PAPER CHROMATOGRAPHIC DATA FOR PURINES, PYRIMIDINES AND DERIVATIVES IN A VARIETY OF SOLVENTS

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Filter paper chromatographic data in ten solvent systems were reported by FINK, CLINE, AND FINK[1] for several classes of compounds, including amino acids, purines, pyrimidines, sugars, organic acids and compounds reacting with acidic *p*-dimethylaminobenzaldehyde. Such data are useful as an aid in identification of metabolites, particularly radioactive ones which may be detected on chromatograms at concentrations far less than that required for classification by color reactions[2]. In addition, the data provide information both for selection of solvent systems for separation of two or more substances, and for recognition of compounds which might overlap and interfere.

In the course of continuing investigation of purine and pyrimidine metabolism[3,4], chromatographic properties for an additional 112 ultraviolet absorbing or fluorescing compounds have been obtained. The data for these have been combined here with the 103 purines and pyrimidines reported earlier[1] to provide a single chromatographic table for these two classes of substances detected by ultraviolet light.

EXPERIMENTAL

The basic procedure is essentially the same as reported previously[1]. Small aliquots of solutions of the various compounds (usually about 3 μl of 0.01 *M* solutions) were applied along a base line on sheets of filter paper (Whatman No. 1, 20 × 21 cm). The sheets were fastened into cylinders by insertion of two plastic loops through 2 mm holes made with a paper punch near the sides and about 5 cm from the top and bottom of the paper. The loops were made from ½ in. I.D. polyethylene (5/8 in. O.D.) or teflon (0.56 O.D.) tubing, by cutting a spiral about 1½ cm wide with a sharp razor blade, and the plastic spiral was then cut to give about 1.1/4 turns per loop. Each paper cylinder was developed by ascending chromatography at 28° in a wide-mouth half-gallon fruit jar (Ball special) which contained 50 ml of solvent and was sealed by a lid lined with "Parafilm". With a two-phase solvent system, a 20 ml beaker containing about 15 ml of the aqueous phase was centered at the bottom of the jar, and the contents allowed to equilibrate at 28° before use.

The composition of the various solvents is tabulated below (Table I). Instead of measuring each component separately before mixing, we now use stock solutions of water and acid, water and ammonium hydroxide, and *tert.*-butyl alcohol and methyl ethyl ketone combined in the proper ratios, to reduce the number of individual measurements for routine preparation of the one-phase solvent systems.

TABLE I

COMPOSITION OF THE SOLVENT SYSTEMS

Nomenclature	*Mixture*
FORM	*tert.*-Butyl alcohol–methyl ethyl ketone–formic acid–water (40:30:15:15)
t-Bu NH_3	*tert.*-Butyl alcohol–methyl ethyl ketone–water–ammonium hydroxide (40:30:20:10)
t-Bu HAc	*n*-Butyl alcohol–glacial acetic acid–water (50:25:25)
n-Bu *s&t* Bu	Upper phase from a mixture of water–*sec.*-butyl alcohol–*tert.*-butyl alcohol (48.4:43:8.6)
HCl *i*-Pr	Isopropyl alcohol–water–concentrated HCl (65:18.4:16.6)
s-Bu	Upper phase from a mixture of *sec.*-butyl alcohol and water
FORM EtAc	Ethyl acetate–formic acid–water (70:20:10)
EtAc form	Upper phase from a mixture of ethyl acetate–water–formic acid (60:35:5)
t-Bu form	*tert.*-Butyl alcohol–methyl ethyl ketone–water–formic acid (44:44:11:0.26)

The compounds were detected by examination of the paper over a short wave ultraviolet lamp (253.7 mμ).

RESULTS AND DISCUSSION

The chromatographic data are tabulated in Table II according to R_F values of the compounds in the first solvent, and a letter was appended to permit individual designations for compounds with the same R_F value in that solvent. To determine whether a specific compound has been listed and where it is located in Table II, the compounds have been arranged alphabetically in Table III with the R_F value and a letter designation for the first solvent. A discussion of the collection of the data and its use has been made in the previous publication[1]. The data for the 115 additional compounds presented here were obtained using a constant temperature cabinet, rather than a room, and under these slightly different environmental conditions, we find a somewhat wider variation in repeated R_F determinations with two-phase solvent systems than previously. Chromatographic data with the phenol solvent included in the earlier paper have been omitted here, since phenol gives a pronounced background under ultraviolet light.

