COMMISSION

COMMISSION DECISION

of 14 November 1989

laying down the reference methods and the list of national reference laboratories for detecting residues

(89/610/EEC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Directive 64/433/EEC of 26 June 1964 on health problems affecting intra-Community trade in fresh meat (1), as last amended by Directive 88/657/EEC (2), and in particular Article 4 (1) (b) and the second subparagraph of Article 8 (3) thereof,

Having regard to Council Directive 85/397/EEC of 5 August 1985 on health and animal-health problems affecting intra-Community trade in heat-treated milk (3), as amended by Regulation (EEC) No 3768/85 (4), and in particular the second subparagraph of Article 5 (3) and the third subparagraph of Article 11 (4) thereof,

Having regard to the opinion of the Scientific Veterinary Committee,

Whereas, in accordance with Article 4 (1) (b) of Directive 64/433/EEC, and Article 11 (4) of Directive 85/397/EEC, reference methods should be laid down for assessing the results of the examination for residues;

Whereas, in accordance with Article 5 (3) of Council Directive 85/358/EEC of 16 July 1985, supplementing Directive 81/602/EEC concerning the prohibition of certain substances having a hormonal action and of any substances having a thyrostatic action (5), as last amended by Directive 88/146/EEC (6), and the second subparagraph of Article 8 (3) of Council Directive 86/469/EEC of 16 September 1986 concerning the examination of animals and fresh meat for the presence of residues (7), all positive findings must, if challenged, be confirmed using the reference methods established pursuant to Article 4 (1) (b) of Directive 64/433/EEC;

Whereas the second subparagraph of Article 8 (3) of Directive 64/433/EEC and the second subparagraph of Article 5 (3) of Directive 85/397/EEC provide that a solution should be sought on the basis of a reference method in the event of a dispute concerning the detection of residues; whereas a single reference method should apply in the event of disputes concerning the substances in groups A I and II of Annex I to Directive 86/469/EEC;

Whereas the determination of reference methods includes the definition of the analytical reference procedures to be followed and the criteria to be applied when carrying out the analyses;

Whereas for technical reasons reference methods should be laid down initially for the detection of certain residues only, excluding residues of chemical elements;

Whereas Article 4 (1) (b) of Directive 64/433/EEC provides for the designation in each Member State of at least one reference laboratory for carrying out the examination for residues in the event of a dispute;

Whereas in accordance with Article 8 (1) (b) of Directive 86/469/EEC the national reference laboratories designated pursuant to Article 4 (1) (b) of Directive 64/433/EEC are to be responsible for coordinating the standards and methods of analysis for each residue or group of residues concerned, including the arrangement of periodic comparative tests of split samples by approved laboratories, and of compliance with the limits laid down;

Whereas the measures provided for this Decision are in accordance with the opinion of the Standing Veterinary Committee,

(1) OJ No 121, 29. 7. 1964, p. 2012/64.
(2) OJ No L 382, 31. 12. 1988, p. 3.
(3) OJ No L 226, 24. 8. 1985, p. 13.
(4) OJ No L 362, 31. 12. 1985, p. 8.
(5) OJ No L 191, 23. 7. 1985, p. 46.
(6) OJ No L 70, 16. 3. 1988, p. 16.
(7) OJ No L 275, 26. 9. 1986, p. 36.

HAS ADOPTED THIS DECISION:

Article 1

The analytical reference procedures to be applied for confirmation of the presence of residues of the substances listed in Annex I to Directive 86/469/EEC with the exception of chemical elements such as heavy metals and arsenic, shall be the following:

— immunoassay,
— thin-layer chromatography,
— high-performance liquid chromatography,
— gas chromatography,
— mass spectrometry,
— spectrometry.

Article 2

The analytical reference procedure of choice must be based:

(a) preferably on molecular spectroscopy providing direct information concerning the molecular of the substance under examination; or

(b) on a combination of procedures providing indirect information concerning the molecular structure of the substance under examination,

and must have a limit of detection which is equal to or lower than that of the procedure used for routine analyses.

Article 3

The criteria applicable to the analytical reference procedures are set out in Annex I.

Article 4

In the event of a dispute between Member States concerning the detection of the residues in groups A I and II of Annex I to Directive 86/469/EEC, the analytical reference procedure to be used is gas chromotography on-line with mass spectrometry.

