



“十二五”国家重点图书出版规划项目

国家新闻出版改革发展项目

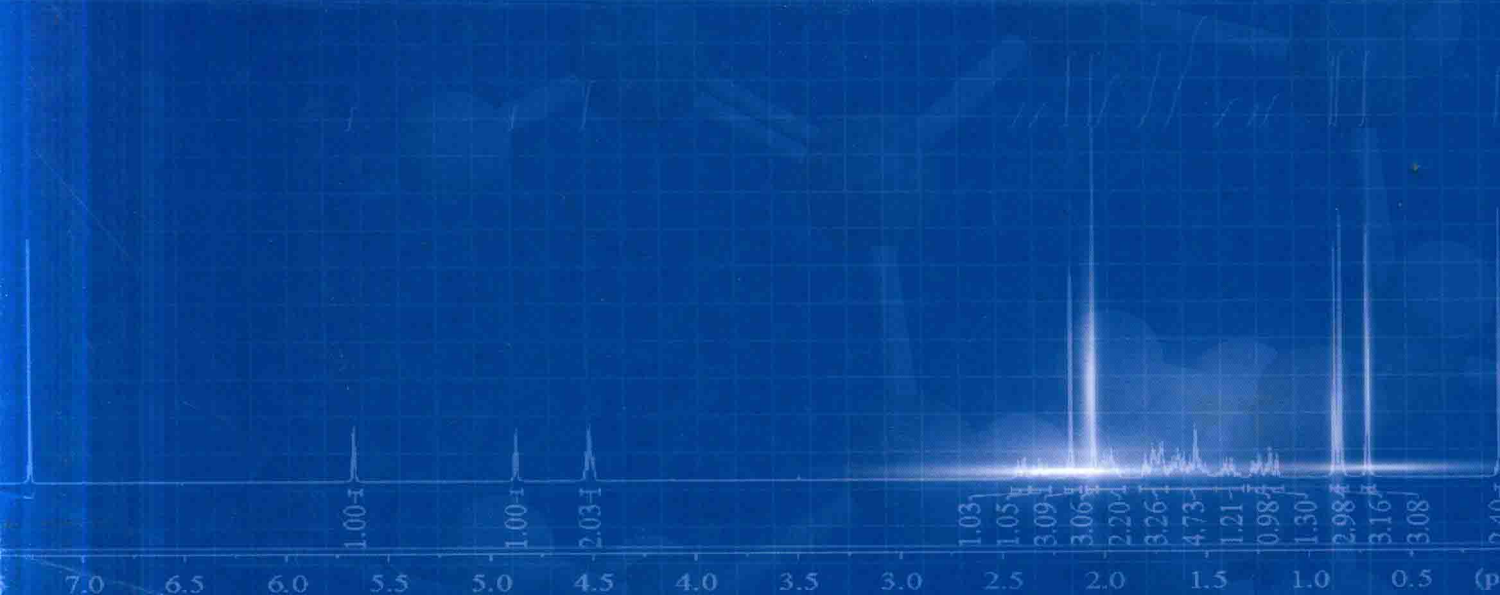
国家出版基金项目

中药化学对照品 波谱图集

第 一 册

Spectral Atlas of
Chemical Reference Substances of
Chinese Medicines

王峥涛 俞桂新 主 编



海峡出版发行集团 | 福建科学技术出版社
THE STRAITS PUBLISHING & DISTRIBUTING GROUP | FUJIAN SCIENCE & TECHNOLOGY PUBLISHING HOUSE



“十二五”国家重点图书出版规划项目

国家新闻出版改革发展项目

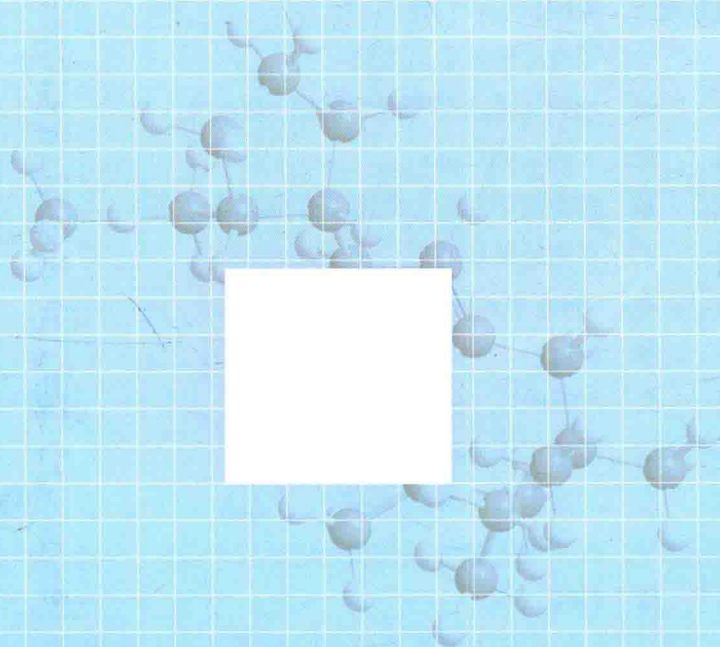
国家出版基金项目

Spectral Atlas of Chemical Reference Substances of Chinese Medicines

中药化学对照品波谱图集

第一册

王峥涛 俞桂新 主 编



海峡出版发行集团
THE STRAITS PUBLISHING & DISTRIBUTING GROUP

福建科学技术出版社
FUJIAN SCIENCE & TECHNOLOGY PUBLISHING HOUSE

图书在版编目 (CIP) 数据

中药化学对照品波谱图集 / 王峥涛, 俞桂新主编. — 福州 :
福建科学技术出版社, 2016. 12
ISBN 978-7-5335-5213-8

I. ①中… II. ①王…②俞… III. ①中药化学-波谱分析-
图集 IV. ①R284.1-64

中国版本图书馆CIP数据核字 (2016) 第319322号

书 名 中药化学对照品波谱图集
主 编 王峥涛 俞桂新
出版发行 海峡出版发行集团
福建科学技术出版社
社 址 福州市东水路76号 (邮编350001)
网 址 www.fjstp.com
经 销 福建新华发行 (集团) 有限责任公司
印 刷 福建地质印刷厂
开 本 889毫米×1194毫米 1/16
印 张 131.5
图 文 2104码
版 次 2016年12月第1版
印 次 2016年12月第1次印刷
书 号 ISBN 978-7-5335-5213-8
定 价 1580.00元

书中如有印装质量问题, 可直接向本社调换

编 委 会

主 编 王峥涛 俞桂新

副主编 孙秦虎

编 委 王峥涛 俞桂新 孙秦虎 谷丽华 张成刚 毛旭东
杨颖博 刘 畅 胡海军 杨俊杰 陈 颀 芮梦珏
许红涛 李春阁 王永丽

总目录

第一册

总论 General

1 中药化学对照品	
1 The chemical reference substances of Chinese medicines	3
2 中药化学对照品的分类与功能	