Many of the compounds listed were generously contributed over the years by the individuals who initially synthesized or isolated them, and we wish to again express our appreciation to them.

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TABLE II

CHROMATOGRAPHIC DATA FOR PURINES, PYRIMIDINES AND DERIVATIVES ARRANGED ACCORDING TO INCREASING R_F VALUE IN THE FIRST SOLVENT SYSTEM

Compound	*R_F values (× 100) in various solvent systems**								
	FORM t-Bu	*NH_3 t-Bu*	*HAc n-Bu*	*s&t-Bu*	*HCl i-Pr*	*s-Bu*	*FORM EtAc*	*EtAc form*	*t-Bu form*
Uridine-5′-diphosphate	0a	0	7	12	66	0	0	0	0
Adenosine-5′-triphosphate	0b	4	6	13	39	0	0	0	0
Uridine diphosphate glucose	0c	6	8	16	69	2	0	0	0
Adenosine-5′-diphosphate	2a	4	6	12	40	0	0	0	0
Uridine-5′-triphosphate	3a	3	5	15	63	0	0	0	0
2,5-Diamino-4,6-dioxypyrimidine	3b	3	8	14	—	2	0	0	0
Guanosine-5′-phosphate	5a	4	17	22	39	2	0	0	0
S-Adenosylmethionine	5b	35	17	14	7	8	1	0	0
Cytidine-5′-phosphate	7a	6	22	20	50	4	2	0	0
Orotidine monophosphate	8a	2	12	12	74	1	1	0	0
Adenosine-5′-phosphate	8b	8	27	25	42	5	3	0	0
Cytosine-5-carboxylic acid	9a	23	—	22	26	8	19	0	3
Uridine-5′-phosphate	12a	4	23	24	70	6	5	0	0
2,6-Diamino-5-formylamino-4-hydroxypyrimidine	12b	10	30	20	19	11	9	0	1
Uric acid	14a	18	30	27	22	5	7	4	12
5-Aminouridine	14b	23	35	42	24	25	7	0	14
Deoxycytidine-5′-phosphate	15a	7	29	22	64	4	6	0	0
6-Amino-2,8-dihydroxypurine	15b	9	31	23	33	—	4.17	0	5
6-Amino-5-formylaminouracil	15c	16	31	26	22	16	12	0	6
Orotidine	17a	17	30	20	66	7	12	0	0
Xanthosine	18a	32	34	28	26	13	12	0	10
5-Methyldeoxycytidine-5′-phosphate	19a	7	36	27	65	8	10	0	0
2-Amino-8-hydroxypurine	19b	24	28	37	21	24	8	0	6
Guanosine	20a	27	36	44	29	32	11	0	11
Deoxyuridine-5′-phosphate	21a	4	38	17	83	6	12	0	0
6-Amino-5-formylamino-4-hydroxypyrimidine	21b	22	40	30	19	18	21	0	7
5-Ribosyluracil	21c	25	35	43	53	34	12	2	0
8-Hydroxy-7-methylguanine	22a	15	46	43	43	35	23	4	11
6-Amino-5-formylamino-1-methyluracil	22b	27	42	35	27	19	22	1	7
3-Methyluric acid	22c	28	41	38	36	24	19	3	18
6,8-Dihydroxypurine	23a	18	38	42	41	36	20	2	19
Guanine	23b	19	45	42	22	36	13	0	11
Thymidine-5′-phosphate	24a	5	36	27	88	6	13	0	0
Xanthine	24b	27	45	46	25	41	21	0	22
5-Hydroxymethyluridine	24c	31	38	48	59	32	13	0	19
Inosine	24d	36	39	48	30	35	14	0	14
1-Methyluric acid	25a	28	42 ±	42	—	27	20	3	30
5-Aminouracil	25b	31	41	46	21	36	12	5	22