Article 5

The reference laboratories in the Member States responsible for carrying out the reference analyses are listed in Annex II.

Article 6

This Decision shall be re-examined before 1 January 1991 in order to take account of developments in scientific and technical knowledge.

Article 7

This Decision is addressed to the Member States.

Done at Brussels, 14 November 1989.

For the Commission

Ray MAC SHARRY

Member of the Commission

ANNEX I

1. DEFINITIONS AND GENERAL CRITERIA

1.1. **Criteria**

The criteria set out or in the Annex to Council Directive 85/591/EEC shall apply to the examination of the reference methods of analyses.

1.2. **Definitions**

1.2.1. *Analyte:* a component of a test sample the presence of which has to be demonstrated. The term 'analyte' includes where appropriate derivatives formed from the analyte during the analyses.

1.2.2. *Standard material:* a well-defined substance in its highest attainable purity to be used as a reference substance in the analyses.

1.2.3. *Reference material:* a sample of a substance or a straightforward manufactured product, one or more of the properties of which is determined with sufficient accuracy for it to be used to calibrate an apparatus or to verify a method of measurement. The certification must be based on a technically valid procedure. If no reference material is available, relevant parameters may be evaluated by analysing fortified sample material.

1.2.4. *Specificity:* the ability of a method to distinguish between the analyte being measured and other substances. This characteristic is predominantly a function of the measuring principle used, but can vary according to class of compound or matrix.

Details concerning specificity must relate at least to any substances which might be expected to give rise to a signal when the measuring principle described is used, e.g. homologues, analogues, metabolic products of the residue of interest. From the details concerning specificity it must be possible to derive quantitatively the extent to which the method can distinguish between the analyte and the other substances under the experimental conditions.

As far as possible, reference methods must provide unambiguous information on the chemical structure of the analyte, i.e. the result of the analysis should exclude all chemical compounds but one. When more than one compound gives the same response, then the method cannot discriminate between these compounds.

If a single technique lacks sufficient specificity, the desired specificity may be achieved by an analytical procedure consisting of a combination of clean-up, chromatographic separation and spectrometric determination, e.g. GC-MS, LC-MS, GC-IR spectrometry, LC/IR spectrometry.

1.2.5. *Accuracy:* in this document this refers to accuracy of the mean. The definition which shall be used is laid down in ISO 3534-1977 under 2.83 (accuracy of the mean : the closeness of agreement between the true value and the mean result which would be obtained by applying the experimental procedure a very large number of times).

The principal limitations on accuracy are :

(a) random errors ;

(b) systematic errors.

For a very large number of experiments, the accuracy of the mean approaches the systematic error.

For desk review of a method, the number of experiments must be specified.

The measure of accuracy is the difference between the mean value measured for a reference material and its true value expressed as a percentage of the true value.

In cases where neither absolute defining methods nor certified reference materials are available, the analyte content of a sample may temporarily be defined by the results obtained with the aid of the reference method itself. In such cases the method shall exhibit the highest degree of specificity and the highest recovery of the analyte of all known methods.

1.2.6. *Precision :* repeatability intra-laboratory (within laboratory) and reproducibility inter-laboratory (within and between laboratories) variabilities.

The general statistical term 'precision' shall be used as defined in ISO 3534-1977 2.84 (precision : the closeness of agreement between the results obtained by applying the experimental procedure several times under prescribed conditions).

According to the Annex to Directive 85/591/EEC the precision values for methods of analysis which are to be considered for adoption under the provisions of that Directive shall be obtained from a collaborative trial which has preferably been conducted in accordance with ISO 5725-1986. For this purpose, the terms repeatability and reproducibility are defined in ISO 5725-1986. For conducting such trials sample materials of known analyte content ranging around the tolerance level to be enforced shall be used.

Until such time as the reproducibility of a method has been established by a collaborative trial, then for the purpose of preselection of candidate methods by desk review, it is sufficient that data on repeatability are available. For this purpose the term repeatability is used here as defined in ISO 3534-1977 under 2.85 (a) (repeatability : the closeness of agreement between successive results obtained with the same method on identical test material, under the same conditions (same operator, same apparatus, same laboratory and short intervals of time)).

The measure of repeatability to be used is the coefficient of variation as defined in ISO 3534-1977, 2.35 (coefficient of variation : the ratio of the standard deviation to the absolute value of the arithmetic mean).

