



The International Pharmacopoeia

Third Edition

Volume 1

General methods of analysis

1979

World Health Organization 1979

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.372	/ 2 1 /	.1
AMENDMENTS AND CORRIGENDA TO VOLUMES 1 AND 2		
.310	/3 2 1 /	.2
AMENDMENTS AND CORRIGENDA TO VOLUMES 1,2 AND 3		
.256	/4 3 2 1 /	.3
AMENDMENTS AND CORRIGENDA TO VOLUMES 1,2,3 AND 4		
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WHO Expert Advisory Panel

1

1978/ /

1977-1974

42 1

units WHA30-39⁴
) International System of Units (SI)
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WHA3.10

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GENERAL NOTICES

Quantities and their precision

20	.	decimals			
0.20	2.05	1.95	2.0	20.5	19.5
			.0.0205		0.195

Temperature measurements and their precision

Calculation of results

		decimal			
1	9	5	:		
		.		4	
				.	

Solution

Solubility

	° 20				
	()		"Part	"	
			()	1	
<i>l</i>					
	1		Very soluble		
	10	1	Freely soluble		
	30	10	Soluble		
	100	30	Sparingly soluble		
	1000	100	Slightly soluble		
	10000	1000	Very slightly soluble		
	10000		Practically insoluble		

Loss on drying

1.0

Constant weight

"

1 () 0.5

ignite () "

"

Containers

 γ permeability

Well-closed container

handling

.Tightly closed container

deliquescence efflorescence

Protection from light

()

()

()

Patents and trademarks

Use of trade names

Reagents, test solutions and volumetric solutions

VS TS IR R

.167

UNITS OF MEASUREMENT

Système international d' Unités (International system of Units) (SI)

(CGPM)

⁵

SI

(1960)

(SI)

submultiples

multiples

decimal multiples

:

(SI)

submultiples

SI

5

A guide to international recommendations on names and symbols for quantities and on units of measurement

The SI for

1975

D. A.Lowe

.1977

health professions

giga	(G) 10^9
mega	(M) 10^6
killo	(k) 10^3
centi	(c) 10^{-2}
milli	(m) 10^{-3}
micro	(μ) 10^{-6}
nano	(n) 10^{-9}
pico	(p) 10^{-12}

:

Units of length

()	meter (m)
()	centimetre (cm)
()	millimeter (mm)
()	micrometer (μ m)
()	nonometer (nm)

Units of mass

()	Kilogram (kg)
()	gram (g)
()	milligram (mg)
()	microgram (μ g)
()	nanogram (ng)

Units of volume (capacity) ()

$1000 = ()$	Litre (l) = 1000 cm^3
$1 = ()$	millilitre (ml) = 1 cm^3
$0.001 = ()$	microlitre (μ l) = 0.001 cm^3

Units of time

year (a)
day (d)
hour (h)
minute (min)
Second (s)
millisecond (ms)
microsecond (μ s)

Units of temperature

	kelvin (k)
($^{\circ}$)	degree Celsius ($^{\circ}\text{C}$)

Units of pressure

kilogram (kPa)
pascal (Pa)

:

Non-SI

$0.69 \text{ kPa} \approx (\text{psi})$	lbf/in^2	()
$133 \text{ Pa} \approx ()$	mm Hg	

*Units of radioactivity*⁶

Gigabecquerel (GBq) = 27.03mCi

megabecquerel (MBq) = 27.03 μ Ci

becquerel (Bq) = 27.03pCi

Curie (Ci) = 37GBq

millicurie (mCi) = 37MBq

microcurie (μ Ci) = 37KBq

Units of electric current

amper (A)

milliamper (mA)

nanoampere (nA)

Units of electric potential

volt (v)

millivolt (mv)

Units of resistance

ohm (Ω)

PHYSICAL METHODS

MEASUREMENT OF MASS

capacity	balances	accuracy	sensitivity
accurately	"	50	"weighed
0.001	20	0.1	200-100
		"	"
		microbalance	50

Apparatus

) damping device	beam	(	(magnetic
)			(aperiodic balance
	manual placement		weight –loading
			optical scale projection system
		(	datum line
counterpoised			.single-pan
			beam

)

(

Placement of balance

leveling

Checking of sensitivity

RECOMMENDED PROCEDURE

Checking the stability of the equilibrium position

one-tenth

0.001

0.1

Operation of the balance

.pan supports

beam

crucibles

beakers

()

buoyancy

forceps

**DETERMINATION OF MELTING TEMPERATURE, MELTING RANGE,
CONGEALING POINT, BOILING POINT, AND BOILING RANGE**

(triple point)

(°) Celsius

"melting point"

()

()

()

melting range

apparent constants

reproducibility

.A

Determination of Melting Temperature and Melting Range of Pulverizable Substances

corrected

melting range

collapse

"melting range $a-b$ °C ° $b-a$ "

melting temperature

Apparatus

.(Silicones)

() ° 360+ 10–

. 0.8

solid-stem

.safety

total-immersion-thermometer

liquid column

partial-immersion thermometer

emergent liquid column

.emergent-stem

borosilicate

1.1-0.9

0.15-1.10

7

RECOMMENDED PROCEDURE

24

R

R

3

5

. ° 263+ ° 69+

Box 3045, S-171 03 solna, sweden

7

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mark

()

$$0.00015 N(T - t)$$

T

t

N

emergent-stem

T T_s

.B

Determination of Melting Point of Fats, Waxes, etc

Apparatus

A

:

° 100+ 10-
A

—
—
—

RECOMMENDED PROCEDURE

10

. 24 10 .
. 10

20

. 1 (° 1) ° 5

.C

Determination of Congealing Point

Apparatus

10 2 3
12

RECOMMENDED PROCEDURE

10

10

° 5

° 2

.D

Determination of Boiling Point

Apparatus

A

4

2

1

RECOMMENDED PROCURE

()

4-3

()

2-

° 10

1 ° 1

1 ° 2-1

emergent-

stem

A

(670)

101.3

:

$$k(p - p_1)$$

barometric

p

p_1

k

:

$$101.3 = (\quad) p$$

$$(\quad 1 \quad) 0.3 = k$$

:

()

$$760 = (\quad) p$$

$$(\quad 1 \quad) 0.04 = k$$

()

.E

Determination of Boiling Range (Distillation Range)

()

Apparatus

receiver

60-50

12-10

side-arm

16-14

12-10

:

75-70 5
 60-55 40
 bent adapter delivery receiver
 0.5 50-25
 Bunsen
 7-5 asbestos ()
 16-14
 4-3
 A 100
 emergent-stem correction
 bulb stem
 RECOMMENDED PROCEDURE
 25
 0.5-0.3
 10-5
 1 3-2
 (distillation ranges)
 (760) (Kpa) 101.3 ()
 2.7) 0.36 ° 0.1
 (

DETERMINATION OF MASS DENSITY AND RELATIVE DENSITY

			(Q)
	.cubic meter	1	(SI)
(	1	)	1
reduced to vacuum		) buoyancy	(Q ₂₀) ° 20
			.(conditions
	° 20		(d ₂₀ ²⁰)
specific gravity	"	" d ₂₀ ²⁰	"
			."° 20
	° 20		d ₄ ²⁰
	0.998234 ° 20		."° 4
			:

$$d_4^{20} = 0.998234 d_{20}^{20}$$

RECOMMENDED PROCEDURE

	) hydrostatic	d ₂₀ ²⁰
. pycnometer ()	(
(g/ml /	kg/l /	) Q ₂₀

$$Q_{20} = 0.99703 d_{20}^{20} + 0.0012$$

Use of pycnometer

() plummet

.beam

() riders

()

Use of pycnometer

5
 $^{\circ} 20$
 mark $30^{\circ} 1 \pm 20$
 inter

R

$^{\circ} 1 \pm 20$
 $\left(d_{20}^{20} \right)$

DETERMINATION OF OPTICAL ROTATION AND SPECIFIC ROTATION

optical activity

()

optical rotation

dextrorotatory

$(-)$ $(+)$

angular

(a)

radian (rad)

(SI)

) 589.3 (sodium D line) D

(589.6 589.0

546.1

photoelectric polarimeter
 .° 25-20

Specific optical rotation (specific rotation) (

(100

. 1 1 100

$$\frac{10000}{ldp} = \frac{10000a}{lc} =$$

() c () l a
 100 () p d 100

λ t $[\alpha]_{\lambda}^t$

(SI)
 m²·rad/mol (a_D) molar (/ . 2) m²·rad/kg ((/ . 2)

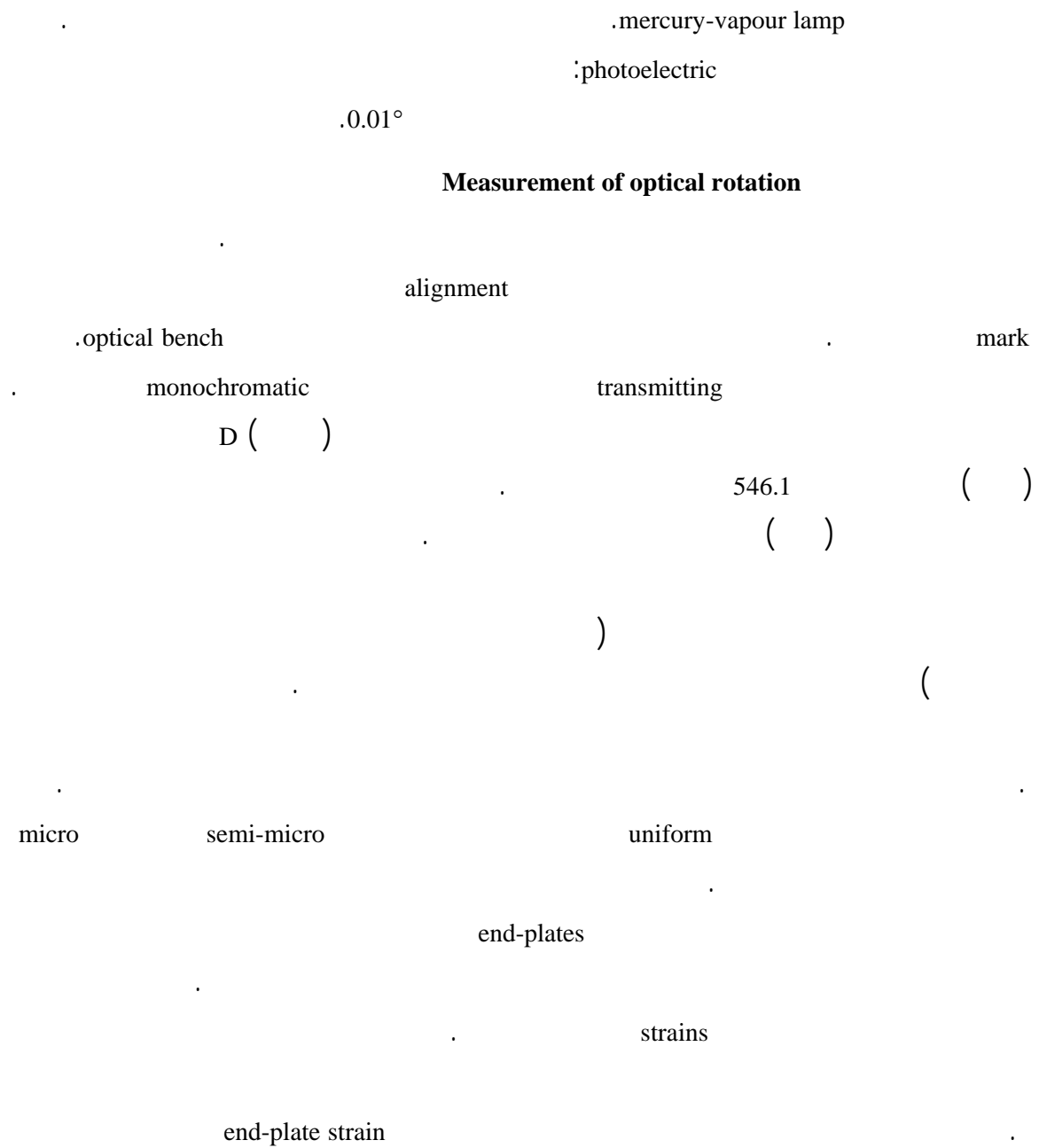
Apparatus

.polarimeter

0.05°

0.01°

:visual



mark

.blank

meniscus

30

racemization

.mutarotation

6

visual

sign

vacuum velocity (n)

— (n_λ^t)

incidence sin

$(\ln D)$ 589.3

$(n_D^{20}) \circ 0.5 \pm 20$

Apparatus

(D) 589.3

prisms

° 20 1.330

° 25 1.3325

SPECTROPHOTOMETRY IN THE VISIBLE AND ULTRAVIOLET
REGIONS

electromagnetic radiation

monochromatic

spectral range

spectrum

(780-380)

380-190)

monochromatic

quantitative

International

: Pharmacopoeia

(T) 10 logarithm – (A) Absorbance

.molar extinction coefficient

– *Absorption spectrum*

.graphic

.photometrically ()

.
stray light slit-width
solute .polychromic radiation
association molecules
.ionization dissociation

Apparatus

.
monochromatic radiant energy
dispersing device
associated detector
amplifiers
700 380
700 190
.automatic
single-beam double-beam

.
housing
1 ()
.silica
()

Spectrophotometer calibration

calibrations			
photometric scales			
spectral line			
quartz-mercury arc	—		
		435.83	404.66, 365.48, 334.15, 313.16, 302.25, 253.7
praseodymium	) didymium		
	holmium		(neodymium
	3±536.2	1±360.9	1±287.5 1±241.5 maxima
241.15 :		holmium perchlorate TS	
		536.3	361.5 278.2
% 1±	photometric scale		
	potassium dichromate TS		.absorptivity
	specific extinction	absorbance	
sulfuric acid	1000	60.06	potassium dichromate
:	A	1.000	VS (/ 0.005)
	350	313	257
	()	()	()
	0.640	0.292	0.865
	0.646-0.634	0.295-0.289	0.874-0.856
			0.756-0.740
			permitted tolerance
	106.56	48.62	144.02
			124.54
			$E_{1cm}^{1\%}$

transmittance ()
national institutions

inorganic
photometric scale

.periodic calibration

Operation of spectrophotometers

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valid

instruction manual

.

double-beam

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calibration

.reference beam

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solvents for use in the ultraviolet region

lower

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hydrocarbons

transparency

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1

cyclohexane

.0. 10

240

Identification tests in the ultraviolet region

qualitative

.International Chemical Reference Substance

: (% 10)
.transmittance ()

Quantitative determinations in the ultraviolet region

280-240

0.5±

320

2±

320-280

1±

International

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Chemical Reference Substance

. "Identification tests in the ultraviolet region

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.labeling

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Quantitative determinations in the visible region

"Quantitative determinations in the ultraviolet region"

5

SPECTROPHOTOMETRY IN THE INFRARED REGION

electromagnetic spectrum

10^{-4} (40-2.5) 10^{-1} 250-4000

optical isomers

Polymorphism

()

transmittance ()

absorbance

absorption spectrum

"

specific extinction

absorptivity

(24) "Spectrophotometry in the visible and ultraviolet regions"

Apparatus

wavelengths

Wavelengths

1

.detection devices optical materials
 .detector monochromator
 1- 670-4000
 (15-2.5)
 reliability
 .polystyrene film
 attenuated total reflectance technique
 single-reflection attachment
 alignment
 .maximum transmission ()
Use of solvents
 .()
 .
 .(6 2.5) 1- 1700 4000 (1) carbon tetrachloride R
 IR R R R
 1- 2000 - 2400 40) 1- 250 (1)
 . (7.5 - 5.5) 1- 1300 - 1800 (5.0 - 4.2)
 .(11.8 - 11.4) 1- 845 - 875
 .transparency

Preparation of the substance to be tested

.
 .
 mineral oil
 potassium halide
 attenuated total reflectance technique .

:
 capillary film *.Method 1*
 ()
.Method 2
 mull 5-2
 semi-transparent
) potassium halide *.Method 3*
 -200 1 (IR IR
 - 300 1 prism instruments - 300 1.5
 .grating () - halide 300 1.0
 2 15-5
 .
 .
 .
 (5) 1- 2000 transmission ()
 .compensation %75 specific absorption
.Method 4
 ()

Identification by reference substance

1- 670 4000
 (15 2.5)
 .transmittance %2 %5

3 2

2 mineral oil
fluorinated hydrocarbon oil
hexachlorobutadiene

Identification by reference spectrum

(15 2.5) ¹⁻ 670 4000 International Reference Spectrum

International Reference

reference absorbance

Spectrum

International

superimposed

polystyrene

maxima

9.73) ¹⁻ 1028 (6.25) ¹⁻ 1601 (3.51) ¹⁻ 2851 Reference Spectrum
(

International Reference

Spectrum

resolving power

International Reference Spectra

(5 2.5) ¹⁻ 2000 4000

Attenuated total reflectance technique

translucent

2-1

rubber

reflecting element

plastic materials

attachment

proper alignment

ATOMIC ABSORPTION SPECTROPHOTOMETRY

ground state

()

flamless

Apparatus

spectral line

nebulizer-burner system

hollow-cathod

monochromator

Use of solvents

()

.burner-aspirator —

%2

RECOMMENDED PROCEDURE

3

()

3

3

FLUORESCENCE SPECTROPHOTOMETRY

30 20

dilutions

Terms

Fluorescence intensity

.Fluorescence emission spectrum

.fluorescence excitation spectrum

Apparatus

. (fluorometer)

.incident beam 90°



Preparation of solution

100 10

()

"inner fulter"

10-7-10-5

(c-d)/(a-b)

c b a

.2.50 0.40 d

solvent blank

Measurement technique

()

exciting beam

1 %2-1

TURBIDIMETRY AND NEPHELOMETRY

Terms

:Transmittance (T)

transmission Transmittancy

:Turbidance (S)

light-scattering effect

:Turbidity (τ)

Apparatus

() —

Instrumental measurement

Visual comparison

70 () 23

COLOUR OF LIQUIDS

RECOMMENDED PROCEDURE

16) 10 10 .(50

Stock Colour Standard Solutions

Yellow stock standard TS

10.7 TS 1.9 TS 9.5
(/ 10 ~) 100 TS 4.0 TS TS

Read stock standard TS

6.3 TS 6.1 TS 40.5
10 ~) 100.0 TS 12.0 TS TS (/

Green stock standard TS

10.4 TS	20.1 TS	3.5
100.0	TS	4.0 TS
		. TS (/

Brown stock standard TS

8.0 TS	17.0 TS	35.0
	. TS	100.0 TS

Standard Colour Solutions

)

.TS (/ 10 ~) (

	Bn	Gn	Rd	Yw)
				. (/ 10)
			()	() TS
0			0.78	99.22
1			1.65	98.44
2			3.12	96.88
3			6.25	93.75
4			12.50	87.50
5			25.00	75.00
6			50.00	50.00
7			100.00	—

7-4

RADIOPHARMACEUTICALS

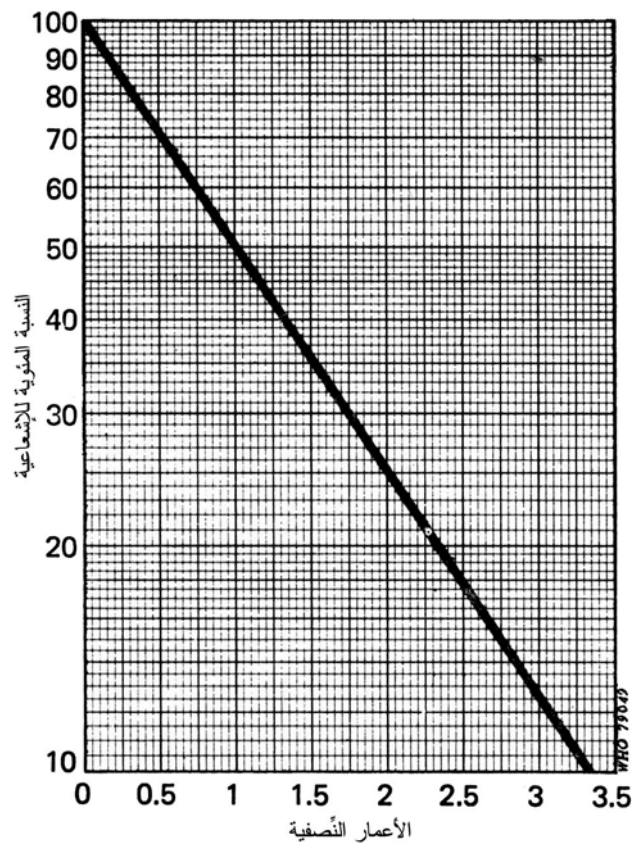
(radioactive pharma-) handling ceuticals)

Definitions	
Nuclide	
mass number	
Radioactivity	
transformation	
"disintegration"	:" transformation
Radionuclide	
()	
Units of radioactivity	
becquerel (Bq)	(SI)
Curie (Ci)	1
	$3.7 \times 10^{10} \text{Bq}$
Units of	"
	(4) "measurement
Half-life period	
	() :
	: exponential decay
$N = N_0 e^{-\lambda t}$	
$\lambda \quad t = 0$	$N_0 \quad t \quad N$

:

$$T_{\frac{1}{2}} = \frac{0.693}{\lambda}$$

.(1)



:1

Radioactive concentration

.standardization

30

Specific radioactivity (or specific activity) ()

1" : :

(O-iodohippuric 1 (1 mCi of iodine-131) 131-
 1 75- 40MBq" "1979 / / 1 12.00 acid)
 ."1979/ / 1 Selenomethionine

1 (131I) 131- (x mci) x
 1 y 131-
 :

1 131- x/y
 .() purity
 " ."Specific activity "
 "activity
 "specific radioactivity

Radionuclidic purity

) :

impurity xenon-131m 131-
 :

.(bequerels curies)
 1 125- (99mci) 99 125-
 .%99 126-
 . 126 125-

%1 126-
30

" :

."

