

Quasimeme Laboratory Performance Studies



Programme 2012

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What is QUASIMEME ?

QUASIMEME (Quality Assurance of Information in Marine Environmental monitoring) was founded in 1992. The project was initiated with EU funding (1992-1996) and continued by subscription of the participating institutes. QUASIMEME was coordinated by the QUASIMEME Project Office at the FRS Marine Laboratory in Aberdeen, United Kingdom until 2005. In 2005 the coordination was transferred to Wageningen University and Research Centre (Alterra DLO) in The Netherlands. From 1st of January 2011 onwards, QUASIMEME is part of WEPAL (Wageningen Evaluating Programmes for Analytical Laboratories). WEPAL is accredited for the organisation of Interlaboratory Studies by the Dutch Accreditation Council RvA since April 26, 2000 (registration number R002). The accreditation is based on the ISO 17043 requirements. The scope can be found at: http://www.wepal.nl/website/about_wepal/Scope.htm. WEPAL is now also accredited for a selection of determinands and QUASIMEME exercises. See for detailed information the different tables in this report. Annex I lists the roles and responsibilities of the WEPAL/QUASIMEME staff. QUASIMEME is more than a proficiency-testing scheme. At the heart of the project is a holistic learn by doing spiral. The routine laboratory performance studies provide the basis of external quality assurance for institutes that make regular chemical measurements in the marine environment. Most studies have two rounds per annum with a minimum of two test materials containing the analytes at different concentrations. The output from these studies is reviewed annually by the QUASIMEME Scientific Assessment Group, which is comprised of experts in each of the main areas of the QUASIMEME Laboratory Performance (LP) studies. Further information relating to the membership and terms of reference for the Scientific Assessment Group is given in Annex I.

As a result of the review it is possible to identify areas of poor performance, which would benefit from a more detailed scrutiny. An improvement programme may be initiated through a workshop run at an institute with sound expertise followed by a series of development exercises to provide detailed tuition and information, with a range of test materials tailored to the specific needs of the problem.

The QUASIMEME LP studies provide external quality assurance (QA) for national and/or international monitoring programmes, individual or collaborative research and for contract studies. The QUASIMEME LP studies support quality management and quality measurement in the participating laboratories.

Participants may use the assessment of the study data to:

- Validate internal laboratory QA
- Support accreditation
- Support QA of environmental monitoring data
- Provide data for national or international programmes

QUASIMEME collaborates with the following organisations:

- Helsinki Commission (HELCOM)
- Oslo and Paris Commission (OSPAR)
- Mediterranean Pollution Monitoring and Research Programme (MEDPOL) - Barcelona Convention
- Arctic Monitoring and Assessment Programme (AMAP)
- International Council for the Exploration of the Seas (ICES)
- European Environment Agency (EEA)
- National Marine Monitoring Programmes of member countries
- NORMAN. Quasimeme is one of the founding members of the Norman network, which has been established as a continuation of an EU project (<http://www.norman-network.com/>). Among others, Norman has the objective to encourage the validation and harmonisation of common measurement methods and monitoring tools so that the demands of risk assessors can be better met. QUASIMEME has been requested to take part owing to its large experience with the conduct of interlaboratory studies, workshops and the range of materials which it possesses.
- PT-WFD network. QUASIMEME has become a member of the PT-WFD network (<http://www.pt-wfd.eu/>). This network is comprised of organisers of proficiency tests which support the implementation of the EU Water Framework Directive. It pursues to ensure that the demands of the EU WFD are met with through the organisation of high-quality proficiency tests which are performed in a harmonised and comparable way. Participation in the network contributes to the quality of our services.

These organisations are represented on the QUASIMEME Advisory Board. Further information relating to the membership and terms of reference for the Advisory Board is given in Annex I.

The QUASIMEME programme is updated annually and made available to all current and former participants and as well as to third parties that have a close interest in the project and its outcome e.g. OSPAR, HELCOM, MEDPOL and ICES.

Participation

Participation in the QUASIMEME Laboratory Performance studies is open to all institutes and companies world-wide that make chemical measurements in seawater, sediment and biological materials, and require external quality assurance.

The application form to participate in this year's rounds can be found in Annex 4 of this document and also on the QUASIMEME website www.quasimeme.org.

The minimum number of participants for any study is preferably 10. When QUASIMEME offers a new type of test material or "determinand" group, and the number of participants is less than 10, the study will be cancelled. The project office will determine, on case by case basis, what to do when an existing study has less than 10 participants. Important considerations are costs and the possibilities to establish reliable assigned values and thus meaningful z-scores. When a study is cancelled, participants will be notified and no costs will be incurred.