1.2.7. *Limit of detection :* the smallest measured content from which it is possible to deduce the presence of the analyte with reasonable statistical certainty. It is equal to the mean of the measured content of representative blank samples ($n \geq 20$) plus three times the standard deviation of the mean.

NB : If it is to be expected that factors such as species, sex, age, etc. may influence the characteristics of a method, then a set of blank samples is required for each individual homogeneous population to which the method is to be applied.

1.2.8. *Sensitivity :* a measure of the ability of a method to discriminate between small differences in analyte content. In this document, sensitivity is defined as the slope of the calibration curve at the level of interest.

1.2.9. *Practicability :* a non-standard characteristic of an analytical procedure. It is dependent on the scope of the method and is determined by requirements such as sample throughout and costs. For reference methods, most aspects of practicability are of minor significance compared with the other criteria defined in this document. It is usually sufficient that the required reagents and equipment are commercially available.

1.2.10. *Applicability :* a list of the commodities to which the candidate method can be applied as presented or with minor modifications.

1.2.11. *Other criteria which may be selected as required*

1.2.11.1. Limit of decision : the lowest analyte content which, if actually present, will be detected with reasonable statistical certainty and can be identified according to the identification criteria of the method. If both accuracy and precision are constant over a concentration range around the limit of detection, then the limit of decision is equal to the mean of the measured content of representative blank samples ($n \geq 20$) plus six times the standard deviation of the mean.

1.2.11.2. Quantification

1.2.11.2.1. Limit of quantification : the smallest measured content above which a determination of the analyte is possible with the following degree of accuracy and repeatability (within laboratory) :

Accuracy : in the case of repeated analysis of the reference sample, the deviation of the mean from the true value, expressed as a percentage of the true value, shall not lie outside the limits − 20 to + 10 %.

Repeatability : in the case of repeated analysis of the reference sample, the coefficient of variation (CV) (1.2.6.) of the mean shall not exceed the following values :

	CV
— mean up to µg/kg :	0,30
— mean over 1 µg/kg and up to 10 µg/kg :	0,20
— mean over 10 µg/kg :	0,15

1.2.11.2.2. Calibration curves

If the method depends on a calibration curve then the following information must be given :

— the mathematical formula which describes the calibration curve,

— numerical values of the parameters of the calibration curve with 95 % tolerance intervals,

— acceptable ranges within which the parameters of the calibration curve may vary from day to day,

— the working range of the calibration curve,

— details of the variance of the variables which is valid at least for the working range of the calibration curve.

Whenever possible, suitable internal standards shall be used for establishing calibration curves of reference methods.

1.2.11.3. Susceptibility to interference

For all experimental conditions which could in practice be subject to fluctuation (e.g. stability of reagents, composition of the sample, pH, temperature) any variations which could affect the analytical result should be indicated. The method description shall include means of overcoming any foreseeable interference. If necessary, alternative detection principles suited for confirmation shall be described. It is of prime importance that interference which might arise from matrix components should be investigated. Therefore, at least the largest amount of sample of the blank population which has no interfering effect on the determination of the analyte (after any specified sample 'clean-up') shall be indicated.

1.2.11.4. Relationship between tolerance values and analytical limits

For substances with a zero tolerance, the limit of decision of the analytical method must be sufficiently low that residue levels which would be expected after illegal use will be detected with at least 95 % probability. Typical residue levels in various sample materials shall be listed in a handbook of experimental data for reference methods to be established by the Commission services.

For substances with an established tolerance level, the limit of quantification shall not exceed that tolerance minus three times the standard deviation which the method produces for a sample at the tolerance level.

2. CRITERIA FOR THE IDENTIFICATION OF RESIDUES

2.1. General requirement

Laboratories carrying out analyses for the final confirmation of the presence of residues of low molecular weight organic substances, especially those having hormonal or thyrostatic action, shall ensure that the criteria for the interpretation of results are fulfilled in accordance with the requirements of this section. The criteria are designed for the identification of the analyte and aim to prevent false positive results. For a positive conclusion, the analytical results have to fulfil the criteria laid down for the particular analytical procedure.

2.2. **Definitions regarding the presence of an analyte**

2.2.1. *Positive result:* the presence of the analyte in the sample is proved, according to the analytical procedure, when the general criteria, and the criteria specified for the individual detection method, are fulfilled. The result of the analysis is 'positive'.