2 The classification and related function of chemical reference substances of Chinese medicines	4
3 中药化学对照品的要求与选择标准	
3 The requirements and selection criteria of chemical reference substances of Chinese medicines	5

各论 Monographs

生物碱类 Alkaloids	11
黄酮类 Flavonoids	175

第二册

甾体类 Steroids.....	565
三萜类 Triterpenes	685
二萜类 Diterpenes	1013

第三册

倍半萜类 Sesquiterpenes.....	1159
环烯醚萜类 Iridoids	1233
单萜类 Monoterpenes	1327
香豆素类 Coumarins	1373

木脂素类 Lignans	1469
醌类 Quinones.....	1575

第四册

苯丙酸类 Phenylpropionic acids	1633
酚类 Phenols	1697
苯乙醇苷类 Phenylethanoid glycosides	1847
有机酸类 Organic acids.....	1891
其他类 Other classes	1905

附录 Appendixes

《中国药典》(2015年版)中药化学对照品相关应用表

The related application table of chemical reference substances of Chinese medicines listed in *Chinese*

Pharmacopoeia (2015 Edition)2032

中药化学对照品中文名索引

Chinese name index of chemical reference substances of Chinese medicines.....2058

中药化学对照品英文名索引

English name index of chemical reference substances of Chinese medicines2066

目 录

第一册

总论 General

1 中药化学对照品	
1 The chemical reference substances of Chinese medicines	3
2 中药化学对照品的分类与功能	
2 The classification and related function of chemical reference substances of Chinese medicines	4
3 中药化学对照品的要求与选择标准	
3 The requirements and selection criteria of chemical reference substances of Chinese medicines	5

