*, 82 (1960) 6050)

Solvent: S_1 = Benzene–methanol–water (2:6:1).
Paper: P_1 = Schleicher & Schüll No. 2495 acetylated paper.
P_2 = Whatman No. 1.
(Descending).
Detection: U.V. light.

Compound	R_F	
	S_1P_1	S_1P_2
Methyl *p*-amino-α-benzamidocinnamate	0.60	
p-Aminophenylpyruvic acid hydrochloride	0.72	0.67
Methyl α-benzamido-*p*-[bis-(2-hydroxyethyl)-amino]-cinnamate	0.79	
4-{*p*-[Bis-(2-chloroethyl)-amino]-benzylidene}-2-phenyl-2-oxazolin-5-one	0.24	
Methyl α-benzamido-*p*-[bis-(2-chloroethyl)-amino]-cinnamate	0.63	
p-[Bis-(2-chloroethyl)-amino]-phenylpyruvic acid	0.81*	

* Streaked in most runs.

TABLE 39

R_F VALUES OF SOME DERIVATIVES OF MELPHALAN [*p*-BIS-(2-CHLOROETHYL)-AMINO-L-PHENYLALANINE]

(F. BERGEL AND J. A. STOCK, *J. Chem. Soc.*, (1960) 3658)

Solvents: S_1 = *n*-Butanol–ethanol–propionic acid–water (10:5:2:5).
S_2 = 1 % aqueous NH_4Cl.
S_3 = 2 % aqueous NH_4Cl.
Paper: Whatman No. 1 (ascending).
Detection: 0.25 % ninhydrin in acetone.

Compound	R_F*		
	S_1	S_2	S_3
Gly·Mel·OEt	0.80	—	0.52
L-Ala·Mel·OEt	0.89 (0.95)	0.69	—
L-Val·Mel·OEt	0.84	—	0.51
L-Phe·Mel·OEt	0.86	—	0.01
(L-Cys·Mel·OEt)$_2$ | S	—	0.01	—
Mel·OEt	0.84 (0.94)	0.69	0.63
Gly·OEt	0.57	—	0.95
DL-Phe·OEt	0.87	—	—
DL-Ala·OEt	(0.66)	0.97	—
Mel	0.69	—	—
Val	0.38	—	—
Phe·Gly·OEt	0.81	—	—
Gly·Gly·OEt	0.57	—	—
Val·Mel	0.88	—	—
Gly·Phe·OEt	0.75	—	—

* R_F values for freshly prepared solvent given in parentheses.

TABLE 40

R_F VALUES OF SOME N,N-BIS-(2-CHLOROETHYL)-AMINOPHENYL-AMINO ACIDS

(T. A. CONNORS, W. C. J. ROSS AND J. G. WILSON, *J. Chem. Soc.*, (1960) 2994)

Solvents: S_1 = Butan-1-ol–ethanol–water–propionic acid (10:5:5:2).
S_2 = Water satd. butan-1-ol.
Paper: Whatman No. 1.
Detection: U.V. light (presumed).

Compound	R_F	
	S_1	S_2
α-[*m*-Bis-(2-chloroethyl)-aminophenyl]-alanine	0.80	—
1-Amino-7-[bis-(2′-chloroethyl)-amino]-1,2,3,4-tetrahydro-1-naphthoic acid	0.82	—
o-[Bis-(2-chloroethyl)-amino]-DL-phenylalanine	0.79	0.64
m-[Bis-(2-chloroethyl)-amino]-DL-phenylalanine	0.75	0.55
p-[Bis-(2-chloroethyl)-amino]-DL-phenylalanine	0.73	0.51

TABLE 41

R_F VALUES OF NAPHTHALENE AMINO-ACID CONJUGATES AND RELATED DECOMPOSITION PRODUCTS

(E. BOYLAND, G. S. RAMSAY AND P. SIMS, *Biochem. J.*, 78 (1961) 376)