.reference hour

(identities)

.

.

"

."

detector

gamma scintillation spectrometry

Radiochemical purity

.stated

.

(⁵⁷Co)

.

57–

%99

%99

.(⁵⁷Co)

(⁵⁷Co)

.

identical chemical

isotopic

istopic

.form

.

.()

Production and handling of Radiopharmaceuticals

.

.

.

.

الجدول 1: الأميزات الفيزيائية للوكليدات المشعة

الأميزة	مدة العمر النصفي ^a	نظير التلاشي ^b	طاقات الجسم واهتميات الانتقال			الانتقالات الكهروطيفية		
			الانتقال	الانتقال	الانتقال	MeV	طاقة الفوتون MeV	الفوتونات المشعة
137-سيزيوم Cesium-137	30.1a	β^-	0.512	94.6%				
			1.174	5.4%				
					Via 2.6mm 137mBa			9.5%
					0.662			85.1%
					0.032-0.038			8% (Ba K X-rays)
51-كروم Chromium-51	27.7d	e.c		100%	0.320		9.83%	
					0.005-0.006		~22% (V K X-rays)	
57-كوبالت Cobalt-57	270 g	e.c		100%	0.014		9.4%	78.0%
					0.122		85.2%	2.0%
					0.136		11.1%	1.5%
					0.570		0.02%	
					0.692		0.16%	
					أخرى		كثافة منخفضة	
					0.006-0.007		~53% (Fe K X-rays)	
58-كوبالت Cobalt-58	70.8 d	β^+	0.475	15.0%	0.511		β^+ من	
		e.c		85.0%	0.811		99.4%	
					0.864		0.7%	
					1.675		0.5%	
					0.006-0.007		~26% (Fe K X-rays)	

(a) μs = ميكروثانية؛ ms = ميلي ثانية؛ h = ساعة؛ d = يوم؛ a = سنة
 (b) e.c = انبعاث إلكترون؛ it = انبعاث تقاطع نقي

Cobalt-60 كوبالت-60	5.27a	β^-	0.318	99.9%	1.173	99.86%	0.02%
			1.491	0.1%	1.333	99.98%	0.01%
					أخرى	<0.01%	
Gallium غاليوم	78.3h	e.c	100%	0.091	3.6%	0.03%	
				0.185	23.5%	0.4%	
				0.209	2.9%	0.02%	
				0.300	16.7%	0.06%	
				0.394	4.4%	0.01%	
				0.494	0.1%		
				0.704	0.02%		
				0.795	0.06%		
				0.888	0.17%		
				0.0008 - 0.010	43% (Zn K X-rays)		
				via $9.2\mu\text{s}$ 67m Zn			
				0.093	37.6%		
				0.008 - 0.010	13% (Zn K X-rays)		
Gold-198 ذهب-198	2.70d	β^-	0.285	1.32%	0.412	95.45%	4.3%
			0.961	98.66%	0.676	1.06%	0.03%
			1.373	0.02%	1.088	0.23%	
Gold-199 ذهب-199	3.13d	β^-	0.25	21%	0.050	0.3%	3.5%
			0.29	72%	0.158	39.6%	36.4%
			0.45	7%	0.208	8.8%	8.3%
					0.69-0.083	~ 18% (Hg K X-rays)	
Indium-111 إنديوم-111	2.81d	e.c		100%	0.172	89.6%	10.4%
					0.247	94.0%	6.0%

تابع الجدول 1: المُعَيَّرات الفيزيائية للبروتيدات المشعَّة

النوية	مدة العمر النصفية ^a	نظير الانحلال ^b	طاقات التحلل واحتمالات الانتقال			الانتقالات الكهرومغناطيسية		
			طاقة الانتقال	احتمالية الانتقال	طاقة الفوتون MeV	الفوتونات المنبعثة	الانتقالات المنبعثة داخلياً	
Indium-113	99.5min	i.t	100%	0.392	64.9%	24% (In K X-rays)	35.1%	
Indium-113	إنديوم-113			0.024-0.028				
Iodine-123	13.2h	e.c	100%	0.159	83.0%		16.3%	
Iodine-123	اليود-123			0.347	0.10%			
				0.440	0.35%			
				0.506	0.26%			
				0.529	1.05%			
				0.539	0.27%			
				0.027-0.032	~ 86% (Te K X-rays)			
Iodin-125	60.2d	e.c	100%	0.035	7%		93%	
Iodin-125	اليود-125			0.027-0.032	138% (Te K X-rays)			
Iodin-126	13d	β^-	3%	0.389	32%		0.5%	
Iodin-126	اليود-126		30%	0.491	2%			
			15%	0.511	β^+ من			
		β^+	~0.1%	0.666	30%		0.1%	
			1.1	0.754	4%			
		e.c	51.5%	0.880	0.8%			
				1.420	0.3%			
				أخرى	<0.1% each			
				0.027-0.032	~38% (Te K X-rays)			

^a سنة = a ؛ دقيقة = d ؛ ساعة = h ؛ دقيقة = min ؛ ثانية = s ؛ ميلي ثانية = ms ؛ ميكرو ثانية = μ s ؛ نانوية = ns
^b e.c (b) = انقلاط إلكتروني ؛ i.t = انتقال تصادفي

Iodine-131	8.06d	β^-	0.247	1.8%	0.080	2.4%	3.8%
الجزء-131			0.304	0.6%	0.284	5.9%	0.3%
			0.334	7.2%	0.364	81.8%	1.7%
			0.806	0.7%	0.723	1.8%	
1.3% of ^{131}I decays via ^{124}I to ^{131m}Xe							
(Xenon-131m)		I.t		100%	0.164	2%	98%
الجزء-131m					(0.164m)	2%	
Iodine-132	2.29h	β^-	0.84	16.0%	0.506	5.0%	
الجزء-132			1.01	3.3%	0.526	16.0%	0.2%
			1.07	6.5%	0.621	2.0%	
			1.09	3.0%	0.630	13.7%	0.1%
			1.10	2.6%	0.651	2.7%	
			1.26	2.9%	0.668	98.7%	0.4%
			1.29	18.4%	0.670	4.9%	
			1.57	10.8%	0.672	5.2%	
			1.72	12.7%	0.727	6.5%	
			2.24	20.2%	0.773	76.2%	0.3%
		أخرى		3.4%	0.810	2.9%	
					0.812	5.6%	
					0.955	18.1%	
					1.136	3.0%	
					1.295	2.0%	
					1.372	2.5%	
					1.399	7.1%	
					1.433	1.4%	
					1.921	1.2%	
					2.002	1.1%	
					أخرى	<1.5%	

تابع الجدول 1 : المُعَرَّات الفيزيائية للبركليات المُنبَعة

النوية	مدة النصف ا	نقط التحلل	طاقات الجسم واحتمالات الانتقال			الانتقالات الكهروضوئية	
			الطاقة Mev	احتمالية الانتقال	طاقة الفوتون Mev	الفوتونات المنبعثة	الانتقالات المنبعثة داخليا
الحديد-55	Iron -55 2.69 d	e.c			0.006	~28%(Mn K X-rays)	
الحديد-59	Iron - 59 44.6 d	β^-	0.084	0.1%	0.143	0.8%	
			0.132	1.1%	0.192	2.8%	
			0.274	45.8%	0.335	0.3%	
			0.467	52.7%	0.383	0.02%	
			1.566	0.3	1.099	55.8%	
				1.292	43.8%		
				1.482	0.06%		
Mercury -197 الزئبق -197	64.4h	e.c	100%		0.077	19.2%	80.7%
					0.192	~1.1%	0.9%
					0.268	~0.1%	
					0.067 - 0.080	~7.%(Au K X-rays)	
Mercury-197m الزئبق -197m	24 h	e.c	635%		0.134	31.8%	61.7%
		it	93.5%		0.165	0.3%	93.2%
					0.067 - 0.083	36%(Au/ Hg K X-rays)	
					Via 7.8s 197m Au		
					0.130	0.5%	6%
					0.279	5.0%	1.5%
					0.409	<0.005%	
					0.67-0.080	~2%(Au K X-rays)	
Daughter 197Hg							
اليئة 197Hg							

(a) $\mu s = \text{مكرو ثانية} ; ms = \text{ميلي ثانية} ; s = \text{ثانية} ; h = \text{ساعة} ; d = \text{يوم} ; a = \text{سنة}$
 (b) $e.c = \text{التقاط إلكترون} ; it = \text{انتقال تضادوي}$

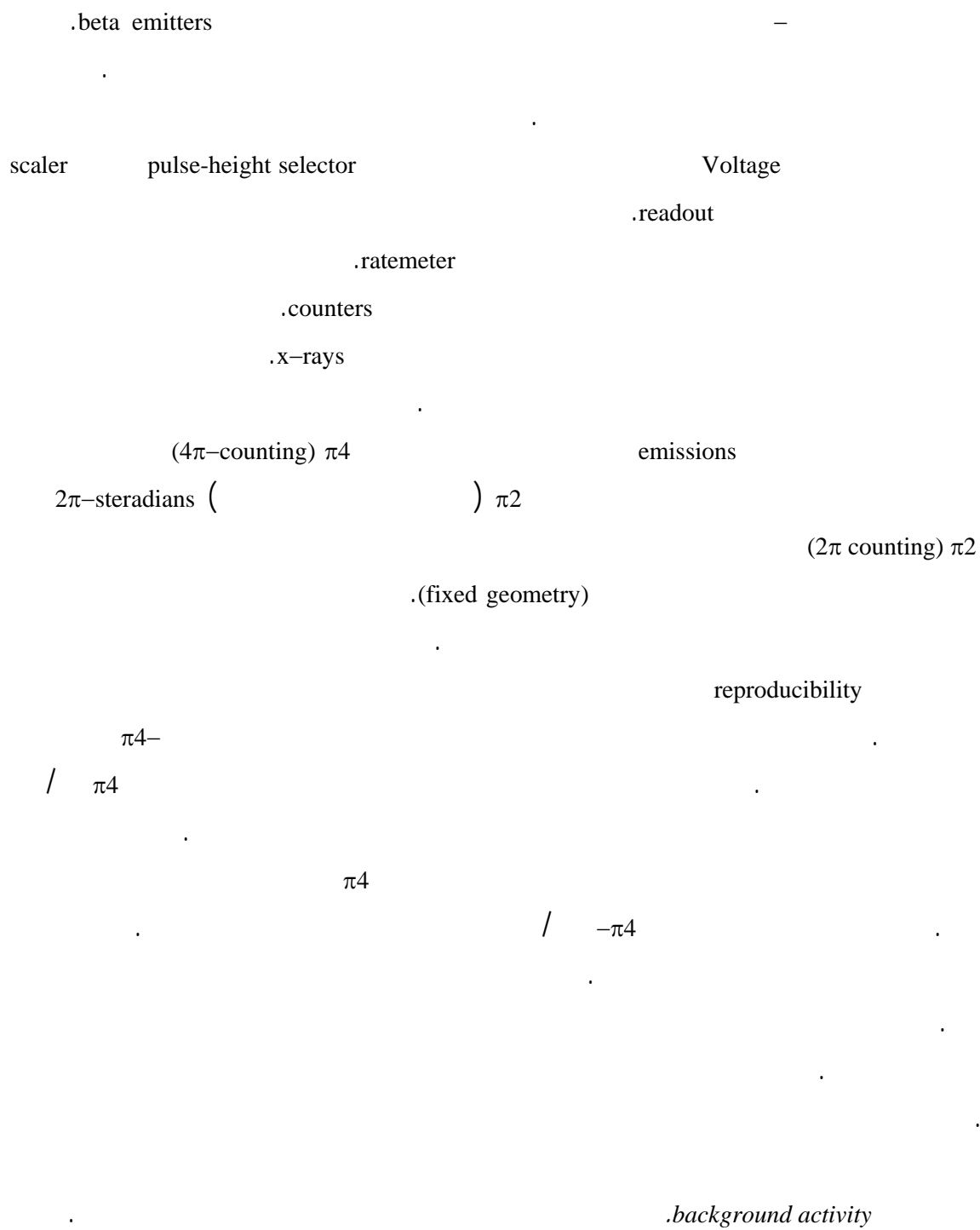
Mercury-203 الزئبق-203	46.6 d	β^-	0.212	100%	0.279	81.5%	18.5%
					0.071-0.085	12.5% (Tl K X-rays)	
Molybdenum-99 موليبدنوم-99	66.2 h	β^-	0.454 0.866 1.232	18.3% 1.4% 80% 0.3%	0.041 0.141 0.181 0.366 0.412 0.529 0.621 0.740 0.778 0.823 0.961	1.2% 5.4% 6.6% 1.4% 0.02% 0.05% 0.02% 13.6% 4.7% 0.13% 0.1%	4.8% 0.7% 1.0%
			أخرى				
Via 6.02 h 99mTc in equilibrium							
					0.002 0.141 0.143	~0% 83.9 0.03	93.9% 10.0% 0.8%
Phosphorus - 32 الفوسفور-32	14.3 d	β^-	1.709	100%			
Selenium - 75 سيلينيوم-75	118.5 d	e.c		100%	0.066 0.097 0.121 0.136 0.199 0.265 0.280 0.401 أخرى	1.1% 2.9% 15.7% 54.0% 1.5% 56.9% 18.5% 11.7% <0.05% each	0.3% 3.0% 0.7% 1.6% 0.4% 0.2%
					0.010-0.012	~50% (As K X-rays)	

تابع الجدول 1: المُؤثرات الفيزيائية للبروتيدات المشعة

النوية	مدة العمر النصفية ^a	نمط الاطلاق ^b	طاقات الجسم واحتمالات الانتقال		الانتقالات الكهروضوئية													
			MeV	الطاقة	احتمالية الانتقال	MeV	طاقة الفوتون	الفوتونات المنبعثة	الانتقالات المنطلقة داخليا									
Technetium-99m تكنيشيوم-99m	6.02 h	i.t	100%	0.002	0.141	0.143	~0%	88.5%	10.6%	0.87%								
											0.010-0.012	~2.6% (As K X-rays)						
													0.031	0.29%	10.1%			
																0.32	0.25%	9.6%
Thallium-201 تاليوم-201	73.5 h	e.c	100%	0.031	0.32	0.135	0.166	0.13%	0.2%	16.0%								
											0.167	8.81%						
													0.255	2.1%	0.1%			
																0.021-0.028	73%(In K X-rays)	
																		0.021-0.028	73%(In K X-rays)
Tin-113 التصدير-113	115 d	e.c	100%	0.255	0.021-0.028	0.021-0.028	0.021-0.028	73%(In K X-rays)	0.021-0.028	73%(In K X-rays)								
											0.021-0.028	73%(In K X-rays)						
Tritium (³ H) تريتيوم (³ H)	12.35 d	β ⁻	100%	0.0186	0.0186	0.0186	0.0186	0.0186	0.0186	0.0186								
											0.0186	0.0186						

(a) μs = ميكرو ثانية؛ ms = ميلي ثانية؛ s = ثانية؛ min = دقيقة؛ h = ساعة؛ d = يوم؛ a = سنة
(b) e.c = التقاط إلكترون؛ it = انتقال تصاوغي

Xenon-131m الزئبق-131م	11.9 d	i,t	100%	0.164 0.029-0.035	2% ~52% (Xe K X-rays)	98%
Xenom-133 الزئبق-133م	5.25 d	β^-	0.9%	0.080 0.081 0.160	0.4% 36.6% 0.05%	0.5% 63.3%
			99.1%			
				0.030-0.036	~46% (Cs K X-rays)	
Xenon-131m الزئبق-131م	2.26 d	i,t	100%	0.233 0.029-0.035	8% ~59% (Xe K X-rays)	92%
		Daughter ¹³³ Xe				
Ytterbium-169 اليتربيوم-169	30.0 d	e,c	100%	0.021 0.063 0.094 0.110 0.117 0.118 0.131 0.177 0.198 0.240 0.261 0.308	0.21% 45.16% 0.78% 3.82% 0.04% 1.90% 11.42% 17.31% 26.16% 0.12% 1.74% 11.04%	12.3% 50.4% 12.3% 56.2% 3.2% 13.5% 17.7% 25.7% 0.7%



: R corrected count rate

$$R = \frac{r}{1 - r\tau}$$

.resolving time τ r

10000 .counts

.%1

Absorption

()

absorbers

.beta emitters

.125- x-rays

$2 /$ "thickness" (μ)

(2)

Method

"Natrii Phosphatis (^{32}P) Injectio" ()

.half-thickness

6

$2 /$ 20 10

$2 /$ 800

logarithm

$$\cdot \left(\frac{\quad^2}{\quad} / 800 \right)$$

function

)