Timetable

Most Laboratory Performance studies are conducted twice per year, with a minimum of two test materials per study. The timetable for this year's programme and the exercise details for the rounds held this year are given in tables 1 and 2 in the timetable section of this document.

Material preparation

QUASIMEME has a number of collaborators who prepare and provide test materials for the Laboratory Performance (LP) studies, and who analyse these test materials for homogeneity and, where appropriate, stability. All collaborators are experts in their particular field and operate to a traceable standard, which can be audited. This may include:

- Accreditation to a standard acceptable to e.g. ISO 17025, ISO17043, ISO 9000 series.
- National reference laboratory.
- Documented evidence of the quality of the test materials provided.

A list of all QUASIMEME collaborators and their role in the provision and testing of materials for the LP studies is given in Annex I

Subscription

QUASIMEME is non-profit making and is funded by the participating laboratories. All materials and services are provided at cost. Details of the costs are given in Table 3 of the participation section of this document.

The subscription includes:

- Two (or more) test materials for each analysis group delivered to your laboratory mostly twice per year.
- A protocol for each study, which includes information on the analyses required, the timescale for analysis and reporting of the data. This will be provided electronically.
- Assessment and confidential report of performance (data and z-scores) provided.
- LP study summary report, provided electronically on the SharePoint site.
- Electronic QUASIMEME study report to enable participants to prepare their own paper copies of reports when required.
- Provision of a help desk.
- Access to QUASIMEME website and SharePoint site.
- QUASIMEME publications and newsletters.
- Development exercises operated in conjunction with expert laboratories, usually involving one round per year, often accompanied by a workshop.
- Invitation to QUASIMEME workshops, and preferential reduced registration fee.
- Use of excess test materials as a laboratory reference material¹.

¹ QUASIMEME supply sufficient quantities of the test materials for each study. Excess test materials can subsequently be used as LRMs with a known assigned value and uncertainty obtained from the QUASIMEME reports.

QUASIMEME organises specialised workshops in support of the routine and development exercises, in addition to more general conferences. Participants pay for their own travel and accommodation, and for most of the workshops there is a registration fee to cover organisational expenses.

Methods and Procedures

Participants should use their normal validated methods and procedures to analyse the test materials. Method codes are provided, in the form of a tick list, which cover sample preparation through to sample detection. Participants are requested to complete the method code tick list. The method codes are collated and included in the LP study reports. This allows participants to review the range and similarity of the methodologies used. As part of the new database, QUASIMEME has updated and integrated these method codes more interactively, providing more depth in assessment relating to the different methodologies used.

Assessment

Each study is fully assessed using the Cofino Model². All data provided at the time of the assessment, including extreme values and left censored values (LCVs)³ are used to establish the consensus value. At the end of the assessment the consensus value is known as the assigned value. In the assessment a z-score (bias)^{4 5} is used to normalise the data and provide an assessment for each participating institute and a comparison of performance between institutes and studies. Details of the formulae used to calculate the z-scores are given in Annex II. The constant and proportional errors used to calculate the z-scores, have been established by the QUASIMEME Scientific Assessment Group and are given for each determinand in the sections for each Analysis Group in this document. Information on the use of the Cofino Model and the assessment rules used for the evaluation of the QUASIMEME Laboratory Performance studies data can be downloaded from the QUASIMEME website www.quasimeme.org.

Confidentiality and Data Submission to Third Parties

QUASIMEME operates a fully confidential service to all participants. The results remain the property of each participant and full confidentiality is maintained. No information on individual participants' performance is disclosed to any third party.

QUASIMEME will provide each participant with a unique code for each round of the Laboratory Performance (LP) studies. These codes will be used only once, and will randomly change with each round.

QUASIMEME will publish the evaluation and overview of the LP studies in peer review journals, maintaining confidentiality. All data, however presented, will be non-attributable. The codes described above will be the only codes used in publications.

The data generated by participants is valuable to the national and/or international organisations that collate and assess environmental data for the chemical determinands analysed in the QUASIMEME LP studies. QUASIMEME encourages all participants to submit their QA data, including their LP studies results, in the submission of environmental information to the national and/or international marine monitoring programmes. QA data submission to any third party, including submission of LP studies data, is the responsibility of the individual institutes. The assessment files, in text, ASCII, and html formats, will be provided electronically after the completion of each LP study.