Solvents: S_1 = Butan-1-ol–propan-1-ol–aq. 2 *N* NH_4OH (2:1:1, by vol.).
S_2 = Butan-1-ol–acetic acid–water (2:1:1, by vol.).
Paper: Whatman No. 1 (descending).
Time of run: 18 h.
Detection: D_1 = U.V. light fluorescence.
D_2 = Freshly diazotised *p*-nitroaniline (0.02% in 0.1 *N* HCl), followed by aq. 10% Na_2CO_3.
D_3 = 0.2% ninhydrin in acetone (70° for 10 min).
D_4 = 0.1 *M* $K_2Cr_2O_7$ in acetic acid (1:1, v/v), followed by 0.1 *M* $AgNO_3$ (R. H. KNIGHT AND L. YOUNG, *Biochem. J.*, 70 (1958) 111).

Compound	R_F		*Colour**			
	S_1	S_2	D_1	D_2	D_3	D_4
N-Acetyl-S-(1,2-dihydro-2-hydroxy-1-naphthyl)-L-cysteine	0.37	0.84	d–a	b	—	+
1-Naphthylmercapturic acid	0.51	0.86	p**	—	—	+
S-(1,2-Dihydro-2-hydroxy-1-naphthyl)-L-cysteine	0.31	0.63	d–a	b	pu	+
S-(1-Naphthyl)-L-cysteine	0.46	0.75	p	—	pu	+
S-(1,2-Dihydro-2-hydroxy-1-naphthyl)-L-cysteinylglycine	0.25	0.62	d–a	b	bn–pu	+
S-(1-Naphthyl)-L-cysteinylglycine	0.40	0.74	p	—	bn–pu	+
S-(1,2-Dihydro-2-hydroxy-1-naphthyl)-glutathione	0.10	0.47	d–a	b	pu	+
S-(1-Naphthyl)-glutathione	0.21	0.67	p**	—	pu	+
Unknown I***	0.05	0.40	d–a	b	pu	+
Unknown II***	0.01	0.35	d–a	b	pu	+

* d = dark; a = absorption; b = blue; bn = brown; pu = purple; y = yellow; p = pink.
** After exposure to NH_3 fumes.
*** Perhaps taurine conjugates of S-(1,2-dihydro-2-hydroxy-1-naphthyl)-glutathione.

TABLE 42

R_F VALUES OF SOME S-CYSTEINE DERIVATIVES

(E. BOYLAND, G. S. RAMSAY AND P. SIMS, *Biochem. J.*, 78 (1961) 376)

Solvents: S_1 = Butan-1-ol–propan-1-ol–aq. 2 *N* NH_4OH (2:1:1, by vol.).
S_2 = Butan-1-ol–acetic acid–water (2:1:1, by vol.).
Paper: Whatman No. 1 (descending).
Time of run: 18 h.
Detection: D_1 = 0.2 % ninhydrin in acetone (70°; 10 min).
D_2 = $K_2Cr_2O_7$–$AgNO_3$ reagent (0.1 *M* $K_2Cr_2O_7$–acetic acid (1:1, v/v) followed by 0.1 *M* $AgNO_3$; R. H. KNIGHT AND L. YOUNG, *Biochem. J.*, 70 (1958) 111).

Compound	R_F		D_1	D_2
	S_1	S_2	*Colour**	*Result*
N-Acetyl-S-(1,2,3,4-tetrahydro-2-hydroxy-1-naphthyl)-L-cysteine**	0.56	0.88	—	+
Unknown***	0.39	0.79	—	+
S-(1,2,3,4-Tetrahydro-2-hydroxy-1-naphthyl)-L-cysteine**	0.57	0.72	p	+
S-(1,2,3,4-Tetrahydro-2-hydroxy-1-naphthyl)-L-cysteinylglycine**	0.37	0.72	b→p	+
S-(1,2,3,4-Tetrahydro-2-hydroxy-1-naphthyl)-glutathione**	0.25	0.45	p	+

* p = purple; b→p = brown turning purple.
** Probable identity.
*** Possible structures: N-acetyl-S-(1,2,3,4-tetrahydro-2-hydroxy-1-naphthyl)-L-cysteinylglycine, or (more probably) the N-acetylglycylcysteine derivative.