2.2.2. *Negative result:* the result of the analysis is regarded as 'negative' if the criteria specified for the procedure are not fulfilled or the analysis does not indicate the presence of the analyte in the sample above the limit of detection.

NB: A negative result does not prove that the analyte is absent from the sample.

2.2.3. *Co-chromatography:* the purified test solution prior to the chromatographic step(s) is divided into two parts.

(a) One part is chromatographed as such.

(b) The standard material that is to be identified is added to the other part, and this mixed solution of analyte and standard material is chromatographed.

The amount of added standard material has to be similar to the estimated amount of the analyte

2.3. **General considerations for the whole analytical procedure**

2.3.1. *Preparation of the sample*

The sample should be obtained and handled in such a way that there is a maximum chance of detecting the analyte, if present.

2.3.2. *Susceptibility to interference*

Information as detailed under 1.2.11.3 (Susceptibility to interference) should be submitted.

2.3.3. *General criteria for the whole procedure*

2.3.3.1. The specificity (1.2.4) and the limit of detection (1.2.7) of the procedure for the analyte and matrix under investigation have to be known.

NB: This information can be obtained from experimental data and/or theoretical considerations.

2.3.3.2. For a positive result, the physical and chemical behaviour of the analyte during the analysis should be indistinguishable from those of the corresponding standard material in the appropriate matrix.

2.3.3.3. The positive or negative result of the analysis will hold only within the borders of specificity and limit of detection of the procedure for the analyte and matrix under investigation.

2.3.4. *General criteria for separation techniques*

Reference samples containing known amounts of analyte must be carried through the entire procedure simultaneously with each batch of test samples analysed. Alternatively, an internal standard may be added to test samples.

2.3.5. *Criterion for off-line physical and/or chemical preconcentration, purification, and separation*

The analyte should be in the fraction which is characteristic for the corresponding standard material in the appropriate matrix material.

Retention data for standards, control samples and test portions should be submitted together with the final result: positive or negative.

2.4. **Criteria for the identification of an analyte by HPLC/IA-Img**

2.4.1. The analyte peak in the Img should be constructed from at least 5 to 11 HPLC fractions.

Retention data for standards, control samples and test portions should be submitted together with the final result: positive or negative.

2.4.2. *Reagents*

The source and quality of the antibody and labelled compound should be specified.

2.4.3. *Calibration curve*

As the method depends on calibration curves, the information itemized under 1.2.11.2.2 (Calibration curves) must be given.

The working range of the calibration curve has to be specified and has in general to cover a concentration range of at least one decade.

A minimum of six calibration points is required, adequately distributed along the calibration curve.

All raw data used to derive the calibration curve should be submitted together with the final result: positive or negative.

2.4.4. Control samples have to be included in each assay. Concentration levels: zero and at lower, middle and upper parts of the working range. Results for these have to be in line with those of previous assays.

All raw data for the control samples and for the test portion should be submitted together with the final result: positive or negative.

2.4.5. The recovery must be checked and specified.

2.4.6. Adequate quality control parameters have to be in line with those of preceding assays, e.g. Bo/T, NSB, slope and intercept of the calibration curve.

2.4.7. For confirmation, two-dimensional HPLC or two immunograms using different antibodies are preferred.

2.5. **Criteria for the identification of an analyte by TLC or HPTLC**

2.5.1. The R_f (value(s) of the analyte should agree with the R_f value(s) characteristic for the standard material. This requirement is fulfilled when the R_f value(s) of the analyte is (are) within ± 3 % of the R_f value(s) of the standard material under the same conditions.

2.5.2. The visual appearance of the analyte should be indistinguishable from that of the standard material.

2.5.3. The centre of the spot nearest to that due to the analyte should be separated from it by at least half the sum of the spot diameters.

2.5.4. For identification, additional co-chromatography in the TLC step is mandatory. As a result, the spot presumed to be due to the analyte should be intensified only; a new spot should not appear, and the visual appearance should not change.

2.5.5. For confirmation, two-dimensional TLC is mandatory.

2.6. **Criteria for the identification of an analyte by HPLC-SP**

2.6.1. The maximum absorption wavelength in the spectrum of the analyte should be the same as that of the standard material within a margin determined by the resulution of the detection system. For diode array detection this is typically within ± 2 nm.