5-Aminouracil	25b	31	41	46	21	36	12	5	22
7-Methylinosine	26a	unstable	38	29	31	15	13	0	4
5-Hydroxymethylorotic acid	26b	22	32	30	53	15	19	0	5
7-Methyluric acid	26c	25	49	37	54	22	20	3	22
5-Hydroxymethyldeoxycytidine	26d	56	53	44	54	34	—	—	—
2,6-Diamino-7-methylpurine	28a	30	42,52	33	14	16	15	4,24	0
7-Methylguanosine	28b	unstable	45	28	40	16	15	0	5
5-Amino-6-carboxyuracil	29a	16	43	25	24	10	27	11	10
6,8-Dihydroxy-2-methylpurine	29b	23	54	50	43	36	29	5	18
1,7-Dimethylguanine	29c	60	49	39	25	23	17	0	7
6-Carboxypurine	30a	16	43	22	35	10	27	4	4
6-Amino-2-hydroxypurine	30b	22	52	34	32	24	19	0	6
1-Methylguanine sulfate	30c	36	54	48	20	35	18	2	14
5-Formyluridine	30d	43	38	45	56	34	20	4	31
1-Methylguanosine	30e	49	50	47	38	32	16	1	13
6-Methylaminopurine deoxyribonucleoside	30f	52	53	26	38	12	18	0	6
6-Amino-8-hydroxypurine	31a	27	51	55	44	52	10	0	19
5-Hydroxydeoxyuridine	32a	18	47	57	68	46	25	6	40
5-Amino-6-methyluracil	32b	31	54	46	25	40	16	1	28
2-Aminopurine	32c	37	57	60	17	48	23	1	23
Cytidine	32d	47	47	45	45	29	19	0	12
1-Methyladenosine	32e	51	53	28	42	15	22	0	5
4-Amino-5-imidazolecarboxamide ribonucleoside	32f	57	50	48	48	36	21	0	19
Adenosine	32g	64	56	63	33	51	20	3	25
Deoxyguanosine	33a	36	50	55	24	39	18	1	20
Isobarbituric acid	34a	4,14	44	53	57	42	31	9	36
6-Aminouracil	34b	22	47	46	pink str.	38	32	6	22
2,6-Diaminopurine hemisulfate	34c	31	56	39	16	28	29	0	11
5-Methylaminouracil	34d	40	61	61	35	53	10,21	11	45
2-Amino-4,6-dioxypyrimidine	35a	21	51	48	pink str.	39	33	6	22
7-Methylguanine	35b	24	55	46	26	35	19	2	11
Uridine	35c	33	46	55	67	42	25	6	35
3-Methylguanine	36a	22	53	34	33	25	21	2	7
2-Hydroxy-6-methylpurine	36b	30	55	45	40	33	27	2	11
5-Hydroxymethyldeoxyuridine	36c	39	49	59	73	47	25	4	36
6-Azauridine	36d	42	49	53	63	42	27	9	39
5-Methylcytidine	36e	47	53	41	49	30	20	0	12
5-Hydroxymethyluracil	37a	36	48	56	65	46	29	8	33
4,5,6-Triaminopyrimidine sulfate	37b	48	57	40	22	32	29	0	2,14
1-Methylinosine	37c	56	54	45	49	37	30	3	19
2-Amino-4,6-dioxy-5-methylpyrimidine	38a	17	56	45	68	33	38	5	14
Orotic acid	38b	23	39	31	57	15	34	9	6
6-Amino-5-formylamino-3-methyluracil	38c	26	54	50	50	38	31	5	25

(continued on p. 122)

TABLE II (*continued*)