TABLE 43

R_F VALUES OF SOME NAPHTHOLS AND OTHER NAPHTHALENE METABOLITES

(E. BOYLAND, G. S. RAMSAY AND P. SIMS, *Biochem. J.*, 78 (1961) 376)

Solvents: S_1 = Butan-1-ol–propan-1-ol–aq. 2 *N* NH_4OH (2:1:1, by vol.).
S_2 = 0.1 *N* NH_4OH.
Paper: Whatman No. 1 (descending, S_1; ascending, S_2).
Time of run: 18 h (S_1), 8 h (S_2).
Detection: D_1 = U.V. fluorescence.
D_2 = Freshly diazotised *p*-nitroaniline (0.02 % in 0.1 *N* HCl), followed by aq. 10 % Na_2CO_3.
D_3 = D_2 after spraying with 2 *N* HCl (100° for 10 min).

Compound	R_F		*Colour**		
	S_1	S_2	D_1	D_2	D_3
1-Naphthol	0.97	0.62	b	b	b
2-Naphthol	0.97	0.55	v	o	o
trans-1,2-Dihydro-1,2-dihydroxynaphthalene**	0.89	—	d–a	—	b
1-Naphthylglucosiduronic acid	0.28	—	d–v	—	b
trans-1,2-Dihydro-2-hydroxy-1-naphthylglucosiduronic acid**	0.18	—	d–a	p–o***	b
trans-1,2-Dihydro-1-hydroxy-2-naphthylglucosiduronic acid**	0.18	—	d–a	b***	b
2-Hydroxy-1-naphthylglucosiduronic acid	0.15	—	br–b	y	pu
1-Hydroxy-2-naphthylglucosiduronic acid	0.14	—	br–b	b	pu

* d = dark; a = absorption; b = blue; p = pale; br = bright; v = violet; o = orange; pu = purple; y = yellow.
** Optical isomers not separated.
*** Due to decomposition products.

TABLE 44

R_F VALUES OF SOME METABOLITES OF 1,2-DIHYDRONAPHTHALENE AND 1,2-EPOXY-1,2,3,4-TETRAHYDRONAPHTHALENE

(E. BOYLAND AND P. SIMS, *Biochem. J.*, 77 (1960) 175)

Solvents: S_1 = Butanol saturated with aq. 2 *N* NH_4OH.
S_2 = Butanol–propan-1-ol–aq. 2 *N* HN_4OH (2:1:1, by vol.).
S_3 = Butanol–acetic acid–water (12:3:5, by vol.).
S_4 = Butanol–acetic acid–water (2:1:1, by vol.).
Paper: Whatman No. 1 (descending).
Time of run: 18 h.
Detection: U.V. light; (A) freshly diazotised *p*-nitroaniline (0.02 % in 0.1 *N* HCl) followed by aq. 10 % Na_2CO_3; (B) 0.1 *M* $K_2Cr_2O_7$–acetic acid (1:1) followed by 0.1 *M* $AgNO_3$[a]; (C) aq. 2 % (w/v) $NaIO_4$ followed, after 30 min, by Schiff's reagent[b]; (D) platinic iodide reagent[c]; (E) ninhydrin in acetone (0.2 %) then heated to 70° for 10 min. (First three: spray; last two: dip.)