2.6.2. The spectrum of the analyte should not be visually different from the spectrum of the standard material for those parts of the two spectra with a relative absorbance > 10 %. This criterion is met when the same maxima are present and at no observed point is the difference between the two spectra more than 10 % of the absorbance of the standard material.

2.6.3. For identification, co-chromatography in the HPLC step is mandatory. As a result, the peak presumed to be due to the analyte should be intensified only.

2.7. **Criteria for the identification of an analyte by GC-MS**

2.7.1. *CG criteria*

2.7.1.1. An internal standard should be used if a material suitable for this purpose is available. It should preferably be a stable isotope labelled form of the analyte.

2.7.1.2. The ratio of the retention time of the analyte on GC to that of the internal standard, i.e. the relative retention time of the analyte, should be the same as that of the standard analyte, within a margin of ± 0,5 %.

2.7.1.3. If requirement 2.7.1.2 is not fulfilled, or if no internal standard is used, then identification of the analyte must be proved by using co-chromatography.

2.7.1.4. In the case of co-chromatography, the retention time of the analyte added to the sample must coincide with the retention time of the analyte already present in the sample.

2.7.2. *Criteria for GC-LRMS*

2.7.2.1. The intensities of at least four diagnostic ions must be measured. If the compound does not yield four diagnostic ions with the method used, then identification of the analyte should be based on the results of at least two independent GC-LRMS methods with different derivatives and/or ionization techniques, each producing two or three diagnostic ions.

2.7.2.2. The molecular ion should preferably be one of the four diagnostic ions selected.

2.7.2.3. The relative abundances of all diagnostic ions monitored from the analyte should match those of the standard analyte.

2.7.2.4. The relative intensities of the diagnostic ions detected, expressed as a percentage of the intensity of the base peak, must be the same as those for the standard analyte within a margin of ± 10 % (EI mode) or ± 20 % (CI mode).

2.7.3. *Criteria for GC-HRMS; fragmentography*

2.7.3.1. To be classified as high-resolution measurements, the accuracy of mass setting should be equal to or better than 3 parts per million.

2.7.3.2. The relative abundance of three or more diagnostic ions must be the same as for the standard analyte within a margin of ± 10 % (EI mode).

2.7.4. *Criteria for GC-HRMS; accurate mass plus low-resolution natural isotope.*

2.7.4.1. To be classified as high-resolution measurement, the accuracy of mass determination must be equal to or better than 3 parts per million.

2.7.4.2. The m/z value of the diagnostic ion should be equal to the theoretical value of the corresponding standard analyte.

2.7.4.3. If measurement of a single diagnostic ion does not fulfil the criterion for specificity (1.2.4), then the natural isotope abundance ratio of the diagnostic ion should be measured with low resolution. This ratio should be equal to the theoretical value within a specified margin (typically 5 %).

2.7.4.4. If an unambiguous elemental composition cannot be derived according to 2.7.4.1, 2.7.4.2 and 2.7.4.3. an additional diagnostic ion should be measured accordingly

2.8. **Criteria for the identification of an analyte by IR spectrometry**

2.8.1. *Definition of adequate peaks*

Adequate peaks are absorption maxima in the IR spectrum of a standard material, fulfilling the following requirements :

2.8.1.1. The absorption maximum is in the wavenumber range 1 800 to 500 cm^{-1}.

2.8.1.2. The intensity of the absorption is not less than :

(a) a specific molar absorbance of 40 with respect to zero absorbance and 20 with respect to peak base line, or

(b) a relative absorbance of 12,5 % of the absorbance of the most intense peak in the region 1 800 to 500 cm^{-1} when both are measured with respect to zero absorbance, and 5 % of the absorbance of the most intense peak in the region 1800 to 500 cm^{-1} when both are measured with respect to their peak base line.

NB: Although adequate peaks according to (a) may be preferred from a theoretical point of view, those according to (b) are easier to determine in practice.

2.8.2. A minimum of six adequate peaks is required in the IR spectrum of the standard material. If there are less than six adequate peaks, then the IR spectrum at issue cannot be used as a reference spectrum.

2.8.3. The number of peaks in the IR spectrum of the analyte whose frequencies correspond with an adequate peak in the IR spectrum of the standard material, within a margin of ± 1 cm^{-1} is determined.