(

)

$$\cdot \frac{.2}{\quad}$$

$$(1.205$$

$$\frac{2}{\quad} / 20$$

$$(t_2, t_1)$$

(μ)

$$\mu = \frac{1}{t_2 - t_1} \ln \frac{A_{t1}}{A_{t2}}$$

$$A_{t_2} \quad A_{t_1}$$

$$t_2$$

$$t_1$$

half-thickness

$$t_2 \quad t_1$$

32-

%5±

(0)

$$\frac{2}{\quad}$$

Radiation spectrometry

Crystal scintillation spectrometry

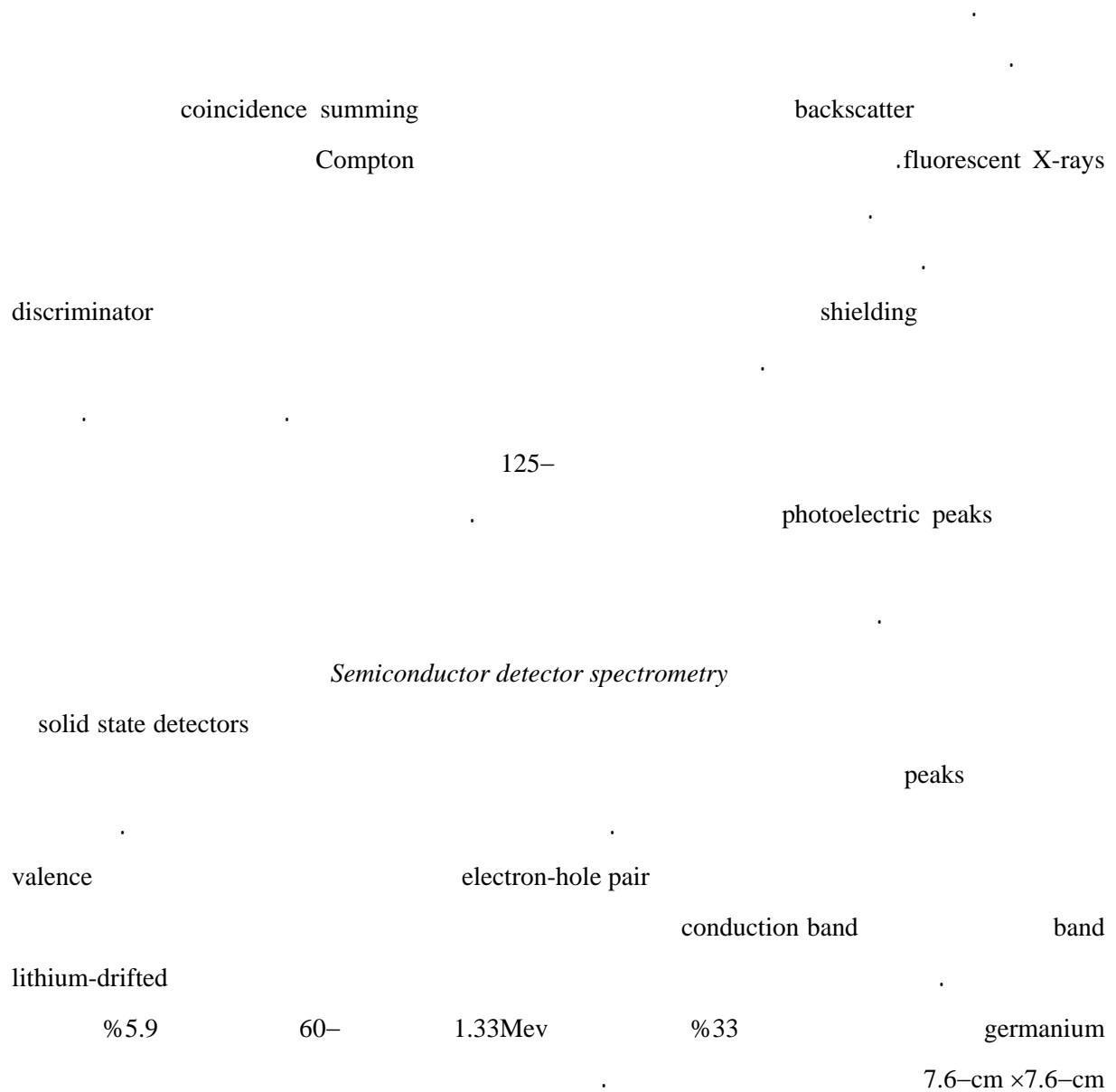
scintillators

()

scanning

plus-height analyser

photoelectric peaks



discriminators

%60 ^{14}C %95

()

^3H

) 2,5-diphenyloxazole *p*-terphenyl

Dimethyl- 1.4-di[2-(4-methyl-5-phenyloxazole)] benzene

(
(POPOP

.quenching

Radiation Shielding

.background radiation

.() Bremsstrahlung

monoenergetic

X- Bremsstrahlung

Bremsstrahlung

exponential

.half-value layers

% 1

7

handling ()

.reference

/

multimillicurie

.remote-handling devices

Determination of Radionuclidic Purity

gamma emitters

:

.gamma spectrometry

(a)

detectors

(b)

resolution

.(Ge:Li)

(c)

fluorescent

coincidence summation

backscatter

.X-rays

:

(

)

isotopic ()

Requirements for radionuclidic purity

:

.1

.2

.197–

203–

batches

Determination of Radiochemical Purity

(76-72)

)

.artifacts

(

carriers

.(99-96)

()

()

Determination of Chemical Purity

Preparation

131-

Tests for Sterility and Pyrogens

Tests for Sterility

.release

.retrospectively

Sterility tests

indicators

sterilizers

Pyrogen tests

.(155-153)

Addition of Bacteriostatic Agents

Other Requirements

Expiry Date

()

Labelling

(vial)

- .1
- .2
- .3
- .4
- .5
- .6
- .7
- .8

30)

(

()

)

:

(1 MBq (mci)

Storage

POWDER FINENESS AND SIEVES

Powders .A

(µm)

:

2000 .(2000/355) Coarse powder
.355 %40
.(710/250) Moderately coarse powder
.250 %40 710
.(355/180) Moderately fine Powder
.180 %40 355
.180 .(180) fine powder
.125 .(125) very fine powder

Sieves .B

.(µm)

.(2)

Wire mash sieves

.2

Approximate screening area (%)	Nominal diameter of wire (mm)	Nominal size of aperture (mm)	Number of sieve (µm)
2000	2.00	0.90	48
710	0.710	0.450	37
500	0.500	0.315	38
355	0.355	0.224	38
250	0.250	160	37
212	0.212	0.140	36
180	0.180	0.125	35
150	0.150	0.100	36
125	0.125	0.090	34
90	0.090	0.063	35
75	0.075	0.050	36
45	0.045	0.032	34

.ISO – standard 565-1972

PHYSICOCHEMICAL METHODS

CHROMATOGRAPHY

mobile solute

partition adsorption stationary

coated ()

gel permeation ion exchange (solid support)

() separation

detection identification

" chromatographic method of analysis "

planar methods

(paper and thin-layer chromatography) adsorbent

)

(high performance liquid chromatography

solutes /

()

identification

separations

determination

detection

Thin –layer Chromatography

0.24)

adsorbent

(

(capillary action)

.plastic

partition

adsorption

(

)

Silica gel

cellulose

alumina

Kieselguhr

prepared layer

basic

identification ()

standard

()

()

R_f

()

R_f

R_r

R_r

Char

()

revelation

loading

RECOMMENDED PROCEDURE

precoated

.

:

()

spreading

•

200

•

•

.

()

slurry

0.25

.

30 ° 110

.

.R

(5-2)

.

.

1

. 5

.

Method

.%60-50

. 4

.

micropipette

1.5

1.5

1.5

.

.

15

() ()

.

.

Paper Chromatography

stationary

Corrosive

R_r R_f

descending

ascending

RECOMMENDED PROCEDURE

Descending paper chromatography

1.5

2.5

grain

Method

3-2

24

.%50

micropipette

10

3

90

Ascending paper chromatography

2.5

Method

3-2

24

.%50

3

10

3

Column Chromatography

solid

adsorption column chromatography

silicic acid

) support

(

)

slurry

(kieselguhr

(

)

adsorbent

) effluent

(

)

(eluate

)

.(

partition column chromatography

.solid adsorbent

.elution

siliceous

earth

reverse-phase

paraffins

silanizing

distribution coefficient

dissociate

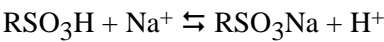
Ion-exchange chromatography

.ion-exchange resin

counter-ion

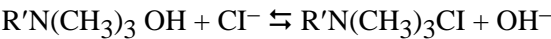
H⁺/Na⁺

:



:

Cl⁻/OH⁻



. () 1

5 2

stoichiometric

(% 300 – 200)

()

()

Treatment of the ion-exchange resin and preparation of the

24

.column

80~)

effluent

1

3

TS (/

.alkalinity

R

(/ 70 ~)

.neutral

R

(/ 80~)

TS (/ 70~)

TS

High - performance liquid chromatography

Introduction

(HPLC)

adsorption

(HPLC)

.ions

size exclusion

ion exchange

partition

HPLC

stationary phase

. Mobil phase

. solutes

distribution

/ purity

HPLC

enantiomeric composition

.chiral

Apparatus

injector

pumping

.(

)

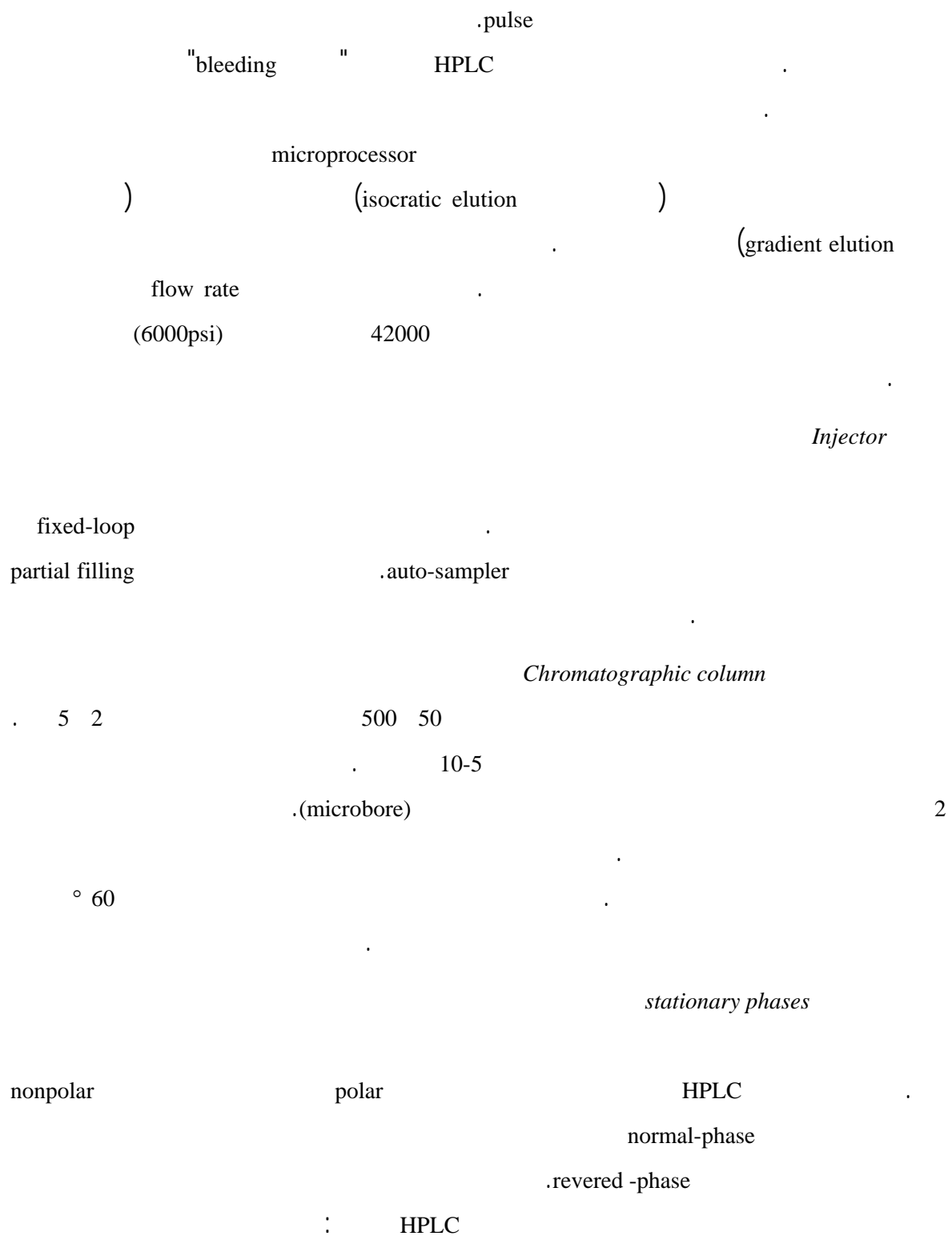
detector

fittings

pumping system

to deliver

HPLC



porous graphite alumina —

polymers —

resin —

silanol support . (HPLC)

covalently silyl () silane

active sites derivatives

bonded phase

Common bonded phases		
C ₉	Si – (CH ₂) ₇ –CH ₃	octyl
C ₁₉	Si – (CH ₂) ₁₇ –CH ₃	octadecyl
C ₆ H ₅	Si – (CH ₂) ₃ –C ₆ H ₅	phenyl
CN	Si – (CH ₂) ₃ –CN	cyanopropyl
NH ₂	Si – (CH ₂) ₃ –NH ₂	aminopropyl
	Si – (CH ₂) ₃ –OCH(OH)–CH ₂ –OH	diol

) enantiomers

albumins (chiral

8.0-2.0

styrene vinylbenzene copolymer

HPLC

()

10⁻³

porosities

carbon-loading

residual silanol

"end-capped"

tailing of peaks

Mobile phase

retention

analyte

lipophilic

modifiers

0.45

()

sonification

()

stabilizers

buffers

organic modifier

ion-pair

.achiral

ion-pair

.achiral

Connecting tubing and fitting

injectors

/ / / /

.detectors

. "zero-dead volume (ZDV) type

0.25

capillary

band spreading

Detectors

(UV/vis)

fluorescence spectrophotometers

chromophoric

analyte

(UV/vis)

/

/

diode array

UV/vis

UV/vis

absorbance

.eluted peaks

spectral homogeneity

.validation

pre-column

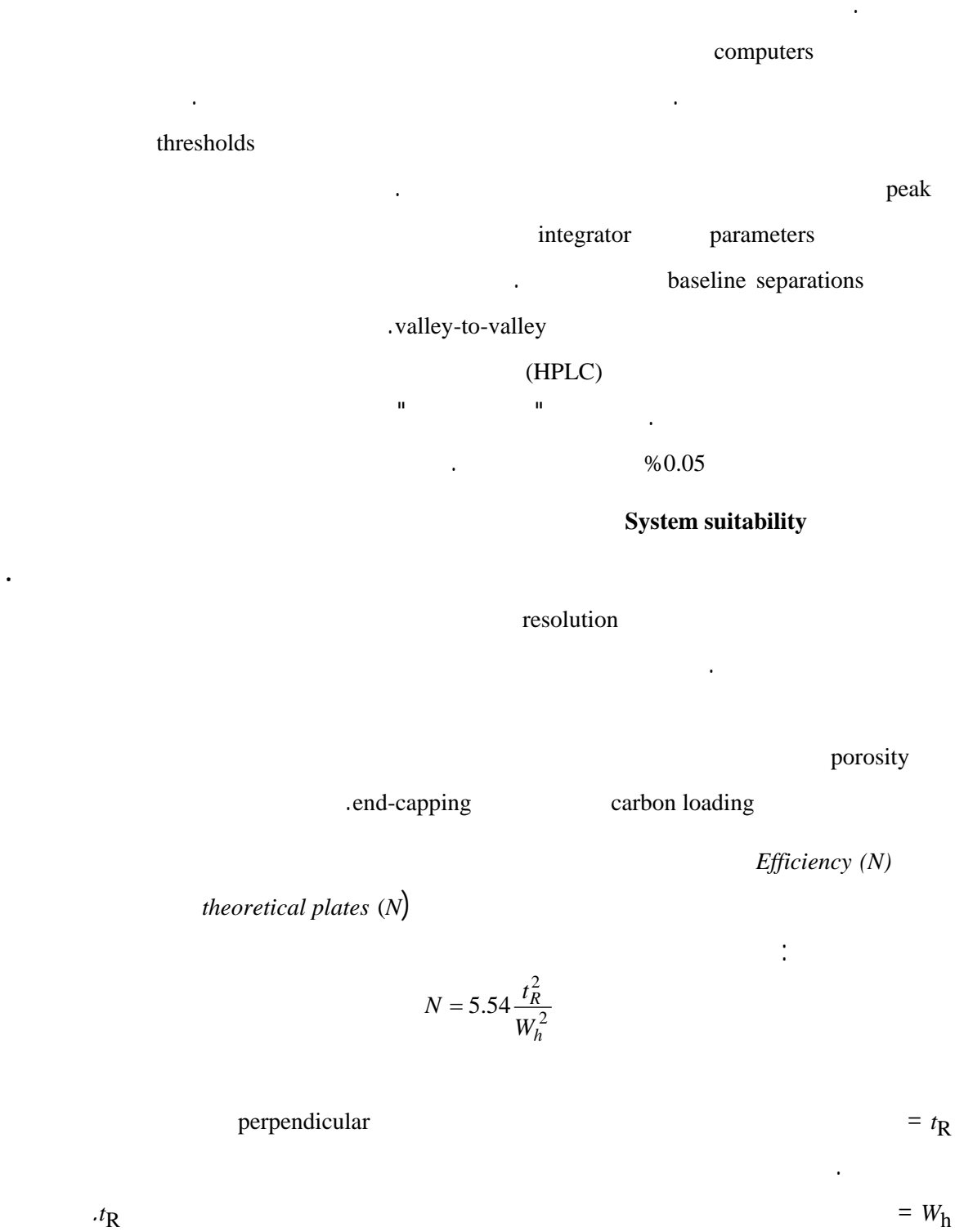
.(

) .post-column

Date collection devices

integrators

signals



$$(N')$$

$$N' = \frac{N}{l}$$

$$= l$$

$$\begin{array}{l} \text{Capacity factor (mass distribution ratio } D_{\text{m}}) \text{ (} D_{\text{m}} \text{)} \\ \vdots \end{array}$$

$$D_{\text{m}} = \frac{\text{---}}{\text{---}}$$

$$\vdots$$

$$D_m = \frac{(t_R - t_M)}{t_M}$$

$$= t_{\text{R}}$$

$$= t_{\text{M}}$$

$$\begin{array}{l} (\quad) \\ \vdots \\ D_{\text{m}} \\ 1 \quad D_{\text{m}} \end{array}$$

$$\text{Resolution factor}$$

$$\vdots$$

$$R_s = \frac{1.18(t_{R2} - t_{R1})}{(W_{b1} + W_{b2})}$$

$$= t_{\text{R}2} - t_{\text{R}1}$$

$$\text{peaks widths}$$

$$= W_{\text{b}2} - W_{\text{b}1}$$

1.5

baseline separation

$$R_s = \frac{t_{R2} - t_{R1}}{W_x}$$

Relative retention

∴ (r)

$$r = \frac{t_{R2} - t_M}{t_{R1} - t_M}$$

peak of interest = t_{R2}

reference peak = t_{R1}

unretained component = t_M

symmetry factor

∴

$$A_s = \frac{W_x}{2d}$$

%5

leading edge

$$\%5 = W_x$$

$$= d$$

. W_x

$$2 A_s$$

∴ () tailing

silanol

Repeatability

assay

relative standard deviation

∴ %2.0

"Related substances"

%5.0

.%1.0

Recommended procedure

.(30)

/

%50

full-scale deflection

.system suitability

)

.(4-2

normalization ()

response factor

(UV/vis)

HPLC

detection

(%20±)

(reciprocals)

blank

Gas Chromatography

adsorbent ()
 gas - solid –) carbon silica gel alumina
 () (chromatography
 firebrick diatomaceous earth
 (gas-liquid chromatography –)
 "open-tube" () (capillary
 polyaromatic porous beads

(K)

$$K = \frac{\text{mass of solute in solid phase}}{\text{mass of solute in gas phase}}$$

solute

K

) – ((

K

detector

detectors

.conductivity

flame

.hologenated

mass

° 300

"temperature programming

3

0.5

100

10

. 5 2

1.5

60-)

250

75

200

peak tailing

silanizing

inlet

) macrogols

polysiloxanes

"Column bleeding

)
 (internal standard
 —
 ()
) normalization
 .(
 integrator
 linear
 planimeter
 area height
 tangentially base line
 internal standard
 (1) 3
)
 A
 (2)
 retention time
 allowance
 (3) coincidence peak

C A data .(1

B

normalization

RECOMMENDED PROCEDURE

pre-column

16*t*_R2/*L*_y2

base line

(mm)

*t*_R

perpendicular

(m)

L

(mm)

Y

eluted

Method

1

1

.3 2

1.05 0.95 symmetry factor

$y_x/2A$
 width y_x
 leading edge perpendicular A
 resolution
 $2(t_{Rb} - t_{Ra})/(y_a + y_b)$.1.0
 perpendiculars $t_{Rb} \quad t_{Ra}$
 $y_b \quad y_a$

DETERMINATION OF pH

(pH)
 negative logarithm

1 activity coefficient

glass electrode
 buffered

pH Scale

: $S \quad X$

E_x

Pt | H₂ | solution X | 3.5 mol/l /1 KCl |

E_s

Pt | H₂ | solution S | 3.5 mol/l /1 KCl |

bridge solutions

(S)