Compound	R_F				*Colour*[d]		
	S_1	S_2	S_3	S_4	*B*	*C*	*E*
S-(2-Hydroxy-1,2,3,4-tetrahydro-1-naphthyl)-L-cysteine	0.23	0.57	0.53	0.72	+	be	p
N-Acetyl-S-(2-hydroxy-1,2,3,4-tetrahydro-1-naphthyl)-L-cysteine	0.25	0.56	0.81	0.88	+	be	·
Methyl ester of N-acetyl-S-(2-hydroxy-1,2,3,4-tetrahydro-1-naphthyl)-L-cysteine	0.85	0.91	0.88	0.91	+	be	·
trans-1,2-Dihydroxy-1,2,3,4-tetrahydronaphthalene	0.79	0.87	0.85	0.86	—	p→b	·
Glucosiduronate of *trans*-1,2-dihydroxy-1,2,3,4-tetrahydronaphthalene	0.04	0.31	0.44	0.59	—	pk[f]	·

[a] R. H. KNIGHT AND L. YOUNG, *Biochem. J.*, 70 (1958) 111.
[b] C. J. W. BROOKS AND L. YOUNG, *Biochem. J.*, 63 (1956) 264.
[c] G. TOENNIES AND J. J. KOLB, *Anal. Chem.*, 23 (1951) 823.
[d] p = purple; b = blue; p→b = purple turning blue; pk = pink; + = positive result; — = negative result; · = not tested (presumed).
[e] After 4 h. The reaction was not sensitive for small amounts of material.
[f] After 15 min.

TABLE 45

R_F VALUES OF FLAVONOID CONSTITUENTS OF *Melicope mantelli* BUCH. AND RELATED COMPOUNDS

(R. C. CAMBIE, *J. Chem. Soc.*, (1960) 2376)

Solvent: 1 % NH_4OH soln.–dioxan–light petroleum (1:1:1, upper phase).
Paper: Whatman No. 1.
Detection: NH_3 vapour; Dragendorff reagent, then with 5 % aq. $FeCl_3$.

Compound	R_F
Melisimplexin	0.73
Melisimplin	0.83
Meliternatin	0.42
Meliternin	0.17
Ternatin	0.63
Wharangin	0.09

TABLE 46

R_F VALUES OF VARIOUS FLAVAN DERIVATIVES

(J. W. CLARK-LEWIS, G. F. KATEKAR AND P. I. MORTIMER, *J. Chem. Soc.*, (1961) 499)

Solvents: S_1 = Forestal solvent: 2 % acetic acid (E. C. BATE-SMITH, *Biochem. J.*, 58 (1954) 122).
S_2 = Butan-1-ol–acetic acid–water (4:1:5; S. M. PARTRIDGE, *Biochem. J.*, 42 (1948) 238).
Paper: Not stated.
Detection: Not specified.

Compound	R_F	
	S_1	S_2
Teracacidin	0.46–0.54	
	0.41–0.52	
Isoteracacidin	0.58–0.68	
	0.58–0.64	
O-Ethylisoteracacidin	0.75–0.87	
	0.78–0.85	
	0.67–0.76	
Anthocyanidin	0.74	
Cyanidin	0.55	
3,7,8,3′,4′-Pentahydroxyflavylium chloride	0.58	
Pinitol		0.23
Inositol		0.14

TABLE 47

R_F VALUES OF MELACACIDIN, ISOMELACACIDIN AND RELATED FLAVAN DERIVATIVES

(J. W. CLARK-LEWIS AND P. I. MORTIMER, *J. Chem. Soc.*, (1960) 4106)

Solvents: S_1 = Butan-1-ol–acetic acid–water (4:1:5) (S. M. PARTRIDGE, *Biochem. J.*, 42 (1948) 238).
S_2 = 2 % acetic acid (aqueous).
S_3 = Water–acetic acid–conc. HCl (10:30:3) (E. C. BATE-SMITH, *Biochem. J.*, 58 (1954) 122).
Paper: Not given.
Detection: D_1 = U.V. light except where otherwise indicated.
D_2 = HCl.
D_3 = Alcoholic 3 % toluene-*p*-sulphonic acid.
D_4 = Alcoholic $AlCl_3$.

