EUROPEAN PHARMACOPOEIA

VOLUME II 1971

COUNCIL OF EUROPE

EUROPEAN PHARMACOPOEIA

VOLUME II

Published under the direction of the
COUNCIL OF EUROPE (PARTIAL AGREEMENT)

in accordance with the Convention
on the Elaboration of a European Pharmacopoeia

(European Treaty Series No. 50)



Printed and published by MAISONNEUVE S.A. 57 - Sainte-Ruffine - France

1971

NOTICE

The official texts of the European Pharmacopoeia are in French and English and are published in the present volume and its French language counterpart.

No translation to other languages may be considered as official other than those appearing in the national pharmacopoeias of the signatory countries of the European Pharmacopoeia Convention or those which may from time to time be authorised by the European Pharmacopoeia Commission and published by authority of the Council of Europe.

All communications concerning the European Pharmacopoeia should be addressed to the Secretary to the European Pharmacopoeia Commission, Council of Europe - Strasbourg - France.

INTRODUCTION

The publication of this, the second volume of the European Pharmacopoeia, marks an important stage in the "progressive elaboration" of a pharmacopoeia common to the countries concerned, as envisaged in the Convention of July 1964 and desired by the eight signatory States.

This volume, like the first, is the result of the patient and energetic efforts of specialists in all our countries who have voluntarily contributed their expert knowledge and the services of their laboratories to the work of the Commission. Its importance lies in the number of monographs it contains and in their quality and variety.

During this stage the Commission has been confronted by a number of often fundamental and difficult administrative and legal problems concerning, for example, methods of biological assay, the use of reference substances and the procedure to be followed for revising monographs.

The style of presentation adopted in the first volume has been retained; however, attention is drawn to the detailed summary of contents included at the beginning of the book, and to the index which is cumulative for the two volumes.

A number of corrections to the texts of the first volume have been included as a separate chapter, except in the case of corrections to reagents: the latter will be found in the Reagents chapter. The General Notices have been revised and extended and, for convenience, are printed in full in Volume II. They are applicable without distinction to both volumes.

In presenting the nomenclature and structural formulae of chemical substances, the rules of the International Union for Pure and Applied Chemistry have been followed wherever possible. Resonance formulae have not been shown. The stereochemistry of compounds has been shown when this affects their pharmacological activity or when it is justified in connection with the analytical identification of certain isomers.

The chapter on analytical methods has been enlarged, particularly by the introduction of amperometry, fluorimetry and gas chromatography and the application of infra-red spectrophotometry and of thin-layer chromatography in the identification and purity tests of the steroid hormones.

Of the monographs a large proportion has been devoted to antibiotics, steroid hormones and vaccines and immunosera.

When fiducial limits are prescribed, it is intended that a statistical analysis using recognised mathematical techniques shall be applied to the experimental results of the assays. The Commission has decided that it would be useful to publish, for information in the Annex, a section on the statistical interpretation of the results of biological assays, giving examples.

Surgical dressings and ligatures are the subject of a number of monographs which have presented particular problems. It is interesting to note the new system which has been introduced to indicate the diameters of surgical ligatures, using a decimal number which corresponds to the diameter expressed in tenths of a millimetre.

The completion of these monographs has called for a considerable amount of research on the part of the experts: this and the discussions which have taken place in the Commission have been characterised throughout by a real and unanimous desire to arrive at conclusions acceptable to all concerned.

The elaboration of a common Pharmacopoeia is now well advanced: it constitutes an irreversible phenomenon. The work is continuing and it is hoped that in the not too distant future the stage will be reached where the task will consist only of keeping it up to date.

It is with great satisfaction that I associate in my appreciation and thanks the members of the Commission, the members of the Groups of Experts and the officers of the Technical Secretariat, each of whom in his own special sphere has undertaken a heavy task, sometimes hazardous but always exhilarating, and has carried it out with conviction, care and patience, happy through the European Pharmacopoeia, to make his contribution to the building of a united Europe.