各论 Monographs

生物碱类 Alkaloids

放线瑞香宁碱 actinodaphnine	12
波尔定 boldine	16
酒渣碱 flazine	20
靛玉红 indirubin	23
异波尔定 isoboldine	27
异钩藤碱 isorhynchophylline	31
益母草碱 leonurine	35
钩樟卡品 lindcarpine	39

linderaline	43
石蒜裂碱 lycorenin.....	47
苦参碱 matrine	51
蝙蝠葛甾苷 menisdaurin.....	55
N-甲基六驳碱 N-methylaurotetanine.....	59
野百合碱 monocrotaline	63
氯化两面针碱 nitidine chloride.....	67
去甲异波尔定 norisoboldine.....	71
氧化苦参碱 oxymatrine.....	75
氧化槐果碱 oxysophocarpine.....	79
盐酸巴马汀 palmatine hydrochloride.....	83
贝母素甲 peimine.....	87
贝母素乙 peiminine.....	92
贝母辛 peimisine.....	97
紫苏萜 perillartine.....	102
派利文碱 perivine	106
盐酸黄柏碱 phellodendrine hydrochloride	110
鸭脚树叶碱 picrinine.....	114
派可林酸 pipercolinic acid	118
胡椒碱 piperine	122
原阿片碱 protopine	126
奎宁 quinine	130
牛心果碱 reticuline	134
吴茱萸次碱 rutaecarpine	138
次波尔定 secoboldine.....	142
一叶萩碱 securinine.....	146
槐果碱 sophocarpine	150
槐胺碱 sophoramine	154
盐酸水苏碱 stachydrine hydrochloride.....	158
左旋千金藤啞碱 L-stepholidine	162
土的宁 strychnine.....	166
黄华碱 thermopsine.....	170

黄酮类 Flavonoids

桉木酮 alnustone	176
山姜素 alpinetin	179
穗花杉双黄酮 amentoflavone	183

芹菜素 apigenin.....	188
落新妇苷 astilbin.....	192
紫云英苷 astragaline.....	196
黄芩素 baicalein.....	200
黄芩苷 baicalin.....	204
宝藿苷 I baohuoside I.....	208
补骨脂查耳酮 bavachalcone.....	212
鹰嘴豆芽素 A biochanin A.....	216
巴西苏木素 brazilin.....	220
蒙花苷 buddleoside.....	224
毛蕊异黄酮 calycosin.....	228
毛蕊异黄酮苷 calycosin-7-glucoside.....	232
小豆蔻明 cardamonin.....	235
儿茶素 (+)-catechin.....	239
白杨素 chrysin.....	243
柯伊利素 chrysoeriol.....	247
升麻素 cimifugin.....	250
山柰酚-3,4'-二葡萄糖苷 kaempferol-3,4'-di-O-glucoside.....	254
大豆苷元 daidzein.....	257
二氢杨梅素 dihydromyricetin.....	261
7,4'-二羟基黄酮 7,4'-dihydroxyflavone.....	265
香叶木素 diosmetin.....	269
黄杞苷 engeletin.....	273
表儿茶素 (-)-epicatechin.....	277
朝藿定 C epimedin C.....	281
杜鹃素 farrerol.....	285
芒柄花素 formononetin.....	289
染料木素 genistein.....	293
染料木苷 genistin.....	297
光甘草定 glabridin.....	301
高车前素 hispidulin.....	305
高车前苷 homoplantagin.....	309
5-羟基-7,4'-二甲氧基黄酮 5-hydroxy-7,4'-dimethoxyflavone.....	312
羟基芫花素 hydroxygenkwanin.....	315
羟基红花黄色素 A hydroxysafflor yellow A.....	318
金丝桃苷 hyperoside.....	322
淫羊藿苷 icarrin.....	325