Compound	R_F			*Colour**			
	S_1	S_2	S_3	D_1	D_2	D_3	D_4
Dihydro-(?,7,8,3′,4′)-tetrahydroxyflavonol	0.57–0.79			fb fl; y**	dy	dy	
Okanin	0.52***						
Melacacidin	0.25–0.32, 0.42–0.48	0.30–0.42, 0.35–0.47	0.58				
O-Methylisomelacacidin	0.63–0.73	0.53–0.66					
O-Ethylisomelacacidin	0.73–0.82	0.63–0.74					
		0.58–0.70					+
Cyanidin			0.55				

* f = faint; b = blue; fl = fluorescence; d = deep; y = yellow.
** Visible light; after 3–4 h.
*** R_F' (*i.e.* leading edge).

TABLE 48

R_F VALUES OF MATTEUCININ AND OTHER ERICACEAE CONSTITUENTS

(H. R. ARTHUR AND S. W. TAM, *J. Chem. Soc.*, (1960) 3197)

Solvent: Phenol saturated with water.
Paper: Whatman No. 1.
Temperature of run: $T_1 = \sim 20°$; $T_2 = \sim 30°$; $T_3 = \sim 25°$; $T_4 = 22°$; $T_5 = 15°$.
Detection: $FeCl_3$ soln.; ammonium molybdate (for glucose).

Compound	R_F				
	T_1	T_2	T_3	T_4	T_5
Quercetin	0.42	0.54			
Aromadendrin			0.83		
Myricetin	0.21	0.34			
Farrerol	0.93				
Matteucinol	0.95				
Matteucinin	0.89				
D-Glucose				0.46	0.36

TABLE 49

R_F VALUES OF FLAVANONES FROM *Angophora lanceolata* AND RELATED DEGRADATION PRODUCTS

(A. J. BIRCH, D. G. PETIT, A. J. RYAN AND R. N. SPEAKE, *J. Chem. Soc.*, (1960) 2063)

Solvents: S_1 = Butanol–acetic acid–water (G. LINDSTED AND A. MISIORNY, *Acta Chem. Scand.*, 5 (1951) 1).
S_2 = Butanol–water (G. LINDSTET AND A. MISIORNY, *Acta Chem. Scand.*, 5 (1951) 1).
S_3 = Benzene–ligroin–methanol–water (G. LINDSTEDT AND A. MISIORNY, *Acta. Chem. Scand.*, 5 (1951) 1).
Paper: Whatman No. 1.
Detection: D_1 = U.V. light after NH_3 fumes.
D_2 = Bisdiazotised benzidine reagent.
D_3 = Diazotised *p*-nitroaniline.

Compound	R_F			*Colour**		
	S_1**	S_2	S_3	D_1	D_2	D_3
2,4-Dimethylphloroglucinol	0.94			b		
Phloroglucinol	0.75					
2-Methylphloroglucinol	0.79					
p-Hydroxybenzoic acid		0.15				r
4-Hydroxycinnamic acid		0.22				i-b
Methylmatteucinol			0.95		bk-r	
Farrerol			0.3–0.4		p-c	
Matteucinol			0.85		c	
Angophorol			0.85		y	
Unknown***			0.75		pi	

* b = blue; r = red; i = indigo; bk = brick; p = pale; c = cream; y = yellow; pi = pink.
** Presumed from text.
*** Possibly isomer of angophorol.

TABLE 50

R_F VALUES OF THE ALKALOID DAPHNANDRINE AND RELATED COMPOUNDS

(I. R. C. BICK, P. S. CLEZY AND M. J. VERNENGO, *J. Chem. Soc.*, (1960) 4928)

Solvents: S_1 = Butan-1-ol–acetic acid–water (63:10:27).
S_2 = Butan-1-ol–acetic acid–water (4:1:5).
Paper: Whatman No. 1.
Detection: Not given.