Compound	*R_F values (× 100) in various solvent systems*								
	FORM t-Bu	*NH_3 t-Bu*	*HAc n-Bu*	*s&t-Bu*	*HCl i-Pr*	*s-Bu*	*FORM EtAc*	*EtAc form*	*t-Bu form*
2,4-Diamino-6-oxypyrimidine	38d	28	54	36	51 pink	23	29	3	9
6-Methylamino-5-(N-formylmethylamino)uracil	38e	29	57	42	60	31	45	7	19
3-Methylhypoxanthine	38f	30	52	40	30	31	27	4	11
Hypoxanthine	38g	35	53	57	28	49	25	6	26
5-Hydroxymethylcytosine	38h	42	49	40	44	30	23	0	10
Deoxyinosine	38i	42	49	58	31	45	26	4	24
3-Methylxanthine	38j	43	55	60	35	51	38	16	31
6-Amino-5-formylamino-3-methyl-4-oxypyrimidine	38k	45	53	35	30	25	40	6	13
4,6-Diamino-5-formylamino-2-methylpyrimidine	38l	48	57	37	40	20	31	0	0
6-Amino-5-formylamino-1-methyl-4-oxypyrimidine	39a	30	55	42	39	33	41	6	17
3,7-Dimethyluric acid	39b	38	60	50	57	40 ±	41	9	34
1-Methylguanine	40a	25	50	45	32	30	23	0	7
7-Methylxanthine	40b	32	56	57	32	47	42	15	28
2-Methyladenine	41a	46	65	71	41	64	33	0	12
8-Hydroxypurine	42a	40	63	76	31	66	26	13	51
2-Amino-6-methylpurine	42b	43	62	64	27	59	32	2	26
5-Formylcytosine	42c	48	55	52	35	40	33	7	26
5-Formyldeoxyuridine	42d	63	55	64	73	53	26	5	44
6-Methylaminopurine ribonucleoside	42e	77	68	70	51	62	25	7	43
Uracil-6-acetic acid	43a	17	51	26	65	15	34	14	33
5-Methyl-5-hydroxybarbituric acid	43b	25	53	51	63	45	43	25	52
4,6-Diamino-2-oxypyrimidine	43c	29	42	19	52	13	49	35	10
Adenine-N′-oxide	43d	29	61	41	32	32	37	5	8
Barbituric acid	43e	37	45	28	51	12	52	31	21
5-Methoxymethyluridine	43f	37	55	58	74	47	35	7	39
Deoxyadenosine	43g	74	66	70	35	62	31	5	35
Uracil-5-carboxylic acid	44a	9	46	23	54	10	38	26	44
5-Acetylamino-6-amino-3-methyluracil	44b	26	59	48	78	39	40	0	25
5-Hydroxymethyl-6-methyluracil	44c	39	55	55	75	49	40	9	34
5-Formyluracil	44d	56	50	56	58	47	39	24	54
2-Methylhypoxanthine	45a	32	62	60	39	50	35	8	28
5-Hydroxymethylorotic acid lactone	45b	37	49	46	49	38	47	37	49
5-Methyluridine	45c	46	57	64	74	55	35	8	47
Cytosine	45d	49	53	48	45	37	32	0	15
2-Methyl-4,5,6-triaminopyrimidine sulfate	45e	55	64	43	35	32	36	0	15 ±
7-Methyladenine	45f	57	60	58	30	42	35	0	15
4-Amino-5-imidazolecarboxamide	45g	58	58	56	50	48	36	1	25
5-Bromouridine	46a	42	58	69	72	61	39	17	65
1-Methyladenine	46b	47	59	35	31	18	41	1	8
6-Succinoaminopurine	47a	7	61	17	55	6	27	4	45

1-Methyladenine	46b	47	59	35	31	18	41	1	8
6-Succinoaminopurine	47a	7	61	17	55	6	27	4	45
2-Thio-orotic acid	47b	25	44	—	69	—	44	21	13
8-Methylhypoxanthine	47c	33	63	62	46	57	30	5	33
1,7-Dimethyluric acid	47d	35 ±	65	63	82	48	40	17	43
6-Hydroxy-2-methylaminopurine	47e	34	58	60 ±	49	50 ±	30	0	25
1,3-Dimethyluric acid	47f	43	64	60	67	49	42	16	42
5-Formylamino-3-methyl-6-methylaminouracil	48a	30	63	52	54	39	49	7	22
Adenine	48b	40	65	71	33	63	37	6	33
5′-Thiomethylinosine	48c	53	61	62	45	53	38	11	44
Deoxycytidine	48d	61	57	55	58	40	29	0	18
7-Methylhypoxanthine	49a	35	62	64	36	50	42	12	28
6-Amino-1-methyluracil	49b	57	58	53	pink str.	44	51	11	27
2-Amino-4-hydroxypyrimidine	50a	35	66	66	55	57	40	4	33
9-Methylhypoxanthine	50b	37	59	57	36	47	42	11	25
6-Amino-2-thiouracil	50c	38	57	str.	65	57	45	18	53
Uracil	50d	41	56	65	69	55	46	21	47
Deoxyuridine	50e	45	58	67	80	59	41	13	52
1-Methyl-6-methylamino-5-(N-formylmethylamino)-uracil	50f	46	64	52	75	44	49	12	32
2,6-Diamino-5-formylamino-4-methoxypyrimidine	50g	52	61	47	51	26	40	0	5
6-Amino-1,3-dimethyl-5-formylaminouracil	50h	58	61	51	51	43	48	8	27
2-Dimethylamino-6-hydroxypurine	51a	36	68	61	37	52	42	4	28
1-Methylhypoxanthine	51b	37	63	62	36	51	42	13	30
1-Methylxanthine	52a	35	67	69	47	65	49	25	51
5-Methylcytosine	53a	55	60	55	52	44	38	0	15
3-Methyladenine	53b	55	61	48	46	43	45	4	12
4,6-Diaminopyrimidine	53c	60	63	56	47	46	49	3	15
6-Dimethylaminopurine ribonucleoside	53d	83	74	80	58	74	36	13	61
5-Fluorouracil	54a	42	62	70	75	63	55	38	64
2-Hydroxy-4-methylpyrimidine	54b	48	66	60	49	55	41	7	38
2-Thiobarbituric acid	54c	50	46	41	72	21	58	39	15
Spongothymidine	55a	63	61	79	81	66	42	12	59
3,8-Dimethylxanthine	56a	38	70	69	48	64	56	24	45
5-Ethoxymethyluridine	56b	51	66	70	85	63	—	—	—
5-Methyldeoxycytidine	56c	67	65	59	63	46	35	1	21
5-Methylorotic acid	57a	27	44	—	78	18	51	8	16
2-Methyladenine sulfate	57b	51	69	76	44	68	46	3	30
5-Acetyluracil	57c	54	66	70	71	64	52	36	63
1-Methylcytosine	57d	61	63	55	55	45	44	2	18
9-Methyladenine	57e	67	71	66	40	59	47	12	30
5′-Thiomethyladenosine	57f	87	75	82	54	77	45	14	54
2-Thiocytosine	58a	34,93	59	89	55	87	45	5	33