CARL STAINIER
Chairman of the Commission 1968-1971

THE EUROPEAN PHARMACOPOEIA COMMISSION

CHAIRMAN OF THE COMMISSION

C. STAINIER1968 — 197!

VICE-CHAIRMEN

E.H. VOGELENZANG (The Netherlands)
L. ROBERT (Luxembourg)

MEMBERS OF THE COMMISSION

E. Boll
J. Bücht
A. Calo
A. Castille*
H. Danner
F. Hartley
B. Huyghe
J.A. Holgate
M.-M. Janot
C.A. Johnson
R. Koltz +

L. ANKER

(Germany)
(Switzerland)
(Italy)
(Belgium)
(Germany)
(United Kingdom)
(Belgium)
(United Kingdom)

(Switzerland)

(France) (United Kingdom) (Luxembourg)

^{*} Retired 1970.

[†] Deceased 26-7-1971.

K. KREBS (Germany) P. LALANNE (France) C.L. LAPIÉRE (Belgium) I. LEMLI (Belgium) G.B. MARINI-BETTOLO (Italy) A. MIRIMANOFF (Switzerland) F.H.L. van Os (The Netherlands) R. PAUL (France) G. PENSO (Italy) L. ROBERT (Luxembourg) E.F. Scowen* (United Kingdom) C.A. Teijgeler (The Netherlands) I.A.C. van PINXTEREN* (The Netherlands) E.H. VOGELENZANG (The Netherlands) T.D. WHITTET* (United Kingdom)

ALTERNATE MEMBERS

H. AUTERHOFF (Germany) R.A. DROST (The Netherlands) P. Duquénois (France) A. Gandini (Italy) D.C. GARRATT (United Kingdom) (Italy) R. GIULIANO G. HEYMANN (Germany) T. HUIZINGA (The Netherlands) P. JANSENS (Belgium) (France) P. JAULMES G.R. KITTERINGHAM (United Kingdom) M. MESSINI (Italy) F.A. NELEMANS* (The Netherlands) F. NICAISE (France) O.-E. SCHULTZ (Germany) I.B. STENLAKE (United Kingdom) J.A.C. van PINXTEREN (The Netherlands)

^{*} Retired 1970.

TECHNICAL SECRETARIAT

Secretary to the Commission: H.S. GRAINGER
Head of Laboratory : R. BONTINCK
Technical Officers : L. ESTOPPEY
P. J. SCHORN

GROUPS OF EXPERTS

In accordance with Rule 18 of the Rules of Procedure approved by the Public Health Committee in October 1964 and adopted by the Commission in March 1965, Groups of Experts are appointed by the Commission, being chosen from a list of persons "selected for their qualifications without regard to nationality".

Group No. 1

Biological Methods and Statistical Analysis

F. HARTLEY, Chairman (United Kingdom) D.R. BANGHAM (United Kingdom) I. DONY (Belgium) M. GAY (Switzerland) S. LAMBIN (France) F.A. NELEMANS' (The Netherlands) I. van Noordwijk (The Netherlands) G. PENSO (Italy) J. PHILIPPE (France) L. THER + (Germany)

Group No. 2

Chemical Methods

E.H. VOGELENZANG, Chairman	(The Netherlands)
E. Boll	(Germany)
J. Вüсні	(Switzerland)
C.A. Johnson	(United Kingdom)
C.L. LAPIÈRE	(Belgium)
A. Mariani	(Italy)
M. Pesez	(France)
J.A.C. van PINXTEREN	(The Netherlands)

^{*} Retired 1969.

[†] Deceased 25-4-71.

Nomenclature and Drafting

P. LALANNE, Chairman	(France)
L. Anker	(Switzerland)
A. Castille*	(Belgium)
W. KIRSCHBAUM	(Germany)
G.R. KITTERINGHAM	(United Kingdom)
C.L. Lapière	(Belgium)
E. MARCOVECCHIO	(Italy)
R. MOREAU	(France)
H. TRISTANT	(France)

Group No. 4

Physical and Physico-Chemical Methods

J. Büсні, Chairman	(Switzerland)
L. Anker	(Switzerland)
E. Boll	(Germany)
A. Castille*	(Belgium)
C.A. Johnson	(United Kingdom)
G. MILAZZO	(Italy)
F. PELLERIN	(France)
J.A.C. van PINXTEREN	(The Netherlands)
E.H. VOGELENZANG	(The Netherlands)

Group No. 5

Reagents

E.H. VOGELENZANG, Chairman	(The Netherlands)
L. Anker	(Switzerland)
A. CASTILLE*, Former Chairman	(Belgium)
J. Fries	(Germany)
A. GAUDIANO	(Italy)
G. HAMANN	(Germany)
E.F. Hersant	(United Kingdom)
K. Krebs*	(Germany)
R. PAUL	(France)
A. VANDEN BULCKE	(Belgium)

^{*} Retired 1970.