No.	*Compound*	R_F	
		S_1	S_2
1	Daphnandrine	0.48	
2	O-Ethyldaphnandrine	0.56	
3	O-Ethylcoclaurine*		0.79
4	O-Ethyl-N-methylcoclaurine*		0.88
5	O-Ethylcoclaurine methiodide**		0.84
6	O-Ethyl-N-methylcoclaurine methiodide**		0.84

* Order of No. 3 and 4, and hence 5 and 6, presumed (not specified).
** No resolution.

TABLE 51

R_F VALUES OF KREYSIGINE, FLORAMULTINE, KREYSIGININE AND FLORAMULTININE (ALKALOIDS FROM *Kreysigia multiflora* REICHB).

(G. M. BADGER AND R. B. BRADBURY, *J. Chem. Soc.*, (1960) 445)

Solvent: 5% Aqueous acetic acid–butan-1-ol (1:1, v/v; upper phase).
Paper: Not specified.
Temperature of run: 15°.
Detection: With iodine.

Compound	R_F	*Colour**
Kreysigine	0.55	py
Floramultine	0.51	py
Kreysiginine	0.40	py → do
Floramultinine	0.30	py → do

* py = pale yellow; do = deep orange; → = after several hours in air.

TABLE 52

R_F VALUES OF SOME VITAMINS AND RELATED COMPOUNDS

(E. E. GADSEN, C. H. EDWARDS AND G. A. EDWARDS, *Anal. Chem.*, 32 (1960) 1415)

Solvents: S_1 = Phenol–citrate/phosphate buffer (100:25, v/v; aqueous buffer: 6.3 % sodium citrate, 3.7 % KH_2PO_4).
S_2 = Butan-1-ol–propionic acid–water (freshly prepared from equal vols. of solution A (1246 ml butan-1-ol + 84 ml water) and solution B (620 ml propionic acid + 790 ml water)).
Paper: Whatman No. 1 (descending).
Time of run: 18–22 h (S_1); 14–16 h (S_2).
Temperature of run: 24° ± 0.5°.
Detection: D_1 = Ammoniacal silver nitrate[a].
D_2 = Ferricyanide–nitroprusside[b].
D_3 = Ninhydrin.
D_4 = Iodine vapour.
D_5 = 2,6-Dichlorophenolindophenol[b].
D_6 = Cyanogen bromide[a].
D_7 = Ferric chloride[b].
D_8 = Phenol–hypochlorite reagent[b].
D_9 = Light.
Order for multiple detection: D_9 (U.V.), D_3, D_4, D_7 or D_1.

Compound	R_F		Quantity used	Colour[c]								
	S_1	S_2	µg	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9
Vitamin A	0.90	—	250									y[e]
α-Tocopherol	0.89	0.77	250[d]	b								
Menadione	0.94	—	250									y[e]
Thiamine	0.93	0.55	250		f	y						
Riboflavine	0.91	0.32	20									y, f
Niacin	0.83	0.68	250				bn	p	o			
Nicotinamide	0.85	0.69	250		y		bn		y			
Pyridoxine	0.87	0.60	250							bn		f
Pantothenic acid	0.66	0.38	250			pu						
Biotin	0.79	0.78	250				bn					
Inositol	0.21	0.12	50	bn								
Choline	0.87	0.52	250				bn					
p-Aminobenzoic acid	0.80	0.69	250							bn	bn	
Folic acid	0.34	0.30	12.5									f
Vitamin B_{12}	0.92	0.31	50									p
Vitamin C	0.34	0.34	250	bn								

[a] R. J. BLOCK, E. L. DURRUM AND G. ZWEIG, *A Manual of Paper Chromatography and Paper Electrophoresis*, Academic Press Inc., New York, 1958, pp. 398–409.
[b] Biochemical Institutes Studies IV, *Univ. Texas Publ.*, No. 5109 (1951).
[c] y = yellow; b = black; bn = brown; p = pink; o = orange; pu = purple; f = fluorescent in U.V.
[d] In mg.
[e] After phenol run only.