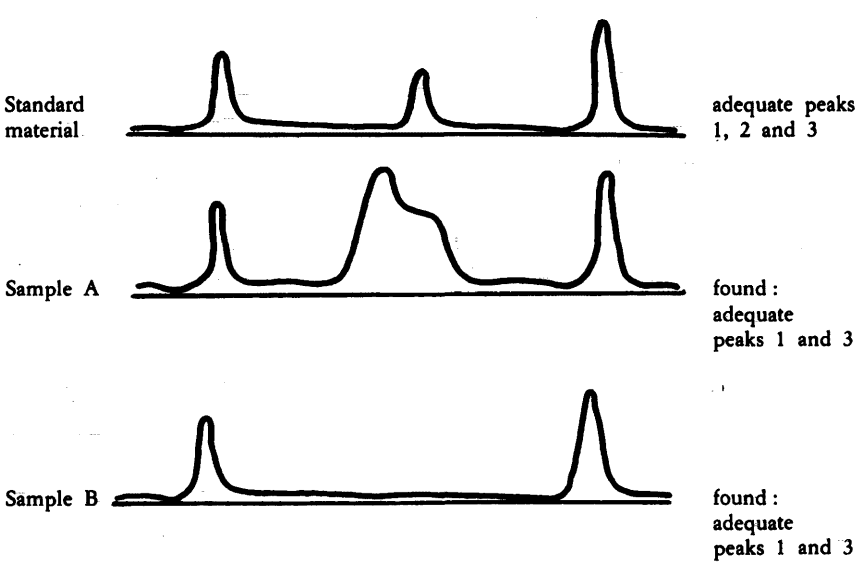
2.8.4. *IR criteria*

2.8.4.1. Absorption must be present in all regions of the analyte spectrum which correspond with an adequate peak in the reference spectrum of the standard material.

2.8.4.2. The 'score', i.e. the percentage of the adequate peaks found in the IR spectrum of the analyte , shall be at least 50.

2.8.4.3. Where there is no exact match for an adequate peak, the relevant region of the analyte spectrum must be consistent with the presence of a matching peak (see Figure 1).

Figure 1



The spectrum of sample A does not exclude the presence of adequate peak 2 ; hence criterion 2.8.4.3 is fulfilled.

The spectrum of sample B excludes the presence of adequate peak 2 ; hence criterion 2.8.4.3 is not fulfilled.

2.8.4.4. The procedure is only applicable to absorption peaks in the sample spectrum with an intensity of at least three times the peak-to-peak noise.

Appendix to Annex I

List of abbreviations and symbols

Bo	= radioactivity of the bound fraction of a blank sample
Bo/T	= fraction of the radioactivity of the bound fraction of a blank with respect to the added activity (fraction of zero binding with respect to total)
CI	= chemical ionization
cpm	= counts per minute
dpm	= disintegrations per minute
EI	= electron impact ionization
GC	= gas chromatography
HPLC	= high-performance liquid chromatography
HPTLC	= high-performance thin-layer chromatography
HRMS	= high-resolution mass spectrometry
IA	= immunoassay
Img	= immunogram
IR	= infrared
LC	= liquid chromatography
LRMS	= low-resolution mass spectrometry
m	= mass
MS	= mass spectrometry
NSB	= non-specific binding = aspecific binding (ASB)
R	= distance moved relative to the solvent front
SP	= spectrometry, e.g. diode array
T	= total radioactivity (cpm or dpm) added to a sample
TLC	= thin-layer chromatography
z	= charge
/	= off-line hyphenated techniques
-	= on-line hyphenated techniques