² Cofino, W.P., Wells, D.E., Ariese, F., van Stokkum, I, Wengener, J. W. and Peerboom, R., J. Chemometrics and Intelligent Laboratory Systems, 53, (2000) 37-55; Cofino, W. P., van Stokkum, I.H.M., van Steenwijk, J., and Wells, D E. Anal. Chim. Acta (2004) (in press); Wells, D.E., Cofino, W.P. and Scurfield, J. A. FRS Marine Laboratory, Aberdeen, Collaborative Report (2004)

³ Left Censored Values is the correct nomenclature for "less than" values

⁴ International Harmonized Protocol for Proficiency Testing of (Chemical) Analytical Laboratories. M Thompson, R Wood, Journal of AOAC International Vol. 76, No. 4, 1993

⁵ The formulae used in calculation of the z-scores are given in Annex II

Timetable 2012

QUASIMEME follows an annual timetable. The time between each round is approximately three months with four months to report the data. This timetable allows all participants to incorporate the test materials into their ongoing analytical programme. This is particularly important for those participants who need to undertake their QA analysis alongside their environmental samples in the laboratory or at sea. The timetable is given in this scheme and a reminder, in the form of an e-mail, is sent to participants prior to the start of each round.

The deadlines for submission of data are fixed. Any data received after the deadline may not be included in the assessment. A confidential individual laboratory report, the full study report and the electronic summary files will be provided within two months of the deadline for the submission of data. These reports and summary files will also be provided for data received after the report is issued, but the individual laboratory report will include the statement, "Data received after the report was issued."

Table 1. Timetable

Round	Start date ⁶	Deadline	Report available
68	1-Jan-2012	30-Apr-2012	30-May-2012
69	1-Apr-2012	30-Jun-2012	30-Aug-2012
70	1-Aug-2012	30-Nov-2012	30-Dec-2012
71	1-Oct-2012	30-Jan-2013	30-Feb-2013

Table 2. Exercises

Round	Analysis Group Code	Number of Test materials	Matrix	Analytes
68	AQ-1	3	Seawater	Nutrients
68	AQ-2	4	Estuarine and Low Salinity Open Water	Nutrients
68	AQ-14	4	Seawater	DOC
68	MS-1	2	Sediment	Trace Metals
68	MS-2	2	Sediment	Chlorinated Organics
68	MS-3	2	Sediment	Polycyclic Aromatic Hydrocarbons
68	MS-6	2	Sediment	Organotins
68	BT-1	2	Fish or Shellfish	Trace Metals
68	BT-2	2	Fish or Shellfish	Chlorinated Organics
68	BT-3	2	Fish or Shellfish	Non ortho PCBs, PCDDs and PCDFs
68	BT-4	2	Shellfish	Polycyclic Aromatic Hydrocarbons
68	BT-8	2	Biota	Organotins
68	BT-9	2	Fish or Shellfish	Brominated Flame Retardants
69	AQ-3	3	Seawater	Metals
69	AQ-4	3	Seawater	Mercury
69	AQ-5	3	Seawater	Halogenated Organics

⁶ The start date is an indication of the beginning of the round. Test materials will be dispatched within a three-week window of this date. The QUASIMEME Project Office will notify all participants of the exact date of dispatch by e-mail.

69	AQ-6	2	Seawater	Volatile Organics
69	AQ-7	3	Seawater	Pentachlorophenol
69	AQ-8	3	Seawater	Triazines and organophosphorus compounds
69	AQ-11	2	Seawater Filter	Chlorophyll and Pheopigments
69	AQ-12	2	Seawater	Organotins
69	AQ-13	3	Seawater	Polycyclic Aromatic Hydrocarbons
69	BT-7	2	Shellfish and Solution	ASP Shellfish Toxins
69	DE-10	4	Shellfish and Solution	DSP Shellfish Toxins
69	DE-14	4	Shellfish and Solution	PSP Shellfish Toxins
70	AQ-1	3	Seawater	Nutrients
70	AQ-2	4	Estuarine and Low Salinity Open Water	Nutrients
70	AQ-14	2	Seawater	DOC
70	MS-1	2	Sediment	Trace Metals
70	MS-2	2	Sediment	Chlorinated Organics
70	MS-3	2	Sediment	Polycyclic Aromatic Hydrocarbons
70	MS-6	2	Sediment	Organotins
70	MS-7	2	Sediment	Brominated Flame Retardants
70	BT-1	2	Fish or Shellfish	Trace metals
70	BT-2	2	Fish or Shellfish	Chlorinated Organics
70	BT-4	2	Shellfish	Polycyclic Aromatic Hydrocarbons
70	BT-8	2	Biota	Organotins
70	BT-10	3	Biota	Perfluorinated Alkyl Substances (PFASs)
71	AQ-3	3	Seawater	Metals
71	AQ-4	3	Seawater	Mercury
71	AQ-11	2	Seawater Filter	Chlorophyll and Pheopigments
71	BT-7	2	Shellfish and Solution	ASP Shellfish Toxins
71	DE-10	4	Shellfish and Solution	DSP Shellfish Toxins