次野鸢尾黄素 irisfloreantin.....	330
异甘草黄素 isoliquiritigenin	334
异荭草素 isoorientin.....	338
异槲皮苷 isoquercitrin	342
异鼠李素 isorhamnetin.....	346
异鼠李素-3-O-新橙皮苷 isorhamnetin-3-O-neohesperidoside.....	350
棕矢车菊素 jaceosidin	354
山柰苷 kaempferitrin.....	357
山柰酚 kaempferol.....	361
5, 6-二羟基-7', 4'-二甲氧基黄酮 ladanein.....	365
甘草查耳酮 A licochalcone A	368
甘草苷 liquiritin	372
龙血素 A loureirin A	376
龙血素 B loureirin B.....	380
木犀草素 luteolin	384
木犀草苷 luteolin-7-O-glucoside	388
石吊兰素 lysionotin	392
芒果苷 mangiferin	396
甲基橙皮苷 methyl hesperidin.....	400
5-甲基-7-甲氧基异黄酮 5-methyl-7-methoxyisoflavone.....	404
桑色素 morin	408
桑根白皮素 morusin.....	412
柚皮素 naringen.....	416
柚皮苷 naringin	420
新橙皮苷 neohesperidin	424
泽兰黄酮 nepetin.....	429
假荆芥属苷 nepitrin.....	432
川陈皮素 nobiletin	435
木蝴蝶苷 A oroxin A	439
木蝴蝶苷 B oroxin B.....	443
柳穿鱼黄素 pectolinarigenin.....	447
柳穿鱼叶苷 pectolinarin	451
5, 7, 3', 4', 5'-五甲氧基黄酮 5, 7, 3', 4', 5'-pentamethoxyflavone.....	455
乔松素 pinocembrin.....	459
球松素 pinostrobin.....	463
枸橼苷 poncirin	467
葛根素 puerarin.....	471

槲皮素 quercetin.....	475
篇蓄苷 quercetin-3-O- α -L-arabinoside.....	479
槲皮苷 quercitroside.....	483
野漆树苷 rhoifolin.....	487
芦丁 rutin.....	491
野黄芩苷 scutellarin.....	495
水飞蓟宾 silybin.....	499
槐角苷 sophoricoside.....	503
鼬瓣花亭 sorbifolin.....	507
斯皮诺素 spinosin.....	510
橘皮素 tangeretin.....	514
花旗松素 taxifolin.....	518
鸢尾苷 tectoridin.....	522
鸢尾苷元 tectorigenin.....	526
5, 7, 3', 4'-四羟基-6-甲氧基-二氢黄酮-7-O- β -D-吡喃葡萄糖苷 5, 7, 3', 4'-tetrahydroxy-6-methoxy-flavanone-7-O- β -D-glucopyranoside.....	530
3, 5, 6, 4'-四羟基-7-甲氧基黄酮 3, 5, 6, 4'-tetrahydroxy-7-methoxy flavone.....	534
(2S)-5, 7, 4'-三羟基-6-甲氧基-二氢黄酮-7-O- β -D-吡喃葡萄糖苷 (2S)-5, 7, 4'-trihydroxy-6-methoxy-flavanone-7-O- β -D-glucopyranoside.....	537
香蒲新苷 typhaneoside.....	540
5, 4'-二羟基-3', 7-二甲氧基黄酮 velutin.....	545
蔓荆子黄素 vitexicarpin.....	548
牡荆素 vitexin.....	552
汉黄芩素 wogonin.....	556
汉黄芩苷 wogonoside.....	560

总 论

General

1 中药化学对照品

中药化学对照品属于药品标准物质,主要用于中药物理、化学和生物学性质的测定。它应具有确定的特性或量值,能够用于校准设备、评价检测方法、给供试药品赋值,及判定其真伪优劣。

中药化学对照品可以是单一成分或混合组分,用于中药材、饮片、提取物、成方制剂,以及药用辅料等的检验,包括中药的定性鉴别,有毒、有害物质的检查,特定成分的含量测定。

中药化学对照品应具备准确性、均匀性、稳定性和适用性。

在中药检验、分析中所用的对照品,实际上属于工作对照品。

中药是一个复杂的体系,一种中药含有多种成分,一个复方含有多味中药。要对其所有的成分分别进行测定是不现实的,更何况很多中药的药效成分、指标成分未知,这对中药的真伪鉴别和质量控制是一个很大的挑战。因此,选择有限的、具有代表性的指标成分进行测定,进而评价、控制中药的质量,是现行中药、植物药质量标准国际认可的通用方案。

有鉴于此,对照品的确立与科学性、适用性评价是中药质量标准研究制定的核心和关键。

1 The chemical reference substances of Chinese medicines

Chemical reference substances (CRS) of Chinese medicines are of the standard substances of medicines, mainly used for the determination of the physical, chemical and biological properties of Chinese medicines. CRS should be provided with definite characteristics or specified values in order to calibrate the equipments, validate the analytical method, and assess the authenticity and quality of the tested samples.