S

(X)

X

:

$$\text{pH}(X) = \text{pH}(S) + \frac{E_x - E_s}{2.3026 RT / F}$$

.Faraday

F (K)

T

R

.dimensionless number

:

$2.3026 RT/F$

$(^{\circ} \text{C})$	$\frac{2.3026 RT/F}{(mv)}$
10	56.18
15	57.17
20	58.17
25	59.16
30	60.15

Potentiometric Determination of pH

glass

						.hydrogen
						0.005± reproducibility
						.10-2
						:3
° 40	° 35	° 30	° 25	° 20		
1.694	1.688	1.683	1.697	1.675	TS	
3.547	3.549	3.552	3.557	–	TS	
4.035	0.024	4.015	4.008	4.002	TS	
6.838	6.844	6.853	6.865	6.881	TS	6.8
7.380	7.389	7.400	7.413	7.428	TS	7.4
9.068	9.102	9.139	9.180	9.225	TS	
9.889	9.925	9.966	10.012	10.062	TS	

						.2.3025 <i>RF/T</i>
						(3) 0.005±
						Calibration of apparatus
						(0.04±)
						0.04±

RECOMMENDED PROCEDURE

cub

 $0.04 \pm$ $0.04 \pm$

3

6

0.1

 $0.05 \pm$

calomel

◦ 2

2

hysteresis

Standard buffer solutions

R

3

ELECTROPHORESIS

.conducting electrolyte

potential

cm/s /

$$\text{cm}^2 \cdot \text{V}^{-1} \cdot \text{S}^{-1} \quad 1-$$

1- 2

v/cm /

1 gradient

()

Moving Boundary (Free-flow) Electrophoresis

refractometry

.conductometry

()

Zone Electrophoresis (Electrophoresis using a Supporting Medium)

)

(

) electro-endosmotic

) (carriers (Joule

()

scanning

.densitometer

:

voltage

parallelpiped

airtight lid

connector

electrical leads

1 20V
marker

Electrophoresis on cellulose acetate strips

25
23 × 10 troughs 24
17 × 2.5
8
bands

Gel electrophoresis

2-1

absorbent lint wicks
Joule

inhibition zone)

organism

(

PHASE SOLUBILITY ANALYSIS

(b)

(d)

(c)

(a)

(*e*)

.calculation

extrapolation

Solvents

$$\text{volatility} \quad (1)$$

◦ 150 ◦ 60

(2)

(3)

/ 4

(4)

/ 50

Apparatus

Constant-temperature bath

$^{\circ} 30$ $^{\circ} 25$

$^{\circ} 0.1 \pm$

50

horizontal shaft

.ampoule

Clamps

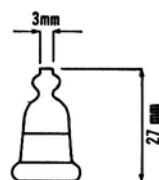
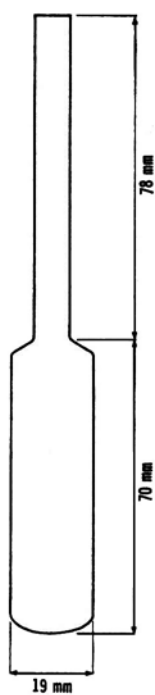
shaft

120-100

. (2)

15

Ampoules



()

()

.2

) . -

Solubility flasks

. ()

(2

. $1 \pm$

Balance

RECOMMENDED PROCEDURE

()

system composition

marked

7

5

5.0

/

:

1

W_2

W_1

$1000(W_2 - W_1)/(W_3 - W_2)$

W_3

Equilibration

()

(14-7)

(7-1)

supersaturated

:

$^{\circ} 10$

—

—

"

"

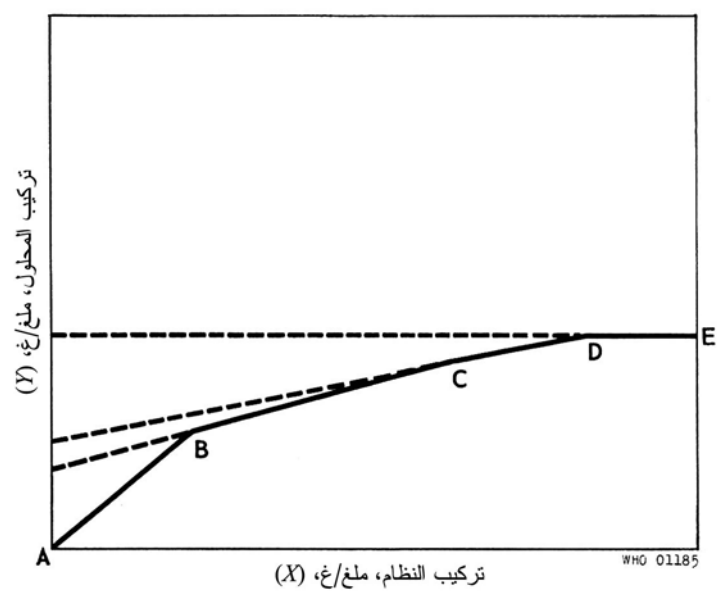
slope

solution composition

$$\begin{aligned}
 & \text{2.0} \\
 & \text{tared solubility flask} \\
 & \frac{70}{\left(\frac{F_2}{F_1} - 1 \right) \left(\frac{F_3}{F_1} - 1 \right)} \times 100 \\
 & 1000(F_3 - F_1)/(F_2 - F_3) : \\
 & F_3
 \end{aligned}$$

Calculation

$$\begin{aligned}
 & X \quad Y \\
 & (3) \quad (\text{system composition}) \\
 & 1 \quad \text{slop} \quad (\text{AB}) \\
 & S \quad (\text{BC}) \\
 & \text{solid solution} \\
 & Y_2 \quad S = (Y_2 - Y_1)/(X_2 - X_1) : \quad \text{slope} \quad .100-100S \\
 & .(\text{BC}) \quad X_1 \quad X_2 \quad Y_1 \\
 & \text{diagram} \quad B \\
 & .Y \quad (\text{BC}) \quad / \quad Y \\
 & \quad \quad \quad C \\
 & \quad \quad \quad Y \quad (\text{CD})
 \end{aligned}$$



:3

E D

inflexions

(B)

CHEMICAL METHODS

GENERAL IDENTIFICATION TESTS

Acetylated substances

monograph (18)
 .TS (/ 1440~)
 .(/ 30) lanthanum nitrate TS
 spot plate .
 .(/ 0.02) iodine VS porcelain
 .TS (/ 100~)

Amines, primary aromatic

TS (/ 70~) 2
 TS (/ 10) 4 .
 .R 1 2-naphthol TS1 -2 2
 .

Ammonia and volatile aliphatic amines

1
 . magnesium oxide R
 manganese/silver R /
 .

Ammonium

B A
 .B A
 1 R 0.2 A
 / VS (/ 0.1)

sodium cobaltinitrite 1 methyl red/ethanol TS
 (/ 100) TS

Bismuth

10 TS (/ 250~) .A
 .sodium sulfide TS
 TS (/ 1000~) .B
 reagent .TS (/ 80)

TS (/ 80)

Bromides

TS (/ 130~) .A
 .TS (/ 40)
 TS (/ 100) TS (/ 260~)
 .TS (/ 1000~)
 hydrobromides bromides) .B
 TS (/ 100~) .(
 .A TS (/ 130~)
 TS (/ 100~) .C
 R .chlorine TS

Calcium

ammonium oxalate TS .A
 TS (/ 250~) .(/ 25)
 .TS (/ 300~)

-2) .B
 80~) glyoxal bis (2-hydroxyanil) TS (.TS (/
 R

Chlorides

TS (/ 130~) .A
 (/ 100~) .TS (/ 40)
 .TS (/ 1000~) TS
 bases hydrochlorides chlorides) .B
 TS (/ 100~) .(
 .A TS (/ 130~)
 manganese .C
 . TS (/ 1760~) dioxide R
 . R / chlorine
 . hood ()

Citrates

(/ 55) .A
 .TS
 .TS (/ 300~)
 mercuric sulfate TS .B
 (/ 10) potassium permanganate TS .

Ferrous salts

potassium (/ 10) .A
 .ferricyanide TS
 .TS (/ 70~)

TS (/ 100~) .B

o-phenanthroline TS (/ 1)

ceric sulfate TS (/ 35)

Iodides

TS (/ 130~) .A

100~)

.TS (/ 40)

.TS (/ 1000~)

TS (/

. (iodides) .B

TS (/ 130~)

TS (/ 100~)

.A

TS (/ 100~) .C

.TS (/ 100) potassium nitrite

•

Nitrates

.TS (/ 15) ferrous sulfate .A

TS (/ 1760~)

•

0.2	nitrobenzene R	0.1	2	.B
-----	----------------	-----	---	----

.TS (/ 1760~)

.TS (/ 400~)

3

5

•

•

acetone R 5

Orthophosphates

5 TS (/ 130~) .A

•

TS (/ 95)

TS (/ 130~)

•

•

.TS (/ 40)	.B
100~)	.
.TS (/ 1330~)	TS (/

Potassium

sodium (/ 30)	.	.tetraphenylborate TS
----------------	---	-----------------------

Salicylates

ferric (/ 25)	neutral	.chloride TS
hydrochloric acid	(/ 300~)	acetic acid TS
.	TS (/ 70~)	

Sodium

.TS (/ 250~)	.A
.	.
.A technical	B :
TS (/ 60~)	.B
.	.uranyl/zinc acetate TS /

Sulfates

.barium chloride TS (/ 50)	.A
.TS (/ 250~)	
.lead acetate TS (/ 80)	.B
ammonium acetate TS (/ 80)	
.	TS (/ 80~)

Tartrates

TS (/ 300~)	.A
--------------	----

TS (/ 15) ferrous sulfate
 TS (/ 80~) hydrogen peroxide TS
 TS (/ 1760~) .B
 TS (/ 100) potassium bromide TS (/ 20~) resorcinol
 10-5

LIMIT TEST FOR CHLORIDES

micrograms individual monograph
 250 1 chloride ions
 .Cl⁻

RECOMMENDED PROCEDURE

23 70
 Nessler 50 45 mark
 "matched tubes" expression
 1 50
 5 .TS (/ 40)
 opalescence

Standard opalescence

10 hydrochloric acid CITS 5.0
 1 50 .comparison tube TS (/ 130~)
 5 .TS (/ 40)

LIMIT TEST FOR SULFATES

	1
SO ₄ [—]	480

.standard barium sulfate suspension

RECOMMENDED PROCEDURE

23 70

Nessler . 50 45 mark

"matched tubes	"expression
$Z_{\text{in}} = \frac{Z_0}{\frac{1}{\Gamma} + j \tan \beta l}$	$Z_{\text{in}} = Z_0 \frac{1 - \Gamma e^{-j2\beta l}}{1 + \Gamma e^{-j2\beta l}}$

5 45

10 .TS

turbidity

Standard turbidity

3 (/ 0.005) sulfuric acid VS 1.0

5	45	.comparison tube	TS (/ 70~)
---	----	------------------	-------------

10 .barium sulfate suspension TS

LIMIT TEST FOR HEAVY METALS ()

metallic impurities ()

hydrogen sulfide

. 1 lead

•

.standard

hydrogen sulfide

. 4 1
 blank
 TS
 (A)
 .(B)
 A
 5-2 5
 .B
 10 lead Pb TS
 1 0.1 1
 1 Pb 1
 . 1
Apparatus
 A ()
 40 mark 23 70
 " expression . Nessler . 50
 . "matched tubes
 . loop
) -50 syringe B
 9 lure conical joint plunger (plastic
 adapter (Millipore syringe XX 11 050 05)
 .
 SX00 013 00)
 . (polypropylene
 . 13
 (Millipore prefilter AP 2001 300) prefilter
 3 13 cellulose esters
 .(Millipore filter SSWP 013 00)

RECOMMENDED PROCEDURE

Preparation of test solution

4-3	pH	25	.1
	(/ 100~) ammonia Pb TS	Pb TS (/ 60~)	
		.	40
	)	30	.2
(dioxanR	acetone R	methanol R	(/ 50~) ethanol TS
.solvent	40	(/ 300~) acetic acid TS	0.5
	crucible		.3
.	charred		silica
	2	.charring	
(/ 1760~) sulfuric acid TS		5 (/ 1000~) nitric acid TS	
muffle furnace		fumes	
	2	.	° 500
	residue	.	TS (/ 250~)
digest	10	(/ 250~) hydrochloric acid TS	
pH	(/ 100~) ammonia Pb TS		.
	(/ 60~) acetic acid Pb TS		8.5 8
.	40	10	.4 3
			.4
	magnesium oxide R		0.5
	incineration	15	.
70~)		.	
	(/ 100~) ammonia Pb TS		TS (/
(/ 60~) acetic acid Pb TS			805 8
	.	40	4-3

Colour development and measurement

 \mathcal{A}

TS

10

40

5

lead Pb TS

ammonia Pb TS

pH

4-3 (/ 60~) acetic acid Pb TS

(/ 100~)

TS

10

40

5

 \mathcal{B}

diagram

syringe

plunger

prefiltration

membrane filter

adapter

beaker

.impurities

ammonia Pb

.(4)

10 4-3 (/ 60~) acetic acid Pb TS

(/ 100~) TS

reagents

hydrogen sulfide TS

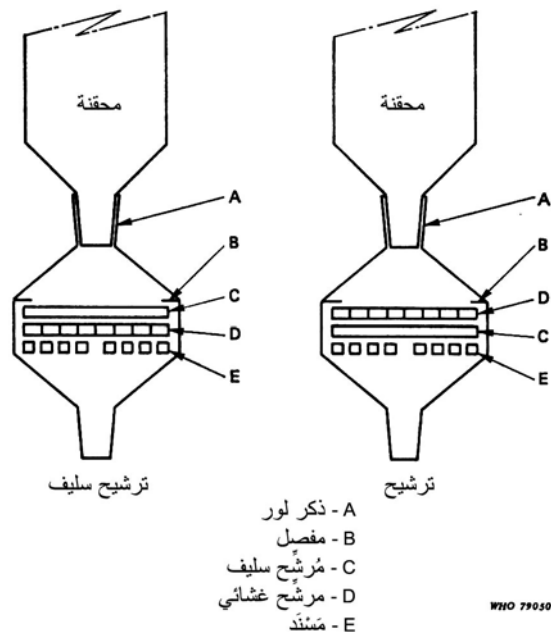
5

Pb TS

(/ 100~) ammonia Pb TS

40

4-3 (/ 60~) acetic acid Pb TS



B : .4

LIMIT TEST FOR IRON

iron

40

RECOMMENDED PROCEDURE

23

70

Nessler

50

45

mark

"matched tubes

" expression

40

(/ 180) citric acid FeTS

2

50 (/ 100) ammonia FeTS mercaptoacetic acid R
5

Standard colour

2 40 iron standard FeTS 2
(/ 180) citric acid FeTS
50 (/ 100) ammonia FeTS mercaptoacetic acid R
5

LIMIT TEST FOR ARSENIC

arsenic

1

()

.As 10 standard stain

depth

10

1

/ 1

.As

Apparatus

rubber bung

120

)

605

200

2

1

(8

bung fitting

70

.bung

6.5

(25 × 25)

spring clip
construction

RECOMMENDED PROCEDURE

TS (/ 80~)

25

10

(1)

(2)

mercuric bromide AsR

6.5

(

)

.mercuric bromide AsR

diaphragm

(1)

AsR

(3) 6.5

(2)

1

granulated zinc AsR

10 potassium iodide AsR

40

mercuric bromide AsR

.diluted arsenic AsTS

° 40

granulated zinc AsR

batches

accelerated

AsR

AsTS (/ 250~)

Standard stain

stannated hydrochloric acid 10
50 dilute arsenic AsTS 1 (/ 250~) AsTS
mercuric bromide paper
AsR

SULFATED ASH

RECOMMENDED PROCEDURE

) dish 1
TS (/ 1760~) moisten (platinum
° 800 ()
TS (/ 1760~)
ignite () ammonium carbonate R

OXYGEN FLASK METHOD

sulfur halogens
titrimetric determination organic
water-soluble inorganic
individual element

Apparatus

combustion
500
platinum gauze
absorbing liquid

RECOMMENDED PROCEDURES

:CAUTION

			scrupulously	
3	5	halid-free		
	strip		package	
oxygen				
			10	
			pulverizable	
(methyl-	)		capsules	
ashless filter-paper flock			15	.cellulose

Determination of bromine and chlorine

	3	(/ 60~)	hydrogen peroxide TS	17
	40			
	bromophenol blue/ethanol TS	/		5
		VS (/ 0.1)		
diphenyl-	/	5	TS (/ 3)	1
(/ 0.01)	mercuric nitrate VS		indicator	carbazone/ethanol TS
.Cl	0.709	Br	1.598	VS (/ 0.01)
				1

Determination of fluorine

124

15

40

0.6

alizarinsulfonate TS (/ 1)

VS (/ 0.1)

5

thorium 3.0 acetate buffer TS

(/ 0.005) nitrate VS

.F 0.380 VS (/ 0.005) 1

indicator

.inorganic fluoride

Determination of iodine

120

.VS (/ 0.2) 10

25

40 .bromine TS1 15 TS

20 (/ 1080~) formic acid TS ()

5 R 0.5 VS (/ 0.05)

(/ 0.005) sodium thiosulfate VS liberated iodine

indicator starch TS

.I 1.06 VS (/ 0.05) 1

Determination of sulfur

120

.(/ 60~) hydrogen peroxide TS 12.5

40

20 (/ 300~) 2 10

(/ 0.01) barium nitrate VS .(/ 750~)

0.2) methylthioninium chloride TS

(/ 2) thorin TS

.pink

(/

.S

0.321

VS (/ 0.01)

1

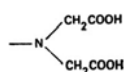
COMPLEXOMETRIC TITRATIONS

titrants

complexing agents

:

aminopolycarboxylic acids



cations

chelate

salt-like bond

.

electrons

coordinate bond

edetic

.

chelating

(ethylenediaminetetraacetic acid, EDTA)

) acid

.disodium edetate

Water-soluble 1:1

unit

()

confer

complexes

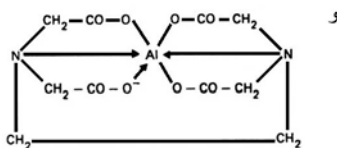
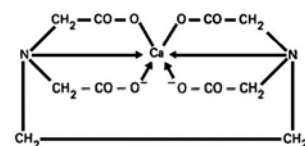
coordinate bonds

.

carbonyl oxygens

:

trivalent aluminium



WHO 79051

metals ()	.pH			
decompose		alkaline solution		
(lead zinc)	()		8	
trivalent metal complexes	()	.		
	chelate rings			
()		alkaline solutions	.	
stability	editic acid	hydroxides		
.metal hydroxide ()				
Schwarzenbach	()			
	:	20	/	0.1
	1.7	Na		
	2.8	Li		
	8.7	Mg		
	10.6	Ca		
	14.3	Fe ²⁺		
	15.5 ^a	Al		
	16.1	Zn		
	17.6	Pb		
	20.4	Hg ²⁺		
	25.1	Fe ³⁺		
.back-titration	()			a
	()			
	.			
) murexide	calcium ions	Schwarzenbach		
	.	(ammonium purpurate		
	.(	) Mordant Black 11		
()		ammoniacal solution		
corresponding				
indicator complex	()	edetates		

Mordant Black 11 .
) screened endpoint methyl orange .(
 .pharmaceutical potential
 calconcarboxylic acid calcon
 sodium edetate
 hydroxide magnesium .14-12 pH
 .
 .
 acid-base xylenol orange
 iminodiacetic acid
 - .metal-complexing ()
 lead bismuth aluminium
 . () 6-2 zinc mercury

RECOMMENDED PROCEDURE

Aluminium

2 monograph
 . 50 VS (/ 1)
 neutralize (/ 0.05) disodium edetate VS 50
 .VS (/ 1) methyl red/ethanol TS /
 50 10
 methenamine R 5 xylenol orange R
 (/ 0.05) lead nitrate VS
 (/ 0.05) disodium edetate VS 1 . -
 .Al 1.349

Bismuth

monograph
 2 1 50 (/ 130~) nitric acid TS
 50 . (/ 100~) ammonia TS TS (/ 130~)
 xylene orange R
 . - (/ 0.05) disodium edetate VS
 .Bi 10.45 VS (/ 0.05) disodium edetate 1

Calcium

monograph
 TS (/ 70~)
 VS (/ 0.05) disodium edetate . 100
 0.1 TS (/ 300~) 4 2
 calcon calcon indicator mixture R
 pink carboxylic acid indicator mixture R
 2.004 (/ 0.05) disodium edetate VS 1 .
 .Ca

Lead

10-5 monograph
 TS (/ 300~) acetic acid
 xylene orange indicator 50 . 50
 (5) methenamine R mixture R
 VS (/ 0.05) disodium edetate
 VS (/ 0.05) disodium edetate 1 .
 .Pb 10.35

Magnesium

10-5 monograph

TS (/ 70~)hydrochloric acid

ammonium chloride 10 . 50

Mordant Black 11 indicator mixture R 100 TS 10.0 buffer TS

VS (/ 0.05) disodium edetate

VS (/ 0.05) disodium edetate 1 .