(continued on p. 124)

TABLE II (*continued*)

Compound	*R_F values (× 100) in various solvent systems*								
	FORM t-Bu	*NH_3 t-Bu*	*HAc n-Bu*	*s6t-Bu*	*HCl i-Pr*	*s-Bu*	*FORM EtAc*	*EtAc form*	*t-Bu form*
2-Amino-4-hydroxy-6-methylpyrimidine	58b	38	72	70	63	63	44	6	36
4-Hydroxypyrimidine	58c	46	68	70	45	65	54	25	51
3,7-Dimethylxanthine	58d	46	70	64	52	56	62	30	42
6-Methylpurine	58e	52	76	81	46	77	46	22	57
Purine	58f	53	73	73	35	69	45	22	52
2,4-Dihydroxypyrimidine-6-methylsulfone	58g	60	61	39	66	23	62	50	61
6-Amino-3-methyl-5-(N-formylmethylamino)uracil	59a	35	64	64	83	58	52	3	52
5-Fluorodeoxyuridine	59b	42	65	72	86	66	50	29	73
6-Methyluracil	59c	50	68	71	77	66	59	29	55
4,6-Diamino-2-thiopyrimidine	59d	80	62	68	56	52	44	2	25
5-Methylbarbituric acid	60a	33	54	24 ±	63	10	65	55	46 ±
2-Amino-5-methyl-4-oxypyrimidine	61a	47	72	71	67	64	48	7	38
5-Methoxymethyluracil	61b	50	68	72	81	65	57	29	58
6-Methylaminopurine	61c	61	77	85	49	80	47	8	53
Thymine	62a	56	68	77	80	70	61	34	61
Thymidine	62b	59	68	77	87	71	48	19	61
2-Aminopyrimidine	62c	80	78	77	52	72	58	35	60
6-Methoxypurine ribonucleoside	62d	81	78	77	59	70	60	29	58
3-Methyluridine	62e	83	68	70	92	65	50	18	59
4,5-Diamino-6-methylpyrimidine	63a	69	64	60	49	55	52	0	13
6-Dimethylaminopurine	63b	71	77	88	52	82	55	12	65
5-Bromodeoxyuridine	64a	53	68	81	85	75	56	32	77
1,7-Dimethylxanthine	66a	42	76	77	58	68	70	42	56
4-Hydroxy-6-methylpyrimidine	66b	47	76	75	54	72	58	33	59
8-Mercapto-6-methylpurine	66c	49	73	77	49	77	58	45	74
1-Methyluracil	66d	50	69	70	81	60	64	38	57
1,7-Dimethylhypoxanthine	66e	70	73	64	52	57	60	29	40
3-Methyl-6-methylamino-5-(N-formylmethylamino)-uracil	67a	41	76	64	89	56	70	27	51
5,6-Dimethyluracil	69a	70	75	80	85	77	69	40	66
2-Amino-4-methylpyrimidine	69b	88	82	87	63	83	65	39	72
1,3-Dimethylxanthine	70a	55	78	80	61	75	67	50	65
6-Azathymine	71a	46	73	82	78	83	70	66	77
6-Methoxypurine	72a	54	82	84	58	84	68	52	69
6-Methyl-2-thiouracil	72b	56	76	79	78	73	77	64	75
6-Amino-1,3-dimethyluracil	72c	83	75	76	pink str.	75	74	38	61
5-Ethoxymethyluracil	73a	59	78	86	89	79	70	49	75
6-Amino-2,4-dimethylpyrimidine	73b	87	72	69	75	70 ±	69	4	16,30
2-Amino-4,6-dimethylpyrimidine	74a	92	82	89	78	86	70	31	67