Biological Substances

F. HARTLEY, Chairman	(United Kingdom)
D.R. BANGHAM	(United Kingdom)
B. Berde	(Switzerland)
J. Courtois	(France)
J. Dony	(Belgium)
A. Häussler	(Germany)
J. van Noordwijk	(The Netherlands)
E. Stürmer	(Switzerland)
L. TENTORI	(Italy)

Group No. 7

Antibiotics

F. HARTLEY, Chairman	(United Kingdom)
E. COTTA-RAMUSINO	(Italy)
M. DUBOST	(France)
J.W. LIGHTBOWN	(United Kingdom)
A. MANTEN	(The Netherlands)
R. Negri	(Italy)
J.S. PITTON	(Switzerland)
H. VANDERHAEGHE	(Belgium)
K.H. Wallhäusser	(Germany)
J.A. Wiegand	(The Netherlands)

Group No. 8

Dressing and Ligatures

G. Penso, Chairman	(Italy)
R. Bernier	(France)
A. Billiémaz	(France)
K.R. CAPPER	(United Kingdom)
J. Dегтомве	(Belgium)
A. Fenselau	(Germany)
M. Fisch	(France)
H. Flück	(Switzerland)
T. Huizinga	(The Netherlands)

E. MARGOTTE (Germany)
W. MITCHELL (United Kingdom)
E. RIEDEL (Germany)
E. WIESMANN (Switzerland)
A. ZAMPIERI (Italy)

Group No. 9

Inorganic Chemistry

A. CALO, Chairman (Italy) A. CASTILLE* (Belgium) I. FLAHAUT (France) D. GIEGLING (Germany) E.F. HERSANT (United Kingdom) I. MEYER* (Germany) H. MÜHLEMANN (Switzerland) J.A.C. van PINXTEREN (The Netherlands) F. Toffoli (Italy)

Group No. 10

Organic Chemistry - Synthetic Products

C.A. JOHNSON, Chairman	(United Kingdom)
L. Anker	(Switzerland)
D.C. GARRATT	(United Kingdom)
R. Jäger	(Germany)
C.L. Lapière	(Belgium)
M. Pesez	(France)
A. Romeo	(Italy)
D. Sonanini	(Switzerland)
E.H. Vogelenzang	(The Netherlands)

Group No. 11

Organic Chemistry - Natural Products

MM. JANOT, Chairman	(France)
J. ALLEN	(United Kingdom)
P. Cordier	(France)

^{*} Retired 1970.

W. Deckers	(Germany)
C.L. LAPIÈRE	
D. Misiti	(Italy)
R. Moreau	(France)
H. MÜHLEMANN	(Switzerland)
A. MÜLLER*	(Germany)
R. STROHECKER	(Germany)
E.H. Vogelenzang	(The Netherlands)

Galenicals

K. KREBS, Chairman	(Germany)
P. Braeckman	(Belgium)
E. CINGOLANI	(Italy)
D.C. GARRATT	(United Kingdom)
R. LARDÉ	(France)
A. LE HIR	(France)
K. MÜNZEL	(Switzerland)
J. POLDERMAN	(The Netherlands)
OE. SCHULTZ	(Germany)

Group No. 13

Pharmacognosy

A. MIRIMANOFF, Chairman	(Switzerland)
P. Duquénois	(France)
J.W. FAIRBAIRN	(United Kingdom)
L. FAUCONNET	(Switzerland)
D.C. GARRATT	(United Kingdom)
A. Imbesi	(Italy)
J. Lemli	(Belgium)
F.H.L. van Os	(The Netherlands)
E. STAHL	(Germany)

^{*} Retired 1970.