.Mg 1.215

Zinc

10-5 monograph

TS (/ 300~) acetic acid

xlenol orange indicator 50 . 50

(5) methenamine R mixture R

VS (/ 0.05) disodium edetate

disodium edetate 1 .

.Zn 3.268 VS (/ 0.05)

NON-AQUEOUS TITRATION

bases acids

. hydroxyl hydrogen ions

recognize Arrhenius

Bronsted .

.proton acceptor proton donor

electron Lewis

neutralization pair

. coordination bond

. (H₃O⁺) hydronium ion

acetic protophilic .acid anion

proton $(\text{CH}_3\text{COOH}_2^+)$ acetonium ion acid
 perchloric
 .nitric hydrochloric sulfuric hydrobromic
 acetic acid
 ethylenediamine base .
 . leveling effect
 butylamine pyridine phenol
 .
 potassium methoxide
 lithium methoxide sodium methoxide
 .tetrabutylammonium hydroxide
 .
 physiologically active
 .titrant
 pharmaceutical preparations ingredient
 .carriers excipients
 acid halides types
 amino acids carboxylic acids acid anhydrides
 phenols imides xanthines barbiturates enols
 amins .sulfonamides pyroles
 quarternary ammonium hetrocyclic
 inorganic acids alkali salts
 halogen acids .
 halide ion mercuric acetate acetic anhydride

.unionized mercuric halide
 acetyltable groupings
 .crystal violet malachite green
 volumetric basic compound
 glacial acetic acid perchloric acid
 .methanol-toluene lithium methoxid
 tetrabutylammonium hydroxide sodium methoxide
 gelatinous
 atmosphere
 1 / 0.1 0.01 blank
 .potentiometrically
 calomel reference electrode
 /lithium perchlorate salt bridge
 acetic acid TS
 crystal violet)
 establishing (
 (V electromotive force E) dE/dV :
 coefficient
 compensant expansion

. standardized

RECOMMENDED PROCEDURES

() Method A

crystal / neutralized glacial acetic acid R1
 blank . violet/acetic acid TS
 . determination indicator
 .mercuric acetate/acetic acid TS / 10
 TS / 3-2
 . (/)
 R1 monograph
 .titrant standardization TS /
 potentiometrically
 electrode .
 . (TS (/ 350)) saturated calomel cell

(t_1) (t_2)
 assay [1 + 0.001 ($t_1 - t_2$)] :

() Method B

()

.determination

potentiometrically equivalence established

reference electrode electrode

aqueous potassium chloride saturated calomel

.R TS (/ 3.50)

electrical resistance

NITRITE TITRATION

aromatic amines

electrometric

circuit platinum

device 100-50 potential

.indicating needle 1- 0.1 current

magnetic stirring mechanical

nitrogene

20 0.5

(/ 1000~) nitric acid TS

ferric chloride R / 1

RECOMMENDED PROCEDURE

50 TS (/ 250~) 20

catalyst
 (/ 0.1) sodium nitrite VS ° 15
 . burette tip
 .° 15 vortex
 0.1 1
 deflects . 1
 . reagent

DETERMINATION OF WATER BY THE KARL FISCHER METHOD

Karl Fischer
 anhydrous iodine sulfur dioxide
 . pyridine
 .atmospheric moisture
 gas inlet tube
 vent tube burette tip
 side arm .desiccant
 TS .airtight
 .automatic burette
 .
 .
 electrical circuit
 V-2 V-1.5 platinum electrodes microammeter
 .Ω2000 resistance
 .
 . 15-10
 50-30 .voltametric

polarizing current
 .microvoltmeter potential difference ()
 .voltage
 plotting graphically
 .potential versus

RECOMMENDED PROCEDURES

(A) Direct titration

dehydrated methanol R 20
 .TS
 1
 .Karl Fischer reagent TS

(B) Backtitration

dehydrated methanol R 10
 .TS
 TS
 1 1
 R TS
 . / 2.5

DETERMINATION OF METHOXYL

methoxy-groups
 methyl iodide distilled hydriodic acid
 .titrimetrically

Apparatus

25 flask

.carbon dioxide 1
 . 9 25 condenser
 5 . 2 scrubber device
 .TS (/ 50) antimony sodium tartarate
 .
 .

RECOMMENDED PROCEDURE

.
 TS (/ 970~) 5 melted phenol R 2.5
 6 TS .
 .R 6 4
 R
 mantled microburner ()
 30 .
 250 .
 .TS (/ 150) 5
 1080~) () 125
 12 .TS (/
 TS (/ 1080~)
 5 R 1 2-1
 VS (/ 0.1) TS (/ 100)
 VS (/ 0.1) . TS
 .(CH₃O) 0.5172 VS (/ 0.1) 1

DETERMINATION OF NITROGEN

RECOMMENDED PROCEDURES

(A) Procedure for macrodetermination

1 200
 R R 10
 nitrogen- (/ 1760~) copper (II) sulfate R
 . free sulfuric acid TS
 30
 .
 granulated zinc R 85-75
 . 25 R 2 R 15
 .
 boric 16
 / VS (/ 0.005) (/ 50) acid TS
 . TS
 .N 1.401 VS (/ 0.05) 1 .

(B) Procedure for microdetermination

3
 1760~) 1 TS (/ 190) copper (II) sulfate
 10 R 1 10 TS (/
 () digestion tube . 1 selenium R
 (/ 400~) 6 microdistillation
 50) TS 5 7 TS
 TS methylthionium / 5 (/
 .VS (/ 0.015)
 VS (/ 0.015) 1 .

.N 0.210

DETERMINATION OF IODINE VALUE

100	
%70	
:	
	<i>Iodine value</i>
1.0	20
0.25 - 0.5	60 - 20
0.15 - 0.25	100 - 60
0.15 - 0.10	100

RECOMMENDED PROCEDURE

carbon R tetrachloride	15	500	300
30	iodine bromide TS		25
150 TS (/ 80)	20		
TS VS (/ 0.1)			
	(a)		
(b) VS (/ 0.1)			
	:		

$$\frac{(b - a) \times 0.01269 \times 100}{()} =$$

DETERMINATION OF PEROXIDES IN FIXED OILS

RECOMMENDED PROCEDURE

15 3

. 250 R 30 R
 1 R 1.3 1
 100 . 3
 . TS VS (/ 0.01)
 .

DETERMINATION OF SAPONIFICATION VALUE

fatty acids

. 1 hydrolysis
 blank 50
 35.5 VS (/ 0.5)
 . / 40

RECOMMENDED PROCEDURE

200 2
 reflux () TS1 / 25
 30 condenser
 TS / 1
 VS (/ 0.5) .VS (/ 0.5)
 .(a) sample
 : formula .(b) VS (/ 0.5)

$$\frac{(b - a) \times 0.02805 \times 1000}{()} =$$

DETERMINATION OF UNSAPONIFIABLE MATTER

"unsaponifiable matter" term
 .ether alkali hydroxides

RECOMMENDED PROCEDURE

0.5) / 25 1 ()
 50 . VS (/
 50 3
 . (:) R R
 .separator
) . 20
 . (R fat
 .
 20 20
 (:) VS (/ 0.5)
 20 . 20
 .TS /
 .R 3 R
 .° 60
 TS (/ 750~) 10 ° 80
 .TS /
 TS / VS (/ 0.1) carbonate-free sodium hydroxide
 VS (/ 0.1) .
 . 0.2
 0.1) .
 0.2 VS (/

DETERMINATION OF ACID VALUE

. 1

RECOMMENDED PROCEDURE

$$\begin{array}{rcl}
 50 & 250 & 10 \\
 & R & TS \left(/ 750 \sim \right) \\
 & .TS & / 1 \\
 VS \left(/ 0.1 \right) & & VS \left(/ 0.1 \right) \\
 . 15 & & \\
 & : & .(a) \\
 & \frac{\alpha \times 0.00561 \times 1000}{(\quad)} = &
 \end{array}$$

BIOLOGICAL METHODS

MICROBIOLOGICAL ASSAY OF ANTIBIOTICS

()

International Biological Standard

microorganism

International Biological Reference Preparation

International Chemical Reference Substance

validated

. inhibition

. assay

dilutions

. turbidimetric

()

International Unit

International

International Biological Standard

WHO

Biological Reference Preparation

Biological Standardization

.

. vial

ampoule

.

.

.

RECOMMENDED PROCEDURE

4-3

Petri dishes

inoculum

culture medium

agar .

.inoculated

dose

100 1

vegetative

.inoculation ° 50 - 48 molten agar medium

flat bottoms

° 4 30

10 sterile

stainless 5

10 - 8 steel

()

logarithm .1:2

rectilinear ()

Latin square

pipette

16

0.1

.bioassays

$$(4)$$

designations

strain

Colindale

– NCTC

Brewing

Yeast

– NCYC

Surrey

Redhill

Nutfield

Maryland 20852

Rockville

– ATCC

Precision of the assay

fiducial

limits (P = 0.95)

Calculation of results

1. *Specification for the quality control of pharmaceutical publications (Second edition of International Pharmacopoeia)*, Geneva, World Health Organization, 1967, Appendix 45: Biological assays and

tests.

2. C. I. BLISS: *Statistics of bioassay*, New York, Academic Press, 1952.
3. C. I. BLISS: *Statistics in biology*, vol. I, New York, McGraw Hill, 1967
4. C. I. BLISS: *Statistics in biology*, vol. II, New York, McGraw Hill, 1970
5. D. J. FINNEY: *Statistical methods in biological assays*, London, Griffin, 1964.
6. W. HEWITT: *Microbiological assay*, New York, Academic Press, 1977.
7. J. PHILLIPPE: *Les methods statistique en pharmacie et en chimie*, Paris, Masson, 1967.

.4

(°)	^b (1)	TS ^a	Test organism	Antibiotic
37-35	IU	4-1	7.0	Cm1
			7.1-7.0	Micrococcus luteus
				NCTC 7743;
				ATCC 10240
31-30	IU	4-1	6.0	Cm1
			6.6-6.5	NCTC 7743;
				ATCC 10240
35-32		40-10	6.0	Cm1
			6.6-6.5	Staphylococcus
				aureus NCTC 6571;
				ATCC 9144
35-32		40-10	6.0	Cm1
			6.6-6.5	ATCC 6538-P
35-32	IU	2 -0.5	6.0	Cm1
			6.6-6.5	NCTC 6571
				ATCC 9144
35-32	IU	2-0.5	6.0	Cm1
			6.6-6.5	ATCC 6538-P
39-37	IU	20-2	4.5	Cm1
			6.6-6.5	Bacillus pumilus
				NCTC 8241
				ATCC 14884

(°)	^b (1)	TS ^a		Test organism	Antibiotic	
33-30	IU	0.2-0.05	4.5	Cm1 6.0-5.9	<i>Bacillus cereus</i> ATCC 11778	
39-37		20-5	7.0	Cm1 6.6-6.5	<i>Bacillus subtilis</i> NCTC 8236 ATCC 11774	Cloxacillin
35-32		8-2	6.0	Cm1 6.6-6.5	ATCC 6538-P	
39-37		10-2.5	6.0	Cm1 6.6	NCTC 6571 ATCC 9144	Dicloxacillin
35-32		8-2	6.0	Cm1 6.6-6.5	ATCC 6538-P	
39-37	IU	25-5	8.0	Cm1 8.1-8.0	NCTC 8241 ATCC 14884	Erythromycin
37-35	IU	1.5-0.5	8.0	Cm1 8.1-8.0	ATCC 9341	
39-37		14-2	8.0	Cm1 8.1-8.0	NCTC 8241 ATCC 14884	Neomycin
37-35		20-2	8.0	Cm1 8.0-7.8	ATCC 29737	
37-35		2.05	8.0	Cm1 8.1-8.0	<i>Staphylococcus epidermidis</i> ATCC12228	
33-30		5-1	6.0	Cm1 6.6-6.5	NCTC 10315	Novobiocin
35-30		50-10	6.0	Cm1 6.6-6.5	ATCC 9341	
37-35		300-25	<i>c</i>	Cm3 6.2-6.0	<i>Saccharomyces cerevisia</i> NCYC 87 ATCC 9763	Nystatin

(°)	^b (1)	TS ^a		Test organism	Antibiotic
39-37	10-2.5	7.0	Cm1 6.6-6.5	NCTC 8236 ATCC 11774	Oxacillin
35-32	8-2	6.0	Cm1 6.6-6.5	ATCC 6538-P	
39-37	20-2	4.5	Cm1 6.6-6.5	NCTC 8241 ATCC 14884	Oxytetracycline
33-30	2-0.5	4.5	Cm1 6.0-5.9	ATCC 11778	
37-35	100-20	TS3 6.0	Cm2 7.3-7.2	<i>Bordetella bronchiseptica</i> NCTC 8344 ATCC 4617	Polymyxin B
37-35	200-50	7.2	Cm2 7.3-7.2	NCTC 8344 ATCC 4617	
37-35	100-5	7.2	Cm1 6.6-6.5	<i>Escherichia coli</i> ATCC 10536	
39-37	20-5	8.0	Cm1 8.0-7.9	NCTC 8236 ATCC 11774	Streptomycin
37-35	15-3	8.0	Cm1 8.1-8.0	ATCC 6633	
39-37	20-2	4.5	Cm1 6.6-6.5	NCTC 8241 ATCC 14884	Tetracycline
33-30	2-0.5	4.5	Cm1 6.0-5.9	ATCC 11778	
.TS2	TS,TS1	.	.		<i>a</i> <i>b</i> <i>c</i>
		.TS3 6.0		dimethylformamide R	

Culture media

" (4) (Cm)
) "List of reagents, test solutions and volumetric solutions
 .(167

Preparation of inoculum

<i>Bacillus subtilis</i>	<i>Bacillus pumilus</i>	<i>Bacillus cereus</i>
6.6-6.5) Cm1	° 39-37	7
. 1	manganese sulfate R	1 (
° 70	30 sterile	
. 1 10 ⁸ - 10 ⁷	spores	—
	.° 4	
	<i>Bordetella bronchiseptica</i>	
	.° 37-35	(6.6-6.5) Cm2
—1	opacity	saline TS sterile
	. 650	%50
		.° 4
vehicle	inoculum	
. ° 70—		TS2 (/ 1) peptone
6.6-6.5) Cm1		<i>Micrococcus luteus</i>
saline TS		.° 37-35 (
%80	50 1	
.° 4		. 650
vehicle	inoculum	
. ° 70—		TS2 (/ 1) peptone
) Cm3		<i>Saccharomyces cerviciae</i>
saline TS		.° 37-35 (6.2-6.0
	%50	—1

.° 4 . 650
 . ° 70– TS2 (/ 1)
 6.6-) Cm1 .
 saline TS .° 37-35 (6.5
 %50 1
 . 650
 . ° 70– TS (/ 5)

STERILITY TESTING OF ANTIBIOTICS

microorganisms

Test conditions

aseptic
 .air filters germicidal disinfecting
 . disinfecting aerosols
 laminar flow environment
 static free clothing () hood
 settle particulate
 slit-sampling plates

Membrane filtration apparatus

. porosity
 47 0.45 nominal
 .(700) 90 75-55

Sampling

Culture media

fungi	bacteria	
anaerobic	aerobic	variety
		.manufacturing
mercaptoacetate		.criteria
.(Cm5)	-	(Cm4) (thioglycolate)
	strains	
.(100)		
. 24		
		lot
	over sterilization	overheating

RECOMMENDED PROCEDURES

Membrane filtration test procedure

(container	6-0.3)	
	TS1 (/ 1)	200

TS1 (/ 1)

penicillinase TS (cephalosporin penicillin)

100-50 ()

100-50 (()

(soybean-casein digest medium -) Cm5

control test

100-50

) Cm6	0.3	10 - 1	()
	100 - 50			
			.((
.(-) Cm7		100 - 50

Incubation

164

Interpretation of test results

control

UNDUE TOXICITY

RECOMMENDED PROCEDURE

18	5		22
0.5			
48		5	
	48		
	15	5	
		20.5	19.5
	(48)		

TEST FOR PYROGENS

	risk	
10		
	4	1

Test animal

(° 2±)

ad libitum

.excite

48

° 0.5

Temperature recording

° 0.1

temperature-

6

sensing device

RECOMMENDED PROCEDURE

30

40

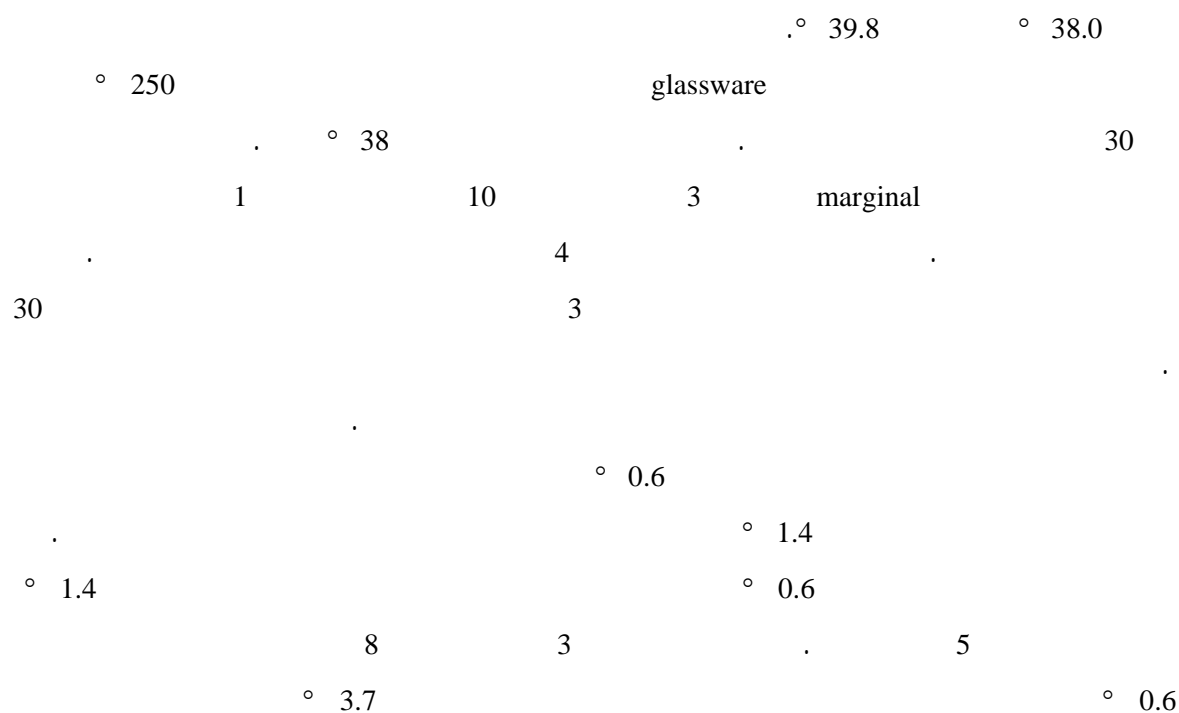
"

"

° 1.0

deviate

° 0.2±



()
**TEST FOR HISTAMINE-LIKE SUBSTANCES (VASODEPRESSOR
 SUBSTANCES)**

RECOMMENDED PROCEDURES

chloralose R
 barbiturate
 .trachea
 saline TS
 cannula
 carotid artery
 .vagus nerve
 mercury manometer

jugular .

heparinized saline TS

recording kymograph :

excursion tracings

0.1 (A) 0.05 TS

(C) 0.15 - (B)

1 1 histamine base

B

(20) 2.7 B

C B A

.B

saline TS 2.0

B B

1

A C

(a)

(b) C

B C

1 0.1) B

C

.(

1

(
0.15)

METHODS OF PHARMACOGNOSY

DETERMINATION OF ASH AND ACID-INSOLUBLE ASH

RECOMMENDED PROCEDURES

Determination of ash

) 3
(
° 450
° 450
1

Determination of acid-insoluble ash

TS (/ 70~) 25 5
° 500
() 1 ()
..