6-Amino-2,4-dimethylpyrimidine	75a	92	82	89	78	86	70	31	67
2-Amino-4,6-dimethylpyrimidine	74a	92	82	89	78	86	70	31	67
1-Methylthymine	75a	67	78	72	85	69	75	56	68
3-Methyl-6-methylaminouracil	76a	43	78	84	pink str.	77	73	38	67
Dithiouracil	76b	73	77	88	88	86	83	90	89
Theophylline-7-acetic acid	77a	45	74	36	88	17	72	54	54
3-Methyluracil	77b	61	78	81	91	77	75	58	70
2-Thiothymine	77c	63	77	92	87	83	75	70	84
5-Ethoxymethy-6-methyluracil	77d	69	81	88	81	84	78	53	76
6-Furfurylaminopurine	78a	85	87	94	79	89	77	58	85
6-Methylmercaptopurine	79a	68	82	90	55	82	78	71	77
1,3,7,9-Tetramethyluric acid	79b	87	80	80	93	71	79	58	65
1,3,8-Trimethylxanthine	80a	61	84	86	75	83	80	63	76
1,3,7-Trimethylxanthine	82a	88	84	81	79	79	85	74	73
4-Hydroxy-2-methylmercaptopyrimidine	83a	59	82	88	76	85	86	78	81
4,6-Dimethylpyrimidine	84a	—	89	—	74	—	81	80	77
1,3-Dimethyluracil	86a	91	85	87	97	84	88	82	83
Propyl-2-thiouracil	88a	76	88	93	95	95	93	92	92
5-Butoxymethyluracil	88b	85	86	96	95	93	89	87	87
2,4-Dimethoxy-5-methylpyrimidine	90a	95	93	93	89	92	91	97	93

* ± following a figure indicates an abnormally high variability in replicate determinations of the R_F values.

TABLE III

PURINES, PYRIMIDINES, AND DERIVATIVES DETECTED WITH SHORT WAVE ULTRAVIOLET LIGHT (ALPHABETICAL ARRANGEMENT OF COMPOUNDS WITH R_F NOTATION FOR THE FIRST SOLVENT IN TABLE II)