e.g. HPLC/GC-MS = HPLC off-line followed by GC with on-line MS

ANNEX II

NATIONAL REFERENCE LABORATORIES

Member State	Reference laboratory	Residue groups
Belgium	Instituut voor Hygiëne en Epidemiologie J. Wijtsmanstraat 14 B-1050 Brussel	All groups
Denmark	Veterinærdirektoratets Laboratorium Kongensgade 16 DK-4100 Ringsted	Group A
	Levnedsmiddelstyrelsens Centrallaboratorium Mørkhøj Bygade 19 DK-2860 Søborg	Group B
Germany	Bundesgesundheitsamt Thielallee 88-92 D-1000 Berlin 33	Group A III (a) (antibiotics) and (b)
	Staatliches Tierärztliches Untersuchungsamt Stuttgart Azenberg Straße 16 D-7000 Stuttgart 1	Group A I (b)
	Tierhygienisches Institut Freiburg Am Moosweiher 2 D-7800 Freiburg	Group A I (a)
	Landesuntersuchungsamt für das Gesundheitswesen Südbayern Veterinärstraße 2 D-8042 Oberschleißheim	Group A II
	Staatliches Veterinäruntersuchungsamt Arnsberg Zur Traubeneiche 10/12 D-5760 Arnsberg 2	Group A I (a), (b) and (c)
	Chemische Landesuntersuchungsanstalt Stuttgart Breitscheidstraße 4 Postfach 100824 D-7000 Stuttgart 1	Group A III (a) (nitrofuranen)
	Chemische Landesuntersuchungsanstalt Offenburg Gerberstraße 24 D-7600 Offenburg	Group B II (b) (chlorinated hydrocarbons PCB and PCT)
Greece	Centre of the Veterinary Institutions of Athens:	
	— Institute of Infectious and Parasitic Diseases Laboratory of Biochemistry 25, Neapoleos Street GR-153 10 Aghia Paraskevi Athens	Groups A I (b); A III (a) (sulphon amides); A I (c) (natural hormones) B (pesticides)
	— Institute of Animal Toxicology 25, Neapoleos Street GR-153 10 Aghia Paraskevi Athens	Groups A I (a); A I (c) (zeranol, trenbolon); A III (b)
	— Institute of Food Hygiene Iera Odos, 75 Botanikos GR-118 55 Athens	Groups A III (a)
Spain	Centro Nacional de Alimentación y Nutrición c/Pozuelo Km 2 Majadahonda (Madrid)	All groups
	Laboratorio de Sanidad y Producción Animal Santa Fe (Granada)	All groups
	Laboratorio de Sanidad y Producción Animal Algete (Madrid)	All groups

Member State	Reference laboratory	Residue groups
France	Laboratoire de dosages hormonaux École nationale vétérinaire de Nantes CP 3018 F-44087 Nantes Cedex 03	Groups A I and II
	Laboratoire central d'hygiène alimentaire (LCHA) 43, rue de Dantzig F-75015 Paris	Groups B I (a); B II (a), (b), and (c)
	Laboratoire des médicaments vétérinaires (LMV) La haute Marche-Javene F-35133 Fougères	Groups A, III, (a) and (b); B, I, (b) and (c)
Ireland	Central Meat Control Laboratory Abbotstown, Castleknock IRL-Dublin 15	Groups A I, II, and III Group B I except organochlorine and organophosphorus compounds Group B II except polychlorinated biphenyls
	State Laboratory Abbotstown, Castleknock IRL-Dublin 15	Group A I, II and III Group B I and II
Italy	Istituto Superiore di Sanità Viale Regina Elena 299 I-00161 Roma	All groups
Luxembourg	Rijksinstituut voor Volksgezondheid en Milieuhygiëne Antonie van Leeuwenhoeklaan 9 NL-3720 BA Bilthoven	All groups
	Institut d'hygiène et d'épidémiologie Rue J. Wijtsman 14 B-1050 Bruxelles	All groups
Netherlands	Rijksinstituut voor Volksgezondheid en Milieuhygiëne Antonie van Leeuwenhoeklaan 9 NL-3720 BA Bilthoven	All groups
	Rijkskwaliteitsinstituut voor land- en tuinbouwprodukten Bornesteeg 45 NL-6708 PD Wageningen	All groups
Portugal	Laboratório Nacional de Investigação Veterinária Estrada de Benfica 701 P-1500 Lisboa	All groups
United Kingdom	Central Veterinary Laboratory New Haw, Weybridge UK-Surrey KT15 3NB	Groups A I, II and III Group B I
	Food Science Laboratory Colney Lane UK-Norwich NR4 7UA	Group A III Groups B I and II
	Veterinary Research Laboratories Stormont UK-Belfast BT4 3SD	Groups A I (a), I (c), II and III Groups B I and II
	Food and Agricultural Chemistry Research Division Department of Agriculture for Northern Ireland Newforge Lane UK-Belfast BT9 5PX	Groups A I (b) and III Groups B I and II