MISCELLANEOUS

INTERNATIONAL CHEMICAL REFERENCE SUBSTANCES

	.	
	:	
infrared spectrophotometry		•
ultraviolet absorbtion		•
	spectrophotometry	•
	()	•
	(automated)	•
gravimetric	titrimetric	•
	non-stoichiometric	
	optical rotation	•
	polarography	•
	fluorescence spectrophotometry	•
	microbiological assay	•
")		
	.(151-145 "	
	3	
)	WHO Expert Committee	

.(1975 567

International

Pharmacopoeia

.Sweden Solna WHO Collaborating Centre for Chemical Reference Substances

.Sweden 3 03 171 3045 Apotekens Centrallaboratorium
package

NAMES, SYMBOLS, AND RELATIVE ATOMIC MASSES OF CERTAIN ELEMENTS

()

12 isotope ¹²C

58.93	Co	Cobalt	26.98	Al	Aluminium
*63.55	Cu	Copper	*121.75	Sb	Antimony
19.00	F	Fluorine	74.92	As	Arsenic ()
197.0	Au	Gold	137.3	Ba	Barium
4.003	He	Helium	209.0	Bi	Bismuth
164.9	Ho	Holmium	10.81	B	Boron
1.008	H	Hydrogen	79.90	Br	Bromine
126.9	I	Iodine	112.4	Cd	Cadmium
*55.85	Fe	Iron	40.08	Ca	Calcium
138.9	La	Lanthanum	12.01	C	Carbon
207.2	Pb	Lead	140.1	Ce	Cerium
*6.941	Li	Lithium	35.45	Cl	Chlorine
24.31	Mg	Magnesium	52.00	Cr	Chromium

3± 1± *

107.9	Ag	Silver	54.94	Mn	Manganese
22.99	Na	Sodium	*200.6	Hg	Mercury
87.62	Sr	Strontium	95.94	Mo	Molybdenum
32.06	S	Sulfur	*58.71	Ni	Nickel
232.0	Th	Thorium	14.01	N	Nitrogen
*118.7	Sn	Tin	*16.00	O	Oxygen
*47.90	Ti	Titanium	30.97	P	Phosphorus
*183.85	W	Tungsten (Wolfram)	*195.1	Pt	Platinum
238.0	U	Uranium	*39.10	K	Potassium
*50.94	V	Vanadium	*101.1	Ru	Ruthenium
65.38	Zn	Zinc	*78.96	Se	Selenium
91.22	Zr	Zirconium	*28.09	Si	Silicon
			3±	1±	*

boron

sulfur

strontium

lead

calcium

.significant figure

LIST OF REAGENTS, TEST SOLUTIONS, AND VOLUMETRIC SOLUTIONS

International Pharmacopoeia

TS

R

1

.VS

PbTS FeTS CITS AsTS AsR

()

IR

Cm

.anhydrous

System international d' Unites (SI)

Specifications for reagents mentioned

SRIP

(1963) in the International Pharmacopoeia

d_{20}^{20}

d

SRIP

$^{\circ} 20$

$^{\circ} 20$

3.0

(Acetate buffer, pH 3.0, TS) TS 3.0

glacial

6

R

12

100

acetic acid R

$d \sim 1048$ (25 1963 SRIP) $C_2H_4O_2$ Acetic acid, glacial, R

: R Acetic acid, glacial, R1

1 $^{\circ} 20$

TS (/ 1760~)

10

10.0

30

VS (/ 0.0167) potassium dichromate

(/ 80) potassium iodide

1.5

$^{\circ} 20$

50

VS (/ 0.1) sodium thiosulfate

TS

.VS (/ 0.1)

0.6

300

R

.TS (/ 300~) Acetic acid

$d \sim 1.037$ (/ 5) $C_2H_4O_2$ /

TS (/ 300~)

.TS (/ 60~) Acetic acid

$d \sim 1.008$ (/ 1) $C_2H_4O_2$ / 60

TS (/ 60~)

.PbTS (/ 60~) Acetic acid

TS (/ 60~)

20 :

()

()

25

3

(26 1963 SRIP) $C_4H_6O_3$ Acetic anhydride R

(27 1963 SRIP) C_3H_6O Acetone R

C_2H_3N Methyl cyanide

Acetonitrile R

:

miscibility

TS (/ 400) Acetonitrile

/ 400 1 R 1 :

.C₂H₃N

(27 1963 SRIP) .Agar R

Al(OH)₃ .Aluminium hydroxide R

:

TS (/ 750~) :

.d~0.894 (31 1963 SRIP) .[R] TS (/ 260~) Ammonia

/ 100 TS (/ 260~) .TS (/ 100~) Ammonia

.d~0.956 (/ 6) NH₃

:

TS (/ 100~) .FeTS (/ 100~) Ammonia

2 40 TS (/ 100~) 5

mercaptoacetic acid R FeTS (/ 180) citric acid

. 50 FeTS (/ 100~)

:

TS (/ 100~) .PbTS (/ 100~) Ammonia

1 TS (/ 100~) 5

60~) 2 . TS (/ 70~)

. () 25 PbTS (/

. / 2 () .

.Ammonia buffer TS

TS (/ 260~) 570 R 67.5 .

. 1000

(32 1963 SRIP) C₂H₇NO₂ .Ammonium acetate R

R .TS (/ 80) Ammonium acetate

.(/ 1) C₂H₇NO₂ / 77

	(33	1963	SRIP)	$(\text{NH}_4)_2\text{CO}_3$	.Ammonium carbonate	R			
	(33	1963	SRIP)	NH_4Cl	.Ammonium chloride	R			
	(	\text{NH_4	/	10)	.Ammonium chloride	TS			
.	1000			R			0.296	.	
							100		10
				2		.Shelf - life			
.10.0		10.0			Ammonium chloride buffer	TS			
	TS (/	260~)		57	R		7.0	.	
							100		
(34	1963	SRIP)	$(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$	.Ammonium molybdate	R				
R				.TS (/	95)	Ammonium molybdate			
						$(\text{NH}_4)_6\text{Mo}_7\text{O}_{24}$	/	95	
(36	1963	SRIP)	$\text{C}_2\text{H}_8\text{N}_2\text{O}_4, \text{H}_2\text{O}$	.Ammonium oxalate	R				
R				.TS (/	25)	Ammonium oxalate			
						$\text{C}_2\text{H}_8\text{N}_2\text{O}_4$	/	27	
(36	1963	SRIP)	NH_4SCN	.Ammonium thiocyanate	R				
				.TS (/	75)	Ammonium thiocyanate			
				(/	1	NH_4SCN	/	75	
R				.VS (/	0.1)	Ammonium thiocyanate			
						1000	NH_4SCN	7.612	
:		/	0.1					.standardization	
50					VS (/	0.1)			30.0
				TS (/	1000~)		2		
45)				2					
								TS (/	
R				.VS (/	0.01)	Ammonium thiocyanate			

		1000	NH ₄ SCN	0.7612	
				<i>.standardization</i>	
				.VS (/ 0.1)	
			.C₄H₄NaO₇Sb .Antimony sodium tartarate R		
			hygroscopic	scales	:
			.TS (/ 710~)	1.5	:
			.TS (/ 50) Antimony sodium tartarate		
			.C ₄ H ₄ NaO ₇ Sb / 50	R	
10			.AsTS Arsenic ()		
					.
	100		AsTS ()	1	:
			. AsTS		:
			.AsTS Arsenic ()		
		6	R ()	0.132	:
20				TS (/ 80~) sodium hydroxide	
	100		TS (/ 250~)	50	
			.(44 1963 SRIP) As₂O₃ .Arsenic trioxide R		
			.(45 1963 SRIP) BaCl₂, 2H₂O .Barium chloride R		
/ 52		R	.TS (/ 50) Barium chloride		
				(/ 0.25) BaCl ₂	
		R	.VS (/ 0.5) Barium chloride		
				1000 BaCl ₂	104.2
:		/ 0.5		<i>.standardization</i>	
	40		VS (/ 0.5)	10.0	
			TS (/ 2) thorin		

.(47 1963 SRIP) $\text{Ba}(\text{NO}_3)_2$ **.Barium nitrate R**
 2.614 R **.VS (/ 0.01) Barium nitrate**
 . 1000 $\text{Ba}(\text{NO}_3)_2$
 : / 0.01 *.standardization*
 40 VS (/ 0.01) 10.0
 methylthioninium TS (/ 2) thorin
 . TS (/ 0.2) chloride
.BaO .Barium oxide R
 .
.Barium sulfate suspension TS
 20 55 VS (/ 0.5) 15 .
 TS (/ 174) 5 TS (/ 750~)
 . 100
 . TS .
.Beef extract R
 ()
 .
 %96.0 $\text{C}_{16}\text{H}_{17}\text{N}_2\text{NaO}_4\text{S}$ **.Benzylpenicillin sodium R**
 . $\text{C}_{16}\text{H}_{17}\text{NaO}_4\text{S}$ %102.0
 .
 .R R 0.5 .
Benzylpenicillin sodium TS
 R 0.03 .
 .R / 3 . 10 TS 7.0
 H_3BO_3 %99.0 H_3BO_3 **.Boric acid R**

750~) 16 3 20 .
 .TS (/
 30 1.0
 TS (/ 750~) 10 1.0
 R 50 30 1 .assay
 TS /
 1 . TS / VS (/ 1)
 .H₃BO₃ 61.83 VS (/ 1)
 .H₃BO₃ / 50 R .TS (/ 50) **Boric acid**
 .(51 1963 SRIP) Br₂ **Bromine R**
 .R **Bromine TS1**
Bromine AsTS
 R 30 40 R 30
 10 : 100
 AsTS (/ 250~) 10 50
 stannous chloride AsTS
 -1 .()
 . / 1
 .(52 1963 SRIP) C₁₉H₁₀Br₄O₅S **Bromophenol blue R**
Bromophenol blue/ethanol TS /
 (/ 0.05) 3.2 R 0.1
 TS (/ 710~) 5 VS
 . 250 (/ 150~)
Brown stock standard TS
 0.8 TS 17.0 TS 35.0

TS 100.0 TS

(56 1963 SRIP) CaCO_3 . **Calcium carbonate R1**

R1 . CaCO_3 . **Calcium carbonate R2**

.disodium edetate

1963 SRIP) CaCl_2 . [R] **Calcium chloride, anhydrous, R**

(58

1963 SRIP) $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$. **Calcium chloride, hydrated, R ()**

(58

R . TS (/ 55) **Calcium chloride**

(/ 0.5) CaCl_2 / 55

2-hydroxy-1-[(2-hydroxy-1-naphthyl)-azo] . **Calcon R**

15705 C.I. Mordant Black 17 C.I. naphthalene-4-sulfonic acid

Solochrom Dark Blue Eriochrome Blue Black R

. $\text{C}_{20}\text{H}_{13}\text{N}_2\text{NaO}_5\text{S}$

2-Hydroxyl-1- (2-hydroxy-4-sulfo-1- . **Calcon carboxylic acid R**

. $\text{C}_{21}\text{H}_{14}\text{N}_2\text{O}_7\text{S} \cdot 3\text{H}_2\text{O}$ naphthyl-azo) -3-naphtoic acid

TS (/ 750~) R

.alkali hydroxides

Calcon carboxylic acid indicator mixture R

.R 10 R 0.1 .

.R

.R 10 R 0.1 .

. CO_2 .Carbon dioxide R

. 1.3 .

.(62 1963 SRIP) CS₂ .Carbon disulfide R
 : R .Carbon disulfide IR
 4 1.0
 cm⁻¹ 670- 4000 (45) "
 cm⁻¹ 935-1265 cm⁻¹ 1755-2000 cm⁻¹ 2440 - 2635 cm⁻¹ 3030- 4000 0.1
 .cm⁻¹ 715 - 800 0.17
 .(63 1963 SRIP) CCl₄ .Carbon tetrachloride R
 .Ce(NO₃)₄, 2NH₄NO₃ .Ceric ammonium nitrate R
 .
 .
 TS (/ 1760~) 10 5 .
 90
 .
 .° 105 . 1
 . 2.5
 10 24 ° 85 2.5 .
 - . 40 TS (/ 190~)
 1 .VS (/ 0.1) ferrous sulfate *o*-phananthroline TS
 .Ce(NO₃)₄, 2NH₄NO₃ 54.8 VS (/ 0.1)
 .Ceric ammonium nitrate TS
 .TS (/ 15) 10 R 6.25 .
 . 3 .
 .(63 1963 SRIP) Ce(SO₄)₂, 4H₂O .Ceric sulfate R
 / 33 R .TS (/ 35) Ceric sulfate
 .Ce(SO₄)₂
 .(64 1963 SRIP) .Charcoal R
 .C₈H₁₁C₃O₆ .Chloralose R

188

	100	CoCl ₂ , 6H ₂ O	6.000	.	
			TS (/ 10~)		TS
.(70	1963	SRIP) CoCl ₂ , 6H ₂ O	.Cobaltous chloride R		
.(72	1963	SRIP)	Congo red paper R		
			.Copper colour, strong, TS		
TS (/ 10~)	120	R (II)	8.0	.	
		.CuSO ₄ , 5H ₂ O			
	10	.	100	5.0	.
.R	5	R	1	20	
TS		VS (/ 0.01)			10
.CuSO ₄ , 5H ₂ O	2.497	VS (/ 0.01)	1	.	
	.CuSO ₄ , 5H ₂ O	/ 60.0	.Copper colour, TS		
TS	100	CuSO ₄ , 5H ₂ O	6.000	.	
			TS (/ 10~)		
.(73	1963	SRIP) .CuSO ₄ , 5H ₂ O	.Copper (II) sulfate R		
160	R (II)		.TS (/ 160) Copper (II) sulfate		
				.CuSO ₄	/
.(73	1963	SRIP) .C ₂₅ H ₃₀ ClN ₃	.Crystal violet R		
R			.Crystal violet/acetic acid TS		
			/ 5	R1	
			.Culture medium Cm1		
pancreatic digest of		4.0	R	6.0	.
1.0	R	1.5	R	yeast	3.0 casein R
.	1000	agar	R	20-10	R
			R		;
			tearing		

.Culture medium Cm2

3.0 pancreatic digest of casein R 17.0 .
 2.5 R 0.5 R soybean meal papaic digest
 R 2.5 dipotassium hydrogen phosphate R
 10.0 . 500 agar R 20 - 10
 . 1000 polysorbate 80 R
 R ;
 . tearing

.Culture medium Cm3

2.4 R yeast 4.7 R 9.4 .
 25-15 R 10.0 R 10.0 R
 . 1000 agar R
 R ;
 .

(thioglycolate) mercaptoacetate

.Culture medium Cm4

.
 2.5 L-cystine R 0.5 : mortar .
 5.0 R 0.75 R 5.5 R
 .pancreatic digest of casein R 15.0 R yeast
 . 1000
 .R
) R 0.5 R 0.3
 VS (/ 1) (.7.2 - 7.0
 .TS (/ 1) resazurin sodium 1.0
 .° 25 ° 121 20-18 autoclaving
 . ° 30-20 .

.Dichloromethane R

.R TS (/ 750~)

.miscibility

.° 41 39 %95

◦ 105

.residue on evaporation

. / 0.5

.Dichromate colour, strong, TS

$$(\sim 10)$$

120 R

6.0

.K₂Cr₂O₇

TS

10 . 50

5.0 *.assay*

`.assay`

20 R

2

10

1

.TS (/ 100~)

5

R

1 . TS

VS (/ 0.1)

0.1)

.K₂Cr₂O₇

4.904

VS (/ 0.1)

.K₂Cr₂O₇ / 4.904

.Dichromate colour TS

100	K ₂ Cr ₂ O ₇	490.35
-----	---	--------

TS (/ 10~)

TS

.C₄H₁₀O₃ .Diethylene glycol R

.R R TS (/ 750~)

.miscibility

° 250 240

. / 1.120-1.117 .(Q_{20}) *Mass density*

TS /

250

60

15

$$\text{VS} \left(/ 0.02 \right) /$$

2.5

.C₃H₇NO .Dimethylformamide R

TS (/ 750~) .miscibility
 .° 156 152 %25
 . / 0.947-0.945 .(Q₂₀) Mass density
 TS / 2 10 1
 VS (/ 0.01) 0.2
 5 VS (/ 0.01) 0.3
 TS /

.C₂₆H₂₀N₂O₂ Dimethyl-POPOP .1,4-Di[2-(methyl-5-phenyloxazole)]benzene R
 .scintillation counting

.C₄H₈O₂ 1,4-Dioxane .Dioxan R

.R TS (/ 750~) .miscibility
 .° 105 101 %95
 .° 10
 .residue on evaporation
 . / 0.1 ° 105
 . / 1.031 .(Q₂₀) mass density
 / 5.0 .water
 5 10 1 5 .peroxide
 TS 2 TS (/ 70~)

C₂₄H₂₀N₂ .Diphenylbenzidine R

.R TS (/ 750~)

.° 250-246 .
 . / 1.0 .sulfated ash
 (/ 1750~) 8 .nitrates
 . 5 TS
 .(81 1963 SRIP) C₁₃H₁₂N₄O .Diphenylcarbazone R
 R .Diphenylcarbazone/ethanol TS /
 .C₁₃H₁₂N₄O / 1 TS (/ 750~)
 .C₁₂H₁₀O .Diphenyl ether R
 .
 R .miscibility
 .
 .° 259 .
 .° 28-26 .
 .C₁₅H₁₁NO PPO .2,5-Diphenyloxazole R
 .scintillation counting
 1963 SRIP) K₂HPO₄ .Dipotassium hydrogen phosphate R
 .(81
 .(82 1963 SRIP) C₁₀H₁₄N₂NaO₈, 2H₂O .Disodium edetate R
 R .VS (/ 0.05) Disodium edetate
 . 1000 C₁₀H₁₄N₂Na₂O₈ 16.71
 : .standardization
 10 400 R2 200
 2 .slurry
 . TS (/ 70~)
 .
 . 100

10 . 50 burette 30
R 0.3 TS (/ 70~)
R
(/ 0.05) 1 5.005 .
.VS

] **Disodium hydrogen phosphate, anhydrous, R**

(193 1963 SRIP) Na_2HPO_4 .[R
.(85 1963 SRIP) $\text{C}_2\text{H}_5\text{OH}$.**Ethanol, dehydrated, R**
.(84 1963 SRIP) [R (95)] TS (/ 750~) **Ethanol**
(/ 750~) .**Ethanol, sulfate-free, TS** (/ 750~)
2 TS (/ 750~) 25 : TS
5 42 TS (/ 70~) 3
.(113) " " .TS
. / 20 TS (/ 750~)
. 1000 TS (/ 750~) 950 .TS (/ 710~)
. 1000 TS (/ 750~) 525 .TS (/ 375~)
. 1000 TS (/ 750~) 210 .TS (/ 150~)

(85 1963 SRIP) $\text{C}_4\text{H}_{10}\text{O}$.**Ether R**

(86 1963 SRIP) $\text{C}_4\text{H}_8\text{O}_2$.**Ethyl acetate R**

$\text{C}_4\text{H}_{10}\text{O}_2$.**Ethylene glycol monoethyl ether R**

.R R TS (/ 750~) .miscibility

.° 135 133 %95 .