Radioactive Compounds

M. Guillot, Chairman	(France)
A. Brenner*	(Germany)
J. Вüснт	(Switzerland)
J.C. CHARLTON	(United Kingdom)
Y. COHEN	(France)
P. DUMONT	(Belgium)
G. KLOSS	(Germany)
P. Lerch	(Switzerland)
C. Rossi	(Italy)
M.G. WOLDRING	(The Netherlands)

Group No. 15 A

Vaccines and Sera

G. Penso, Chairman	(Italy)
C. FLEURY	(Switzerland)
W. Hennessen	(Germany)
B. Hofman	(The Netherlands)
A. LAFONTAINE	(Belgium)
S. Lambin	(France)
H.P. Lansberg	(The Netherlands)
W. d'A. MAYCOCK	(United Kingdom)
F.T. PERKINS	(United Kingdom)
R. Sohier	(France)
L. Vella	(Italy)

Group No. 15 B

Blood and Blood Products

G. PENSO, Chairman	(Italy)
G. GHYSELS	(Belgium)
P. KISTLER	(Switzerland)
H.W. KRIJNEN	(The Netherlands)
I. LIOTTA	(Italy)
W. d'A. MAYCOCK	(United Kingdom)
J.P. Soulier	(France)
W. Spielmann	(Germany)

^{*} Retired 1970.

Group No. 15 V

Veterinary Vaccines and Immunosera

G. PENSO, Chairman (Italy) S. Demayer-Clempoel (Belgium) A. FLORENT (Belgium) W.K.W. HILL (The Netherlands) E.C. HULSE (United Kingdom) C. PILET (France) (Italy) L. RAVAIOLI W. SCHNEIDER (Germany) (Switzerland) J. J. SIEGRIST

The Commission acknowledges the help of

P. ARMITAGE (United Kingdom) М. Амоисн (France) J.P. BILLON (France) (France) -M. Bretet A. BONTEMPS (Belgium) O. DAWSON (United Kingdom), (United Kingdom) D.J. FINNEY F.W. HARPLEY (United Kingdom) A.W.M. INDEMANS (The Netherlands) H. de JONGE (The Netherlands) C.M. KING (United Kingdom) A. MÜLLER (Germany) M.V. Mussett (United Kingdom) P. J. PERRY (United Kingdom) V. PIETRA (Italy) P. PIGNATELLI (Italy) K. REHM (Germany) H. le Roy (Switzerland) I. SALLER (France) D. SEINSCHE (Germany) I. SETNIKAR (Italy) P. Tomaselli (Italy) U. WOLFF (Germany)

CONTENTS

INTRODUCTION THE EUROPEAN PHARMACOPOEIA COMMISSION Groups of Experts GENERAL NOTICES	IX
Groups of Experts	125
A CONTROL OF THE PROPERTY OF T	XIII
GENERAL NOTICES	XV
A Zala	3
AMENDMENTS TO VOLUME I	15
METHODS OF ANALYSIS	25
Physical and physico-chemical methods Fluorimetry Gas chromatography Amperometric titrations	25 25 26 28
Chemical methods Identification reactions Identification of steroid hormones Colour reactions of penicillins	31 31 31 34
Limit tests Carbon monoxide in medicinal gases	35 35
Lead in sugars Related foreign steroids in steroid hormones	36 37

Assays	38
Free formaldehyde	38
Aluminium in adsorbed vaccines	38
Calcium in adsorbed vaccines	39
Phenol in vaccines and sera	39
Ethanol content of liquid pharmaceutical prepa-	
rations	39
Methods in Pharmacognosy	46
Haemolytic activity of saponaceous drugs	46
Biological tests	49
Antibiotics, microbiological assay	49
Biological safety tests	53
Test for sterility	53
Test for Mycobacterium tuberculosis	57
Test for pyrogens	58
Test for abnormal toxicity	61
CONTAINERS	5 192%
CONTAINERS	64
Glass containers for injectable preparations	65
REAGENTS	74
Amendments to Reagents of Vol. I	75
Reagents	87
Volumetric analysis	134
· Standardised solutions	134
STANDARDS AND REFERENCE SUBSTANCES	139
MONOGRAPHS	143
	7
ANNEX	430
Microbiological assay of antibiotics: table of micro-	- 2
organisms and culture media	431
Statistical analysis of results of biological assays	
and tests	441
	/max
INDEX	501
APPENDIX : Amendments to Volume II	543