The chemical reference substances of Chinese medicines can be a single compound or a standardized mixture of components, used for the examination of the crude drugs, prepared slices, extracts, the formulated preparations of Chinese medicines, as well as the medicinal auxiliary materials, including the identification, test of toxic and harmful substances and the quantitative determination.

The chemical reference substances of Chinese medicines should be of accuracy, uniformity, stability and applicability, as required for all kinds of reference substances used in official standards.

The reference substances used in the analyses of Chinese medicines are actually the working standards.

Chinese medicines are very complex matrices. A single herb may contain numerous components and a compound formula may contain many ingredient herbs which make it difficult to measure them separately. Moreover the active ingredients in most herbs are unidentified, which make their identification and quality assessment be very difficult and a big challenge. Therefore, it is an internationally recognized and accepted scheme to select and evaluate the representative chemical reference substances for the quality evaluation of Chinese medicines and natural products.

In view of this, the selection and evaluation of marker compounds and the development and validation of chemical reference substances are of great importance in the quality control of herbal materials and finished herbal products.

2 中药化学对照品的分类与功能

中药化学对照品依据其在质量控制中的作用可分为药效成分、活性成分、毒性成分、特征成分、指标成分对照品。

药效成分对照品：结构明确的一种或一组成分，其药效作用与某一中药或某一制剂的临床功效相吻合，可用于中药的含量测定、鉴别和质量评价。

活性成分对照品：结构明确的一种或一组成分，具有公认的药理(生物)活性，其生物活性与某一中药及其制剂的临床功效相关性尚不能完全确定，可用于中药的含量测定、鉴别和质量评价。

毒性成分对照品：结构明确的一种或一组成分，其在正常剂量范围内即呈现明显的毒性、成瘾性或副作用，主要用于限度检查，以及某些重要的鉴别、含量测定(对含量范围进行规定)。当然，毒性成分与活性成分、药效成分是相对的，很多毒性成分如乌头碱、麻黄碱，既是毒性成分，也是药效成分。

特征成分对照品：结构明确的一种或一组成分，其药效、生物活性已知或未知，但具有鉴别某种、数种或某一属植物，或者至少可以鉴别一个复方中某种中药的专属性，主要用于定性鉴别。

指标成分对照品：结构明确的一种或一组成分，其药效、生物活性已知或未知，具有或不具有种、属鉴别

2 The classification and related function of chemical reference substances of Chinese medicines

The chemical reference substances of Chinese medicines can be classified into the therapeutic, biological active, toxic, characteristic, and marker constituents, according to its function in the quality control and standard assessment of Chinese medicines.

Effective constituents refer to the constituents with known therapeutic activity, which are chemically defined substances or group of substances and known to contribute to the therapeutic activity of a herbal material or a preparation, and used for qualitative and quantitative determination, and standard assessment of Chinese medicines.

Biological active constituents refer to the constituents with recognized pharmacological (biological) activities, which are chemically defined substances or group of substances and where the relevance of the pharmacological (biological) activities for the therapeutic effects have not yet been fully established, and used for qualitative and quantitative determination, and standard assessment of Chinese medicines.

Toxic constituents refer to the constituents with recognized toxicity or side effect, which are chemically defined substances or group of substances, and showed obvious or potential toxicity, addiction, or side effect in a normal range of dose. Toxic constituents are mainly used for limit test, and identification and assay for constituents indicating bi-directional activities (toxicity and efficacy). It should be noted that the terms of toxic or effective/biological active constituents are relative. For instance, the toxic constituents such as aconitine, ephedrine, as well are also effective constituents.

Characteristic constituents refer to the constituents specified for a certain herb and its preparations, which are

的特征性,但根据其有无、含量高低,也能够相对控制某种中药及其制剂的质量。

3 中药化学对照品的要求与选择标准

3.1 基本要求与选择标准

3.1.1 基本要求

(1) 可以是化学单体,也可以是标定含量的一组成分的混合物。

(2) 在待测中药中有足够的量,易被检出、测定。

(3) 容易获得,性质稳定(热稳定性、光稳定性等)。

(4) 提供用于结构鉴定的波谱数据(UV、IR、NMR、MS,必要时提供其他相关波谱数据)。

(5) 具有较高的纯度。一般来说,定性鉴别应不小于95%,含量测定应不小于98%。

3.1.2 选择标准

(1) 易于与待测中药及其制品中共存的结构近似的成分相互分离、辨识。

(2) 其理化性质与中间体和最终产品的提取、制备工艺一致,即指标

chemically defined substances or group of substances with known or unknown therapeutic or biological activities. They should be specific for a plant species or certain plant species and genera, or at least specific for one ingredient herb in a compound formulation, and used mainly for identification.