. / 0.93 .(Q_{20}) Mass density

1963 SRIP) $\text{FeNH}_4(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$.**Ferric ammonium sulfate R**

(88

.TS (/ 45) Ferric ammonium sulfate
 $\text{FeNH}_4(\text{SO}_4)_2$ / 45 R
 .(88 1963 SRIP) $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$.Ferric chloride R
 / 27 R .TS (/ 25) Ferric chloride
 FeCl_3
 1963 SRIP) $\text{FeNH}_4(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$.Ferrous ammonium sulfate R
 .(89
 .TS (/ 1) Ferrous ammonium sulfate
 $\text{FeNH}_4(\text{SO}_4)_2$ / 1 R
 .(90 1963 SRIP) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$.Ferrous sulfate R
 R .TS (/ 15) Ferrous sulfate
 .(/ 0.1) FeSO_4 / 15
 . TS (/ 15) .
 .VS (/ 0.1) Ferrous sulfate
 90 R 2.8 .
 . 100 TS (/ 1750~)
 : / 0.1 .standardization
 TS (/ 1.440~) 5 40.0
 .VS (/ 0.02) potassium permanganate
 .
 1963 SRIP) CH_2O_2 .[R] TS (/ 1080~) Formic acid
 $d \sim 1.2$ (92
 . .Gelatin R
 . / 10 TS 7.0 R .Gelatin TS
 .Glucose hydrate R
 %99.0 $\text{C}_6\text{H}_{12}\text{O}_6 \cdot \text{H}_2\text{O}$ monohydrate of α -D-glucopyranose

3 . 5 ° 6
. 5 TS (/ 40)
. / 0.5 .
.C₁₄H₁₂N₂O₂ 2,2'-(Ethanediylidenedinitrilo) diphenol **.Glyoxal bis(2-hydroxyanil) R**
. TS (/ 750~) .
. ° 2.5-2.3 .
Glyoxal bis(2-hydroxyanil) R **.Glyoxal bis(2-hydroxyanil) TS**
.C₁₄H₁₂N₂O₂ / 10 TS (/ 750~)
.Green stock standard TS
10.4 TS 20.1 TS 3.5 .
1000 TS 4.0 TS
. TS (/ 10~)
.He / 999.95 **.He .Helium R**
50 TS **.Heparinized saline TS**
. 1
. / 1.00 **.Histamine, strong, TS**
82.8 R 138.1 .
. 50.0 R
° 10-4 TS .
. 30 .
. / 1.0 **.Histamin TS**
.TS TS TS .
. TS .
.C₅H₉N₃,2HCl **.Histamine dihydrochloride R**
. C₅H₉N₃,2HCl %101.0 %98.0

.TS (/ 750~) R .
 .° 246-244 .
 . / 5.0 .
 25 R 5 10 0.15 .
 (/ 0.2) .TS (/ 750~)
 1 . TS / 0.5 VS
 .C₅H₉N₃,2HCl 9.21 VS (/ 0.2)
 %98.0 .C₅H₉N₃,2H₃PO₄ **.Histamine phosphate R**
 . C₅H₉N₃,2H₃PO₄ %101.0
 .TS (/ 750~) 5 .
 .° 132 .
 . / 60-50 1.0 .water
 25 R 5 10 0.15 .
 (/ 0.2) .TS (/ 750~)
 1 . TS / 0.5 VS
 .C₅H₉N₃,2H₃PO₄ 15.36 VS (/ 0.2)
 Ho₂O₃ %99.9 .Ho₂O₃ **.Holmium oxide R**
 .Dy₂O₃ Er₂O₃
 .
 .
.Holmium perchlorate TS
 TS (/ 140~) R 40 .
 . 1000
 1963 SRIP) HI .[R] .TS (/ 970~) **Hydriodic acid**
 .(95

.[R] .TS (/ 420~) Hydrochloric acid
 .d~1.18 (96 1963 SRIP)
 420~) .TS (/ 250~) Hydrochloric acid
 .d~1.12 HCl / 250 TS (/
 250~) .Hydrochloric acid (/ 250) AsTS
 :B A TS (/
 (/ 75) 5 50 10 .A
 TS
 16 AsTS 0.2 50 .B
 AsTS
 stannous chloride AsTS 5 50 .
 .()
 . / 0.05 0.2
 . AsTS (/ 250~) Hydrochloric acid, stannated
 250~) AsTS 1 .
 . 100 AsTS (/
 .TS (/ 70~) Hydrochloric acid
 1000 TS (/ 250~) 260 .
 .d~1.035 (/ 2)
 .Cl 50 1 .Hydrochloric acid CITS
 1000 VS(/ 0.1) 14.3 .
 .
 (/ 250~) .VS (/ 2) Hydrochloric acid
 . 1000 HCl 72.93 TS
 .standardization
 .VS (/ 1)
 (/ 250~) .VS (/ 1) Hydrochloric acid

		. 1000 HCl 36.47	TS
:	/ 1	.standardization	
1 ° 270	R		1.5
. TS /			50
(/ 1)	1 R	52.99	.VS
(/ 250~)	.VS (/ 0.5) Hydrochloric acid		
	. 1000 HCl 18.23	TS	
	.standardization		
	.VS (/ 1)		
(/ 250~)	.VS (/ 0.1) Hydrochloric acid		
	. 1000 HCl 3.647	TS	
	.standardization		
	.VS (/ 1)		
250~)	.VS (/ 0.015) Hydrochloric acid		
	. 1000 HCl 0.5470	TS (/	
	.standardization		
	.VS (/ 1)		
250~)	.VS (/ 0.01) Hydrochloric acid		
	. 1000 HCl 0.3647	TS (/	
	.standardization		
	.VS (/ 1)		
60	.TS (/ 60~)Hydrogen peroxide		
	. 1 H ₂ O ₂		
. (98 1963 SRIP) H ₂ S	.Hydrogen sulfide R		
. R	.Hydrogen sulfide TS		
	TS		

			(101	1963 SRIP)	I ₂	.Iodine R
						.Iodine TS
)	100		R	3	R	2.6 .
						.(/ 0.1
			R		R	.VS (/ 0.1) Iodine
				.	1000 KI	36.0 I 25.38
25.0	/	0.1				<i>.standardization</i>
						VS (/ 0.1)
			R		R	.VS (/ 0.02) Iodine
				.	1000 KI	7.2 I 5.076
						<i>.standardization</i>
						.VS (/ 0.1)
			R		R	.VS (/ 0.01) Iodine
				.	1000 KI	3.6 I 2.538
						<i>.standardization</i>
						.VS (/ 0.1)
						.IBr .Iodine bromide R
			.			.
R	R		TS (/ 750~)			.
						.R
				.	° 40	.
						.
						.Iodine bromide TS
.	1000	R			R	20 .
						.
						.Iron colour, strong, TS
TS (/ 10~)			120	R		6.6 .

$\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$
 10.0 . 25.0 5.0 *.assay*
 VS (/ 1) 3-2 . 60
 ° 15 .R TS (/ 100~)
 2 VS (/ 0.05)
 TS (/ 175) sulfosalicylic acid
 $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ 13.52 vs / 0.05) 1 .
 $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ / 45.0 **.Iron colour TS**
 TS 100 $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ 4.500 .
 . TS (/ 10~)
.Iron standard FeTS
 5 100 R 0.173 .
 1 . 1000 TS (/ 70~)
 . 20
 / 5.0 **.Karl Fischer reagent TS**
 1 2.5 .
 .
 anhydrous pyridine R 100 R 63 .
 32 sulfur dioxide R
 500 R .
 TS . 24
 .
 20 : *.standardization*
 TS R
 .
 . TS

.hydrated
 TS 1
 .
 Ethylene glycol monoethyl ether R
 .R
 %97.0 .La(NO₃)₃,6H₂O **.Lanthanum nitrate R**
 .La(NO₃)₃,6H₂O
 .
 .
 3 25 0.75 .assay
 xylenol orange R 20 R 3 TS (/ 130~)
 . VS (/ 0.05)
 1 .R
 .La(NO₃)₃,6H₂O 21.65 VS / 0.05)
.Lanthanum nitrate TS
 TS (/ 130~) 1 R 4.3 .
 . 100
 . 100 1 **.Lead, strong, PbTS**
 TS (/ 1000~) 5 R 0.1598 .
 . 1000
 . 10 1 **.Lead, dilute, PbTS**
 . 100 PbTS 10 .
 .
 .(105 1963 SRIP) C₄H₆O₄Pb,3H₂O **.Lead acetate R**
 R **.TS (/ 80) Lead acetate**
 .(/ 0.25) C₄H₆O₄Pb / 80
 .(107 1963 SRIP) Pb(NO₃)₂ **.Lead nitrate R**

R .VS (/ 0.05) **Lead nitrate**
 . 1000 $\text{Pb}(\text{NO}_3)_2$ 16.56
 25.0 / 0.05 .standardization
 20 TS 10 200
 .VS (/ 0.05) R 11
 . LiClO_4 **Lithium perchlorate R**
 .
 R R TS (/ 750~) .
 .R
Lithium perchlorate/acetic acid TS /
 R1 R 10.64 .
 . 1000
 R 400 .400 **Macrogol 400 R**
 .9.1 8.2 n $\text{H}(\text{OCH}_2\text{CH}_2)_n\text{OH}$
 . hygroscopic () .
 R 400 2.1 .average molecular weight
 .TS / 25.0
 ° 100-96
 . 1
 0.5) 50 .
 .TS / 5 VS (/
 . 15 VS (/ 0.5)
 4000 .
 . VS (/ 0.5)
 .420 380
 . / 1.140-1.110 .(Q_{20}) *Mass density*

° 8 4 .Congealing point
 .° 0.4
 . / 50 7.5 4.5 .pH value
 50 5.0 .acidity or alkalinity
 0.01) .TS /
 .VS (/ 0.01) VS (/
 . 2.0
 . / 10 .sulfated ash
 1 4 .heavy metals ()
 . / 50 . 25 TS (/ 70~)
 75 50 .limit of monoethylene and diethylene glycols
 2-1) 250-100 . 250 R
 . 25 1 100 (25.0
 .
 .R
 . 50
 15 10 . R
 525 5-2 TS
 10 TS 15 blank .
 TS (/ 400) 10 .TS (/ 400)
 TS 15 R 30
 . 525 5-2
 .
 .MgO .Magnesium oxide R
 .
 .TS (/ 750~) .
 .(111 1963 SRIP) MgSO₄·7H₂O .Magnesium sulfate R

.(112 1963 SRIP) MnO_2 .**Manganese dioxide R**
 .**Manganese/silver paper R** /
 15) VS (/ 0.1) .
 VS (/ 0.1) TS (/
 15 (1 Whatman) .
 / .
 . R
) 40 () .*test for sensitivity*
 .TS (NH₄ / 10) 1.0 (30 80
 .R 1 9
 .R /
 . 1 ° 60-50 .
 .
 . $\text{MnSO}_4 \cdot \text{H}_2\text{O}$.**Manganese sulfate R**
 .
 750~) 0.6 1 .
 .TS (/
 .TS (/ 15) **Manganese sulfate**
 . MnSO_4 / 15.0 R
 C₂H₄O₂S .(Thioglycolic acid R) **Mercaptoacetic acid R**
 .(206 1963 SRIP)
 .(112 1963 SRIP) .C₄H₆HgO₄ .**Mercuric acetate R**
 .**Mercuric acetate/acetic acid TS** /
 R1 R 50 .
 TS /
 . 1000 VS (/ 0.1)
 .(113 1963 SRIP) .HgBr₂ .**Mercuric bromide R**

			Mercuric bromide AsTS	
. 100	TS (/ 750~)		R 5	.
			.Mercuric bromide AsR	
	. ² / 120-65			.
	.400			
		AsTS	25	
			.	
		AsR		.
			.	.
			.	
		.Hg(NO₃)₂,H₂O .Mercuric nitrate R		
			R	.
	.deliquescent			.
	.TS (/ 1000~)			.
		.VS (/ 0.01) Mercuric nitrate		
	5	R	3.5	.
	.	1000	500	TS (/ 1000~)
:	/ 0.01		<i>.standardization</i>	
	2 TS (/ 1000~)		2	20.0
	° 20		.TS (/ 45)	
			VS (/ 0.01)	
	.(114 1963 SRIP) HgO	.Mercuric oxide, yellow, R		
		.Mercuric sulfate TS		
20		40 R	5	.
.		40	TS (/ 1760~)	
1.0	:	R	.Methanol, dehydrated, R	
			.	/

.(117 1963 SRIP) CH₃OH **.Methanol R**
 .C₆H₁₂N₄ Hexamethylenetetramine **.Methenamine R**
 .C₆H₁₂N₄ %99.0
 .
 .TS (/ 750~) .
 3 10 . 25 2.5 .
 1 TS /
 3 10 .VS (/ 0.1)
 3 TS /
 .VS (/ 0.1)
 . / 0.5 .sulfated ash
 50 10 1.5 .
 VS (/ 0.5)
 1 . TS / VS (/ 1)
 .C₆H₁₂N₄ 35.05 VS (/ 0.5)
 .4'-dimethylaminoazobenzene-4-sufonic acid **.Methyl orange R**
 .(117 1963 SRIP) C₁₄H₁₄N₃NaO₃S
.Methyl orange/ethanol TS /
 TS (/ 750~) R 0.04 .
 . 1000
 1963 SRIP) C₁₅H₁₅N₃O₂ 4'-Dimethylaminobenzene-2-carboxylic acid **.Methyl red R**
 .(118
.Methyl red/ethanol TS /
 (/ 0.05) 0.95 R 25 .
 TS (/ 750~) 5 VS
 . 250 TS (/ 375~)

.Methyl red/methylthionium chloride TS /
 0.4 TS (/ 750~) / 0.5 R 20 .
 . / 20 R
 $C_{16}H_{18}ClN_3S \cdot 3H_2O$.[methylene blue] **.Methylthionium chloride R**
 .(119 1963 SRIP)
.TS (/ 0.2) Methylthionium chloride
 . 100 R 23 .
 C.I. 11 C.I. .[Eriochrome black R] **Mordant Black 11 R**
 2-(2-hydroxy-6- Solochrome Black T 14645
 .(84 1963 SRIP) $C_{20}H_{12}N_3NaO_7S$ nitro-4-sulfo-1-naphthylazo)-1-naphthol
.Mordant Black 11 indicator mixture R
 .R 100 R 11 1 .
 .(122 1963 SRIP) $C_{10}H_8O$.[β-naphthol R] **2-Naphthol R** -2
.2-Naphthol TS1 -2
 (/ 80~) 40 R -2 5 .
 . 100 TS
 . TS1 -2 :
 1963 SRIP) .[R (70)] **TS (/ 1000~) Nitric acid**
 .*d*~1.14 (125
.TS (/ 130~) Nitric acid
) 1000 TS(/ 1000~) 130 .
 .*d*~1.07 (/ 2
.TS (/ 15~) Nitric acid
 .HNO₃ / 15.0 TS(/ 1000~) .
.TS (/ 3~) Nitric acid
 .HNO₃ / 3.0 TS(/ 1000~) .
 .(128 1963 SRIP) $C_6H_5NO_2$ **.Nitrobenzene R**

(129 1963 SRIP) N₂ .R
 (132 1963 SRIP) .Pancreatic digest of casein R
 (135 1963 SRIP) .Papaic digest of soybean meal R
 (135 1963 SRIP) .Paraffin, liquid, R
 enzyme .Penicillinase R
Bacillus cereus
 thiazolidine
 R TS (/ 750~) R
 .ethyl acetate R
 R
 "Preparation of penicillinase"
 .
 .
 2.7 R 10 .Preparation of penicillinase
 200 R 5.9 R
 0.4 . 1000 TS (/ 200~) 7.2
 TS (/ 1) 1 5 R
 . 10
 NCTC 9946 *Bacillus cereus*)
 ° 37-35 ° 37-18 .(
 . 16
 .R .Penicillinase TS
 "Penicillinase assay" TS
 . 36
 .Penicillinase assay
 ° 1 ± 30 20 15 borosilicate glass

. ° 30
 0.4 gelatin TS 1.6 :
 TS 1 TS 1 TS
 2.0 15 . 1
 .TS VS (/ 0.01)
 36 . TS
 R 220 (7.0 ° 30)
 .TS 1
 . 3-2 ° 2 0 .
 .
 .(137 1963 SRIP) **.Peptone, dried, R**
 0.02 : R **.Peptone R1**
 . /
.TS (/ 5) Peptone
 R 7 R 5.0 .
 . 20 8.4 - 8.0 . 1000
 . 30 ° 115 7.4 - 7.2
.TS1 (/ 1) Peptone
 () R1 1.0 .
 100 0.2 ± 7.1 1000
 . 20 - 18 ° 121
.TS2 (/ 1) Peptone
 R 9 R 1.0 .
 . 20 8.4 - 8.0 . 1000
 . 30 ° 115 7.4 - 7.2
. [R (/ 70)] .TS (/ 1170~) Perchloric acid
 .*d*~1.67 (137 1963 SRIP)

TS (/ 1170~)

.TS (/ 140~) Perchloric acid
 $d \sim 1.09$ HClO₄ / 141

.VS (/ 0.1) Perchloric acid

8.2 ° 25 R1 900 .

acetic anhydride 32 TS (/ 1170~)

R1 . R

. 24 1000

.water

. 24 / 0.2 0.1 R

0.5 .standardization

2 ° 120 potassium hydrogen phthalate R

"Non-aqueous titration" A

20.42 VS (/ 0.1) 1 .127

.C₈H₅KO₄

.(108 1963 SRIP) .[light petroleum R] Petroleum, light, R

.(138 1963 SRIP) C₁₂H₈N₂, H₂O 1,10-Phenanthroline .o-Phenanthroline R

.TS (/ 1) o-Phenanthroline

. 100 R 0.11 .

.o-Phenanthroline TS

1.5 70 ferrous sulfate R 0.7 .

. 100 R

.C₆H₆O .Phenol R

. .

R 100 15 .

.R R TS (/ 750~)

. ° 15 15 1.0 .Completeness of solution

	.° 40.5	.congealing temperature	
		.residue on evaporation	
		/ 0.5	° 105
	.(139	1963 SRIP) C ₂₀ H ₁₄ O ₄	.Phenolphthalein R
		.Phenolphthalein/ethanol TS	/
. 100	TS (/ 750~)	R	1.0 .
		.Phenolphthalein/pyridine TS	/
. 100	R	R	1.0 .
1963 SRIP)	C ₁₉ H ₁₄ O ₅ S	Phenolsulfonphthalein	.Phenol red R
			.(139
		.Phenol red/ethanol TS	/
0.05)	2.85	R	0.05 .
	.TS (/ 750~)		5 VS (/
	. 250	TS (/ 150~)	
	.(Phosphate buffer, sterile, pH 4.5, TS) TS 4.5		
potassium dihydrogen phosphate R			13.6 .
° 120	20	. 1000	
TS (/ 1440~)		4.55 - 4.45	
		.TS (/ 110~)	
		pH	.
	.(Phosphate buffer, sterile, pH 6.0, TS1) TS1 6.0		
8.0 dipotassium hydrogen phosphate R			2.0 .
	potassium dihydrogen phosphate R		
	° 120	20	. 1000
(/ 110~)	TS (/ 1440~)		6.05 - 5.95
			.TS
		pH	.

.(Phosphate buffer, sterile, pH 6.0, TS2) TS2 6.0

anhydrous disodium hydrogen	1.16	.
potassium dihydrogen phosphate R	7.96	phosphate R
° 120	20	. 1000
TS (/ 1440~)	6.05 - 5.95	
	.TS (/ 110~)	
	pH	.

.(Phosphate buffer, sterile, pH 6.0, TS3) TS3 6.0

8.0 dipotassium hydrogen phosphate R	20.0	.
potassium dihydrogen phosphate R		
° 120	20	. 1000
(/ 110~)	TS (/ 1440~)	6.05 - 5.95
		.TS
	pH	.