5-Acetylamino-6-amino-3-methyluracil	44b	5-Aminouridine	14b
5-Acetyluracil	57c	6-Azathymine	71a
Adenine	48b	6-Azauridine	36d
Adenine-N′-oxide	43d	Barbituric acid	43e
Adenosine	32g	5-Bromodeoxyuridine	64a
Adenosine-5′-diphosphate	2a	5-Bromouridine	46a
Adenosine-5′-phosphate	8b	5-Butoxymethyluracil	88b
Adenosine-5′-triphosphate	0b	6-Carboxypurine	30a
S-Adenosylmethionine	5b	Cytidine	32d
5-Amino-6-carboxyuracil	29a	Cytidine-5′-phosphate	7a
6-Amino-2,8-dihydroxypurine	15b	Cytosine	45d
6-Amino-1,3-dimethyl-5-formylaminouracil	50h	Cytosine-5-carboxylic acid	9a
2-Amino-4,6-dimethylpyrimidine	74a	Deoxyadenosine	43g
6-Amino-2,4-dimethylpyrimidine	73b	Deoxycytidine	48d
6-Amino-1,3-dimethyluracil	72c	Deoxycytidine-5′-phosphate	15a
2-Amino-4,6-dioxy-5-methylpyrimidine	38a	Deoxyguanosine	33a
2-Amino-4,6-dioxypyrimidine	35a	Deoxyinosine	38i
6-Amino-5-formylamino-4-hydroxypyrimidine	21b	Deoxyuridine	50e
6-Amino-5-formylamino-1-methyl-4-oxypyrimidine	39a	Deoxyuridine-5′-phosphate	21a
6-Amino-5-formylamino-3-methyl-4-oxypyrimidine	38k	2,5-Diamino-4,6-dioxypyrimidine	3b
6-Amino-5-formylamino-1-methyluracil	22b	2,6-Diamino-5-formylamino-4-hydroxypyrimidine	12b
6-Amino-5-formylamino-3-methyluracil	38c	2,6-Diamino-5-formylamino-4-methoxypyrimidine	50g
6-Amino-5-formylaminouracil	15c	4,6-Diamino-5-formylamino-2-methylpyrimidine	38l
2-Amino-4-hydroxy-6-methylpyrimidine	58b	2,6-Diamino-7-methylpurine	28a
2-Amino-8-hydroxypurine	19b	4,5-Diamino-6-methylpyrimidine	63a
6-Amino-2-hydroxypurine	30b	2,4-Diamino-6-oxypyrimidine	38d
6-Amino-8-hydroxypurine	31a	4,6-Diamino-2-oxypyrimidine	43c
2-Amino-4-hydroxypyrimidine	50a	2,6-Diaminopurine hemisulfate	34c
4-Amino-5-imidazolecarboxamide	45g	4,6-Diaminopyrimidine	53c
4-Amino-5-imidazolecarboxamide ribonucleoside	32f	4,6-Diamino-2-thiopyrimidine	59d
6-Amino-3-methyl-5(N-formylmethylamino) uracil	59a	6,8-Dihydroxy-2-methylpurine	29b
2-Amino-5-methyl-4-oxypyrimidine	61a	6,8-Dihydroxypurine	23a
2-Amino-6-methylpurine	42b	2,4-Dihydroxypyrimidine-6-methylsulfone	58g
2-Amino-4-methylpyrimidine	69b	2,4-Dimethoxy-5-methylpyrimidine	90a
5-Amino-6-methyluracil	32b	2-Dimethylamino-6-hydroxypurine	51a
6-Amino-1-methyluracil	49b	6-Dimethylaminopurine	63b
2-Aminopurine	32c	6-Dimethylaminopurine ribonucleoside	53d
2-Aminopyrimidine	62c	1,7-Dimethylguanine	29c
6-Amino-2-thiouracil	50c	1,7-Dimethylhypoxanthine	66e
5-Aminouracil	25b	4,6-Dimethylpyrimidine	84a
6-Aminouracil	34b	1,3-Dimethyluracil	86a
		8-Mercapto-6-methylpurine	66c