Participation in the Quasimeme Laboratory Performance Studies

How to Participate

The QUASIMEME Laboratory Performance Studies are open to any organisation, world-wide.

- Consult the enclosed information on the QUASIMEME LP studies, the timetable and the programme.
- Select the test materials required.
- Complete the application form (included in this document, from the QUASIMEME website or by e-mail from the QUASIMEME Project Office).
- Enter the appropriate fee from the table.
- Send the completed application form to the QUASIMEME Project Office, preferably by e-mail.
- DO NOT send any money with the application form. The QUASIMEME Project Office will invoice your institute within two weeks. Details of how to pay will be provided with the invoice.
- The invoice should be paid in Euros within 30 days of receipt.
- In case of excessive delay in payment of the invoice, additional costs may be charged.

Permanent Membership of QUASIMEME

Laboratories can subscribe annually or choose to subscribe for an indefinite period by becoming a permanent member of QUASIMEME. Subscribing for an indefinite period has a number of advantages:

- You do not have to complete the subscription form every year, you only have to notify QPO of any changes in your participation.
- QPO only charge handling fees when you start the subscription for the indefinite period and when changes are made
- You will receive a discount of 3% on the subscription fee.

Please tick the appropriate box on the subscription form if you wish to subscribe for an indefinite period.

Table 3 Costs for Participation in QUASIMEME LPS per year

Analysis Group	Costs in Euro
AQ-1 Nutrients in Seawater	650
AQ-2 Nutrients in Estuarine and Low Salinity Open Water	750
AQ-3 Metals in Seawater	675
AQ-4 Mercury in Seawater	675
AQ-5 Halogenated Organics in Seawater	500
AQ-6 Volatile Organics in Seawater	500
AQ-7 Pentachlorophenol in Seawater	500
AQ-8 Triazines and Organophosphorus Compounds in Seawater	500
AQ-11 Chlorophyll and Pheopigments in Seawater	700
AQ-12 Organotins in Seawater	575
AQ-13 Polycyclic Aromatic Hydrocarbons in Seawater	550
AQ-14 DOC in Seawater	450
BT-1 Trace Metals in Biota	725
BT-2 Chlorinated Organics in Biota	725
BT-3 Non ortho PCBs, PCDDs and PCDFs in Biota	725
BT-4 Polycyclic Aromatic Hydrocarbons in Biota	725
BT-8 Organotins in Biota	725
BT-9 Brominated Flame Retardants in Biota	500
BT-10 Perfluorinated Alkyl Substances (PFASs) in biota (Package 1 only)	600
MS-1 Trace Metals in Sediment	600
MS-2 Chlorinated Organics in Sediment	600
MS-3 Polycyclic Aromatic Hydrocarbons in Sediment	600
MS-6 Organotins in Sediment	600
MS-7 Brominated Flame Retardants in Sediment	500
BT-7 ASP Shellfish Toxins	700
DE-10 DSP Shellfish Toxins	700
DE-14 PSP Shellfish Toxins	750

A discount of 5% of the total amount is applied for laboratories subscribing to 5 or more groups.

A discount of 10% of the total amount is applied for laboratories subscribing to 10 or more groups.

A handling fee of €50 is added to all orders. Customs charges and bank handling charges are accountable to the participant.

VAT (19%) is charged on all orders from Dutch laboratories and on orders from any laboratories in other EU countries if the VAT number is not provided with the order.

Under certain circumstances it may be possible to subscribe for only one round of an exercise. Please contact the QUASIMEME project office for more information.

Extra sets of test materials are available on request but where used for second method testing no discount is offered.

Test materials remaining from exercises are for sale when available. For prices contact the QUASIMEME Project Office. A Z-score Certificate will be made available if requested.

To purchase stock from old rounds the costs are calculated per round test material :

1 test material €200 each

2 test materials €150 each

3 test materials €140 each

We do not permit the purchase of more than 3 of any single test material. QUASIMEME does not supply test materials for ring tests not co-ordinated by QUASIMEME. If you have any queries please do not hesitate to contact the QUASIMEME Project Office.