.(Phosphate standard buffer, pH 6.8, TS) TS 6.8

potassium dihydrogen phosphate R	3.40	.
anhydrous disodium hydrogen phosphate R		3.53
	. 1000	

.(Phosphate buffer, pH 7.0, TS) TS 7.0

anhydrous disodium hydrogen	5.76	.
potassium dihydrogen phosphate R	3.53	phosphate R
	. 1000	

.(Phosphate buffer, sterile, pH 7.0, TS) TS 7.0

anhydrous disodium hydrogen	5.76	.
potassium dihydrogen phosphate R	3.55	phosphate R
° 120	20	. 1000
TS (/ 1440~)	7.05 - 6.95	

.TS (/ 110~)
pH

.(Phosphate buffer, sterile, pH 7.2, TS) TS 7.2

1.4 potassium dihydrogen phosphate R 6.80
20 . 1000 R
1440~) 7.3 - 7.1 ° 120
.TS (/ 110~) TS (/
pH

.(Phosphate standard buffer, pH 7.4, TS) TS 7.4

potassium dihydrogen phosphate R 1.18
anhydrous disodium hydrogen phosphate R 4.30
. 1000

.(Phosphate buffer, sterile, pH 8.0, TS1) TS1 8.0

dipotassium hydrogen phosphate R 16.73
potassium dihydrogen phosphate R 0.52
° 120 20 . 1000
TS (/ 1440~) 8.1-7.9
.TS (/ 110~)
pH

.(Phosphate buffer, sterile, pH 8.0, TS2) TS2 8.0

anhydrous disodium hydrogen 8.95
potassium dihydrogen phosphate R 0.50 phosphate R
° 120 20 . 1000
TS (/ 1440~) 8.1 - 7.9
.TS (/ 110~)
pH

(141 1963 SRIP) .[R] TS (/ 1440~) **Phosphoric acid**

$d \sim 1.7$
 (142 1963 SRIP) P_2O_5 **Phosphorus pentoxide R**
 $C_8H_4O_3$ **Phthalic anhydride R**
 TS (/ 750~)
 R
 130°
Phthalic anhydride/pyridine TS /
 R 300 R 42
 / 1 (R)
 1000
 TS /
 oleic acid **(Polysorbate 80 R) R 80**
 tripolyethylene-glycol 300-sorbitan ether
miscibility
 R TS (/ 750~)
 (144 1963 SRIP) $C_2H_3KO_2$ **Potassium acetate R**
Potassium acetate TS
 1000 R R 100
 (145 1963 SRIP) $KHCO_3$ **Potassium bicarbonate R**
 (148 1963 SRIP) KBr **Potassium bromide R**
 R **Potassium bromide IR**
 " 3
 45) "Spectrophotometry in the infrared region
 670 - 1 250° R
 0.1 4000 cm^{-1}

100 R .TS (/ 100) Potassium bromide .1630 cm⁻¹ 3440
. KBr
.(151 1963 SRIP) KCl .Potassium chloride R
: R .Potassium chloride IR
" 3
) "Spectrophotometry in the infrared region
1 ° 250 R 45
0.1 670- 4000 cm⁻¹
.1630 cm⁻¹ 3440
R .TS (/ 350) Potassium bromide
.KCl / 350
.(154 1963 SRIP) K₂Cr₂O₇ .Potassium dichromate R
R .Potassium dichromate R1
.K₂Cr₂O₇ %99.9
.Potassium dichromate TS
° 130 60 .
. 1000.0 VS (/ 0.005) R1
R .VS (/ 0.0167) Potassium dichromate
. 1000 K₂Cr₂O₇ 4.904
1963 SRIP) KH₂PO₄ .Potassium dihydrogen phosphate R
.(155
.(156 1963 SRIP) K₃Fe(CN)₆ .Potassium ferricyanide R
.TS (/ 10) Potassium ferricyanide
R 1 .
. 100
. TS (/ 10) :
1963 SRIP) C₈H₅KO₄ .Potassium hydrogen phthalate R

.(157

. Potassium hydrogen phthalate standard TS

° 120 R 10.21 .
pH . 1000 R
.° 15 4.00

1963 SRIP) $C_4H_5KO_4$.Potassium hydrogen tartarate R

.(158

.Potassium hydrogen tartarate standard TS

100 R 2 .
. R
.decantation

TS

.(159 1963 SRIP) KOH .Potassium hydroxide R

R

.TS (/ 110~) Potassium hydroxide

.(/ 2) KOH / 112

.Potassium hydroxide/ethanol TS1 /

20 R 40 .

. 1000 TS (/ 750~)

R .VS (/ 1) Potassium hydroxide

. 1000 KOH 56.10

5 : / 1 .

. 3 ° 105 R

75 .

TS / R

1) 1 0.2042 .

.VS (/

.soda lime R

R .VS (/ 0.5) Potassium hydroxide

. 1000 KOH 28.05

.standardization

.VS (/ 1)

R .VS (/ 0.1) Potassium hydroxide

. 1000 KOH 5.610

.standardization

.VS (/ 1)

.VS (/ 0.5) Potassium hydroxide/ethanol /

. 1000 KOH 28.05 TS (/ 710~) R

: / 0.5 .standardization

50 VS (/ 0.5) 25.0

. TS / VS (/ 1) /

.VS (/ 0.02) Potassium hydroxide/ethanol /

. 1000 KOH 1.122 TS (/ 710~) R

.standardization

.VS (/ 0.5) /

.(161 1963 SRIP) KI .Potassium iodide R

10 : R .Potassium iodide AsR

2 35 AsTS (/ 250~) 25 R

stannous chloride AsTS

83 R .TS (/ 80) Potassium iodide

.(/ 0.5) KI /

.(162 1963 SRIP) KNO₃ .Potassium nitrate R

.KNO₂ .Potassium nitrite R

		.TS (/ 750~)	0.35	.
100	R	.TS (/ 100) Potassium nitrite		.KNO ₂ /
		.(165 1963 SRIP) KMnO ₄ .Potassium permanganate R		
R		.TS (/ 10) Potassium permanganate		
		.KMnO ₄ / 10		
R		.VS (/ 0.02) Potassium permanganate		
		. 1000 KMnO ₄ 3.161		
:	/	0.02		.standardization
° 110		R	0.2	
		TS (/ 1760~)	7	. 250
				° 70
6.7	.° 60		15	
	.VS (/ 0.02)		1	
		.(165 1963 SRIP) K ₂ SO ₄ .Potassium sulfate R		
		.TS (/ 174) Potassium sulfate		
. 1000	R		174	.
.(166	1963 SRIP) C ₄ H ₃ KO ₈ .2H ₂ O .Potassium tetraoxalate R			
	.Potassium tetraoxalate standard TS			
	R		25.42	.
		. 1000 R		
		.(169 1963 SRIP) C ₅ H ₅ N .Pyridine R		
.R	R	.Pyridine, anhydrous, R		
		.Red stock standard TS		

6.3	TS	6.1	TS	40.5	.
	100.0	TS	12.0	TS	
				TS (/ 10~)	
	(170	1963 SRIP)	C ₁₂ H ₆ NNaO ₄	.Resazurin sodium R	
R			TS (/ 1)	Resazurin sodium	
				C ₁₂ H ₆ NNaO ₄	/ 1
			TS (/ 1)		
	(171	1963 SRIP)	C ₆ H ₆ O ₂	1,3-Dihydroxybenzene	.Resorcinol R
	C ₆ H ₆ O ₂	/ 20	R		.Resorcinol TS
	NaCl	/ 9	R		.TS
				30 ° 120	
	(172	1963 SRIP)	Se	.Selenium R	
				.Silica gel, desiccant, R	
				SiO ₂	.
				° 110	(
° 50 ± 950		2		loss on ignition ()
				/ 60	
		10		water absorption	
%80				24	
/ 310				1.19	
	(173	1963 SRIP)	AgNO ₃	.Silver nitrate R	
/ 42.5	R		TS (/ 40)	Silver nitrate	
				(/ 0.5	) AgNO ₃
/ 16.99	R		VS (/ 0.1)	Silver nitrate	
				1000	AgNO ₃

: / 0.1 .standardization
 . 100 40.0
 . TS (/ 70~)
 . 5
 . ° 110 .TS (/ 000~)
 /
 .(174 1963 SRIP) .Soda lime R
 .(176 1963 SRIP) $C_2H_3NaO_2 \cdot 3H_2O$.Sodium acetate R
 150 R .TS (/ 150) Sodium acetate
 . $C_2H_3NaO_2$ /
 3,4- : S .Sodium alizarinsulfonate R
 . $C_{14}H_7NaO_7S \cdot H_2O$ dihydroxy-9,10-anthraquinone-2-sulfonic acid
 . — — .
 .TS (/ 750~) .
 .TS (/ 1) Sodium alizarinsulfonate
 . 100 R 0.11 .
 .(177 1963 SRIP) $NaHCO_3$.Sodium hydrogen carbonate R
 .(179 1963 SRIP) $Na_2CO_3 \cdot 10H_2O$.Sodium carbonate R
 .(179 1963 SRIP) Na_2CO_3 .Sodium carbonate, anhydrous R
 R .TS (/ 50) Sodium carbonate
 .(/ 0.5) Na_2CO_3 / 50
 .Sodium carbonate standard TS
 R 2.093 R 2.64 .
 . 1000 R
 .(181 1963 SRIP) $NaCl$.Sodium chloride R
 . $C_6H_5Na_3O_7 \cdot 2H_2O$.Sodium citrate R

				$C_6H_5Na_3O_7$	%99.0	
				.TS (/ 750~)		
				/ 100		.appearance of solution
15	R					.water
				/ 130	/ 110	
	R	20		0.15		
Non-aqueous		"		VS (/ 0.1)		
	VS (/ 0.1)	1	(127	) A	"Titration	
				$C_6H_5Na_3O_7$	8.603	
	(182	1963 SRIP)	$Na_3Co(NO_2)_6$	Sodium cobaltinitrite R		
R				.TS (/ 100)	Sodium cobaltinitrite	
				$Na_3Co(NO_2)_6$	/ 100	
	(183	1963 SRIP)	NaF	Sodium fluoride R		
	(185	1963 SRIP)	NaOH	Sodium hydroxide R		
R				.TS (/ 400~)	Sodium hydroxide	
				NaOH	/ 400	
R				.TS (/ 300~)	Sodium hydroxide	
				NaOH	/ 300	
R				.TS (/ 200~)	Sodium hydroxide	
				NaOH	/ 200	
R				.TS (/ 80~)	Sodium hydroxide	
				(/ 2	) NaOH / 80	
R				.VS (/ 1)	Sodium hydroxide	
				1000	NaOH 40.01	
:	/ 1					.standardization
		3	° 105	R		5

75 .

R

1 0.2042 . TS /
 .VS (/ 1)

.R

R .VS (/ 0.2) Sodium hydroxide

. 1000 NaOH 8.001

.standardization

.VS (/ 1)

R .VS (/ 0.1) Sodium hydroxide

. 1000 NaOH 4.001

.standardization

.VS (/ 1)

R .Sodium hydroxide VS (/ 0.05)

. 1000 NaOH 2.000

.standardization

.VS (/ 1)

R .Sodium hydroxide VS (/ 0.01)

. 1000 NaOH 0.4001

.standardization

.VS (/ 1)

Sodium hydroxide, carbonate-free,

VS (/ 1)

. 1000 NaOH 40.01

R

.VS

/ 600 - 400

R

.R

VS (/ 1)	45	. test for carbonates	
. TS /	()		
			. 20
	0.1		
: / 1		.standardization	
. 3 ° 105	R		5
75			
	R		
1	0.2042	. TS /	
.VS (/ 1)			
.R			
Sodium hydroxide, carbonate-free,	VS (/ 0.5)		
. 1000 NaOH 20.00	R		.VS
1)			
		.VS (/	
Sodium hydroxide, carbonate-free,	VS (/ 0.2)		
. 1000 NaOH 8.00	R		.VS
1)			
		.VS (/	
Sodium hydroxide, carbonate-	VS (/ 0.1)		
. 1000 NaOH 4.001	R		.free, VS

1)

.VS (/

Sodium hydroxide, carbonate-free, VS (/ **0.2)**

. 1000 NaOH 0.8001 R **.VS**

1)

.VS (/

Sodium hydroxide, carbonate-free, VS (/ **0.1)**

. 1000 NaOH 0.4001 R **.VS**

(/ 1)

.VS

(Sodium thioglycolate R) **.Sodium mercaptoacetate R**

.C₂H₃NaO₂S

.TS (/ 750~)

.(189 1963 SRIP) NaNO₂ **.Sodium nitrite R**

.NaNO₂ / 10 R **.Sodium nitrite TS**

6.900 R **.VS (/ 0.1) Sodium nitrite**

. 1000 NaNO₂

: / 0.1 *.standardization*

300 VS (/ 0.02) 50.0

. 20.0 TS (/ 100~) 25

R 2 . 10

. TS VS (/ 0.1)

.(190 1963 SRIP) C₂Na₂O₄ **.Sodium oxalate R**

(195 1963 SRIP) Na₂SO₄ **.Sodium sulfate, anhydrous, R**

.(195 1963 SRIP) $\text{Na}_2\text{S}\cdot 9\text{H}_2\text{O}$.Sodium sulfide R

.Sodium sulfide TS

R 25 R 12 .
 . 100

 $\cdot\text{Na}_2\text{B}_4\text{O}_7, 10\text{H}_2\text{O}$

Sodium tetraborate R

0.6 20 .
TS (/ 750~)

0.3814 *pH Value of a 0.01 mol/l solution* / 0.01

.° 25	9.20-9.15	.7.4-6.5	100
-------	-----------	----------	-----

20	1.0	.Chlorides
----	-----	------------

TS (/ 1000~) 1

(112) "Limit test for chlorides"

. / 250

70~)

2	20	0.5	<i>.Sulfates</i>
---	----	-----	------------------

Limit test

" TS (/
. / 1.0 .(113) " for sulfates

.Sodium tetraborate standard TS

R 3.81 .
 . 1000 R

.C₂₄H₂₀BNa .Sodium tetraphenylborate R

.light petroleum R

R

.7.5 / 20

.TS (/ 30) Sodium tetraphenylborate

			$\text{C}_{24}\text{H}_{20}\text{BNa}$	/	30	R
R		R	1		5	.
						.
		.R				.Sodium thioglycolate R
	(197	1963 SRIP)	$\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$			.Sodium thiosulfate R
	R		.VS (/ 0.1) Sodium thiosulfate			
				.	1000 $\text{Na}_2\text{S}_2\text{O}_3$	15.82
	:	/	0.1			<i>.standardization</i>
			VS (/ 0.0167)			30.0
TS (/ 250~)			5 R		2	.
			100		10	
					TS	
		R	.VS (/ 0.05) Sodium thiosulfate			
				.	1000 $\text{Na}_2\text{S}_2\text{O}_3$	7.910
						<i>.standardization</i>
			.VS (/ 0.1)			
		R	.VS (/ 0.01) Sodium thiosulfate			
				.	1000 $\text{Na}_2\text{S}_2\text{O}_3$	1.582
						<i>.standardization</i>
			.VS (/ 0.1)			
	(198	1963 SRIP)	$\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$			.Stannous chloride R
						.Stannous chloride TS
TS (/ 250~)			100 R		330	.
				.	1000	
			.Stannous chloride AsTS			
250~)			TS			.
		.fine-grained				TS (/

10 6 10 .test for arsenic ()
50 . 16 AsTS (/ 250~)
AsTS
. / 1 -1
.(199 1963 SRIP) .[R R] Starch R
.(99 1963 SRIP)Starch, soluble, R
.Starch TS
5 R R 0.5 .
100
TS
1963 SRIP) .[starch-iodide paper R -] Starch/iodide paper R /
.(200
.C₇H₆O₆S,2H₂O .Sulfosalicylic acid R
.
.TS (/ 750~)
50 5.0 .
.° 105 . 1
. 1.0
1.0 .sulfated ash
TS (/ 1760~) 1 .
. / 1.0
175 R .Sulfosalicylic acid TS
.C₇H₆O₆S /
.(202 1963 SRIP) SO₂ .Sulfur dioxide R
1963 SRIP) .[R] TS (/ 1760~) Sulfuric acid
.d~1.84 (202
.Sulfuric acid, nitrogen-free TS (/ 1760~)

	H ₂ SO ₄	/	1760		TS (/ 1760~)	
						.
R		8		5	45	.Nitrates
						.
					.TS (/ 190~)	Sulfuric acid
		9	TS (/ 1760~)		1	.
					..d~1.12	H ₂ SO ₄ / 190
					.TS (/ 100~)	Sulfuric acid
1000			TS (/ 1760~)		57	.
					.d~1.065 (/ 1)	
					.TS (/ 10~)	Sulfuric acid
	1000		TS (/ 100~)		100	.
			TS (/ 1760~)		.VS (/ 0.5)	Sulfuric acid
					. 1000	H ₂ SO ₄ 49.04
	:		/ 0.5			.standardization
1	° 270		R			1.5
TS	/					50
0.5)			1		52.99	.
						.VS (/
					. VS (/ 0.05)	Sulfuric acid
					. 1000	H ₂ SO ₄ 4.904
						.standardization
					.VS (/ 0.5)	
					. VS (/ 0.01)	Sulfuric acid
					. 1000	H ₂ SO ₄ 0.9808
						.standardization
					.VS (/ 0.5)	

TS (/ 1760~)

.VS (/ 0.005) Sulfuric acid

. 1000 H₂SO₄ 0.4904

.standardization

.VS (/ 0.5)

. C₁₈H₁₄ 1,4-Diphenylbenzene .*p*-Terphenyl R –

.Mercaptoacetic acid R

.Thioglycolic acid R

2,7-Disodium 4-[(O-arsonophenyl)azo]-3-hydroxy-2,7-naphthalenedisulfonate, .Thorin R

.C₁₆H₁₁AsN₂Na₂O₁₀S₂

.TS (/ 2) Thorin

. 100 R 0.2 .

. .

. 1 .

.Th(NO₃)₄·4H₂O .Thorium nitrate R

. .

.TS (/ 750~) .

2.401 R .VS (/ 0.005) Thorium nitrate

. 1000 Th(NO₃)₄

: / 0.005 .standardization

R 0.050

(/ 1) 0.6 20.0 . 250

VS (/ 0.1) TS

TS 3.0 5 .

1 0.8398 .

.VS (/ 0.005) thorium nitrate

.(207 1963 SRIP) C₂₈H₃₀O₄ .Thymolphthalein R

.Thymolphthalein/ethanol TS /

TS (/ 750~) 100 R 0.1 .

.(209 1963 SRIP) C_7H_8 .**Toluene R**
 .(213 1963 SRIP) $C_4H_6O_6U, 2H_2O$.**Uranyl acetate R**
.Uranyl/zinc acetate TS /
 5 50 R 10
 30 R 30 TS (/ 300~)
 .TS (/ 300~)

.Water, carbon-dioxide-free, R

.Xylenol orange R

[3*H*-2,1-Benzoxathiol-3-ylidene bis [(6-hydroxy-5-methyl-*m*-phenylene) ,methylenenitrilo]]
 .tetraacetic acid, *S,S*-dioxide, $C_{31}H_{32}N_2O_{13}S$

.TS (/ 750~)

.Xylenol orange indicator mixture R

.R 10 R 0.1
 .(215 1963 SRIP) .**Yeast extract, water-soluble, R**

.Yellow stock standard TS

10.7 TS 1.9 TS 9.5
 100.0 TS 4.0 TS
 . TS (/ 10~)

(216 1963 SRIP) Zn .**Zinc R**

: R **.Zinc AsR, granulated**

10 .*limit of arsenic* ()
 50 AsTS (/ 250~) stannated hydrochloric acid
 1 R 10

0.1

.test for sensitivity

AsTS

.(216 1963 SRIP) $C_4H_6O_4Zn, 2H_2O$ **.Zinc acetate R**