6-Aminouracil	34b
5,6-Dimethyluracil	69a
1,3-Dimethyluric acid	47f
1,7-Dimethyluric acid	47d
3,7-Dimethyluric acid	39b
1,3-Dimethylxanthine	70a
1,7-Dimethylxanthine	66e
3,7-Dimethylxanthine	58d
3,8-Dimethylxanthine	56a
Dithiouracil	76b
5-Ethoxymethyl-6-methyluracil	77d
5-Ethoxymethyluracil	73a
5-Ethoxymethyluridine	56b
5-Fluorodeoxyuridine	59b
5-Fluorouracil	54a
5-Formylamino-3-methyl-6-methylaminouracil	48a
5-Formylcytosine	42c
5-Formyldeoxyuridine	42d
5-Formyluracil	44d
5-Formyluridine	30d
6-Furfurylaminopurine	78a
Guanine	23b
Guanosine	20a
Guanosine-5′-phosphate	5a
5-Hydroxydeoxyuridine	32a
6-Hydroxy-2-methylaminopurine	47e
5-Hydroxymethylcytosine	38h
5-Hydroxymethyldeoxycytidine	26d
5-Hydroxymethyldeoxyuridine	36c
8-Hydroxy-7-methylguanine	22a
4-Hydroxy-2-methylmercaptopyrimidine	83a
5-Hydroxymethyl-6-methyluracil	44c
5-Hydroxymethylorotic acid	26b
5-Hydroxymethylorotic acid lactone	45b
2-Hydroxy-6-methylpurine	36b
2-Hydroxy-4-methylpyrimidine	54b
4-Hydroxy-6-methylpyrimidine	66b
5-Hydroxymethyluracil	37a
5-Hydroxymethyluridine	24c
8-Hydroxypurine	42a
4-Hydroxypyrimidine	58c
Hypoxanthine	38g
Inosine	24d
Isobarbituric acid	34a
1,3-Dimethyluracil	66a
8-Mercapto-6-methylpurine	66c
5-Methoxymethyluracil	61b
5-Methoxymethyluridine	43f
6-Methoxypurine	72a
6-Methoxypurine ribonucleoside	62d
1-Methyladenine	46b
2-Methyladenine	41a
3-Methyladenine	53b
7-Methyladenine	45f
9-Methyladenine	57e
2-Methyladenine sulfate	57b
1-Methyladenosine	32e
6-Methylamino-5-(N-formylmethylamino)uracil	38e
6-Methylaminopurine	61c
6-Methylaminopurine deoxyribonucleoside	30f
6-Methylaminopurine ribonucleoside	42e
5-Methylaminouracil	34d
5-Methylbarbituric acid	60a
5-Methylcytidine	36e
1-Methylcytosine	57d
5-Methylcytosine	53a
5-Methyldeoxycytidine	56c
5-Methyldeoxycytidine-5′-phosphate	19a
1-Methylguanine	40a
1-Methylguanine sulfate	30c
3-Methylguanine	36a
7-Methylguanine	35b
1-Methylguanosine	30e
7-Methylguanosine	28b
5-Methyl-5-hydroxybarbituric acid	43b
1-Methylhypoxanthine	51b
2-Methylhypoxanthine	45a
3-Methylhypoxanthine	38f
7-Methylhypoxanthine	49a
8-Methylhypoxanthine	47c
9-Methylhypoxanthine	50b
1-Methylinosine	37c
7-Methylinosine	26a
6-Methylmercaptopurine	79a
1-Methyl-6-methylamino-5-(N-formylmethylamino)uracil	50f
3-Methyl-6-methylamino-5-(N-formylmethylamino)uracil	67a
3-Methyl-6-methylaminouracil	76a
5-Methylorotic acid	57a

(continued on p. 128)

TABLE III (*continued*)

6-Methylpurine	58e	Theophylline-7-acetic acid	77a
6-Methyl-2-thiouracil	72b	2-Thiobarbituric acid	54c
1-Methylthymine	75a	2-Thiocytosine	58a
2-Methyl-4,5,6-triaminopyrimidine sulfate	45e	5′-Thiomethyladenosine	57f
1-Methyluracil	66d	5′-Thiomethylinosine	48c
3-Methyluracil	77b	2-Thio-orotic acid	47b
6-Methyluracil	59c	2-Thiothymine	77c
1-Methyluric acid	25a	Thymidine	62b
3-Methyluric acid	22c	Thymidine-5′-phosphate	24a
7-Methyluric acid	26c	Thymine	62b
3-Methyluridine	62e	4,5,6-Triaminopyrimidine sulfate	37b
5-Methyluridine	45c	1,3,7-Trimethylxanthine	82a
1-Methylxanthine	52a	Uracil	50d
3-Methylxanthine	38j	1,3,8-Trimethylxanthine	80a
7-Methylxanthine	40b	Uracil-6-acetic acid	43a
Orotic acid	38b	Uracil-5-carboxylic acid	44a
Orotidine	17a	Uric acid	14a
Orotidine monophosphate	8a	Uridine	35c
Propyl-2-thiouracil	88a	Uridine-5′-diphosphate	0a
Purine	58f	Uridine diphosphate glucose	0c
5-Ribosyluracil	21c	Uridine-5′-phosphate	12a
Spongothymidine	55a	Uridine-5′-triphosphate	3a
6-Succinoaminopurine	47a	Xanthine	24b
1,3,7,9-Tetramethyluric acid	79b	Xanthosine	18a

SUMMARY

Paper chromatographic data for 215 purines, pyrimidines and derivatives in nine solvent systems have been reported. The data are useful as an aid in identification of compounds, and for selection of solvents to perform various separations.

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