Markers (Marker substances) are chemically defined substances or group of substances. They may or may not contribute to the clinical efficacy, specific or not specific for a plant species or certain plant species and genera, and may be used for identification and quantitation of a herb or preparation based on whether they can be detected or the content is high or low.

3 The requirements and selection criteria of chemical reference substances of Chinese medicines

3.1 General requirements and selection criteria

3.1.1 General requirements

(1) One substance or group of substances with specified quantity of each components.

(2) Constituents that occur naturally in sufficient quantities in herbal materials and are easy to detect and determination in the tested samples.

(3) Easy to obtain and stable (thermostability, photosensitivity, etc.).

(4) Available spectral data for structure identification (UV, IR, NMR, MS spectra, and others if necessary).

(5) With high purity, in general, should not be less than 95% for identity purpose, and should not be less than 98% for assay purpose.

3.1.2 Selection criteria

(1) Relatively easy to separate or distinguish from other structurally similar ingredients in the same herb or other herbs in a compound finished products.

成分应能定量转移至按既定工艺制备的目标产品。例如，高亲脂性指标成分可能不适用于水煎剂制备的中药产品的质量评价。

(3) 可在普通实验室中使用常规仪器(如TLC、GC、HPLC等)进行测定。

(4) 同种中药应用于不同的制剂、剂型，可选择不同的指标成分。

(5) 如果单一成分不足以鉴定和评价某种中药或其制品，可选取多种成分。

(6) 在没有法定对照品的情况下，可采用新的对照品。在这种情况下，应提供新对照品的结构鉴定、理化性质、制备方法的详细数据。

(7) 在天然存在的对照品难于获得或难于测定分析的情况下，可采用衍生化的对照品。如穿龙薯蓣中薯蓣皂苷的检测，采用的是检测其水解产物薯蓣皂苷元，而不是直接测定薯蓣皂苷。

3.2 不同类型中药化学对照品的要求与选择标准

3.2.1 药效、活性成分对照品

3.2.1.1 要求

(1) 应该具有与供试品药材、最终产品临床功效一致的药效或相关的生物活性。

(2) 能够在一个允许的范围内进行定量测定。

(3) 如果不能用理化方法定量，则应有相应的生物检定法。

(4) 最好同时具有较好的专属性。

(5) 符合对照品的基本要求。

(2) Extractable and detectable by the extraction and preparation procedures of the intermediate or finished product. (i. e. the markers should be quantitatively transferred into the target product by the established producing procedure. For instance, the high lipophilic markers may be not suitable for quality evaluation of the herbal product prepared by water decoction).

(3) Analytical instruments available in general laboratory circumstance for determination (e. g. TLC, GC, HPLC, etc.) .

(4) Different CRS may be selected for the same herbal materials depending on the different forms of finished products.

(5) A group of CRS may be selected if a single one is not sufficient do identify and evaluate the herbal materials or finished products.

(6) New markers may be selected if no official reference substances are available. In that case, detailed documentation should be provided for the identity and properties of the selected makers.

(7) Derivative markers can be selected if the naturally occurring substances are too difficult to be obtained or to be detected. For instance, the hydrolyzed aglycones (Diosgenin) is used in stead of the glycoside (Dioscin, a steroidal saponin), is used for assay of Dioscoreae Nipponicae Rhizoma and Paridis Rhizoma in *Chinese Pharmacopoeia*.

3.2 The requirements and selection criteria of different chemical reference substances of Chinese medicines

3.2.1 Effective and biological active constituents

3.2.1.1 Requirements

(1) Representative to the main therapeutic efficacy or pharmacological profiles of the herbal materials and finished products.

(2) Can be quantitatively determined in a permissible range.

(3) Biologic assay required if physical/chemical quantification is not possible.

(4) Where possible with good specificity.