Test Materials and Analysis Groups

The QUASIMEME LP studies routinely include test materials, containing determinands at concentrations similar to those possibly found in estuarine, coastal and open water environments.

Seawater Test Materials

The seawater used to prepare the test materials is collected from the Eastern Atlantic Ocean and filtered to remove bacteria and other particles. The filtered seawater is dispensed into 250ml or 1 litre glass bottles. The low salinity test materials are prepared by diluting the filtered seawater with ultrapure demineralised water to the required salinity.

Sediment Test Materials

The sediment test materials cover a range of natural sandy and silty sediments from open water, estuaries and harbour locations around the North Sea, Eastern Atlantic Ocean and Mediterranean Sea. Although wet sediments constitute a more realistic natural material, previous QUASIMEME Laboratory Performance studies have shown that there was no significant difference in laboratory performance when dry sediments were used compared to wet sediments. Where wet sediments are provided, these are stabilised by sterilisation. The dry sediments are sieved and milled to <0.5 mm and may also be stabilised by sterilisation. Both the wet and dry sediments are divided into representative sub samples.

The level of test material homogeneity is assessed following BCR guidelines (1993). The dry sediments have been shown to be stable over a number of years when stored at room temperature. Dry sediments are considerably less expensive to produce and handle compared to wet sediments. Therefore QUASIMEME will continue to provide dry sediments, unless there are specific reasons / requests to provide wet sediments.

Biota Test Materials

The biota test materials are collected from contaminated waters, open water and coastal locations around the North Sea and Mediterranean, and include e.g. plaice, cod, mussels, shrimps, flounder and tuna. All materials are homogenised and sterilised by autoclaving. The use of wet tissues by QUASIMEME is unique for the purposes of the Laboratory Performance studies, and allows participants to analyse determinands in a test material matrix similar to a natural sample.

The level of test material homogeneity is assessed following BCR guidelines (1993). The test materials have been shown to be stable for a number of years when stored at room temperature.

Analyte Groups

In table 4 the analyte group codes can be found for specific groups of determinands in specific matrices. These analysis group codes are used to subscribe to QUASIMEME Laboratory Performance Studies.

Table 4 Analysis Group Code for Determinand-Test Material Combination

Determinand Group	(Sea)water	Biota	Sediment	Remarks
Nutrients	AQ-1			Seawater
	AQ-2			Estuarine water
DOC	AQ-14			Seawater
Chlorophyll and Pheopigments	AQ-11			Filtered Seawater
Trace Metals	AQ-3	BT-1	MS-1	
Mercury	AQ-4			
Chlorinated Organics	AQ-5	BT-2	MS-2	
Polycyclic Aromatic Hydrocarbons (PAH's)	AQ-13	BT-4	MS-3	
Organotins	AQ-12	BT-8	MS-6	
Brominated Flame Retardants (BFR's)		BT-9	MS-7	
Perfluorinated Alkyl Substances (PFASs)		BT-10		
Non ortho PCBs, PCDDs, PCDFs		BT-3		

Volatile Organic Compounds (VOC's)	AQ-6			
Pentachlorophenol	AQ-7			
Triazines & Organophosphorous Pesticides	AQ-8			
ASP - Shellfish Toxins		BT-7		
DSP - Shellfish Toxins		DE-10		Development Exercise
PSP - Shellfish Toxins		DE-14		Development Exercise

The details for a specific Analysis group can be found in the specific section dedicated to that analysis group in this document. These sections contain information about test materials used and the determinands to analyse. The given minimum and maximum concentrations in the tables are indicative of the typical ranges and reflect the values in test materials used over the past two years. However, there are test materials where the concentration of a determinand may be outside these values. These would be atypical of the normal range of test materials. Normally, the constant and proportional errors have been agreed by the Scientific Assessment Group and are used by QUASIMEME in the calculation of the z-scores used in the data assessment (Annex II).

QUASIMEME has set clear guidelines on the boundaries of the uncertainty of the assigned value. When the allowable target error exceeds 100% of the assigned value, then the assigned value is set to be indicative. However, there have been occasions where the assigned value has been indicative, primarily as a function of the magnitude of the constant error, rather than the performance of the laboratories. Therefore, it was decided that assigned values will be given when the target error exceeds 100% of the assigned value in case all other requirements of the data-assessment are met.

Where known AA-EQS was given as stated by the European Union (Document 13144/07).

NB. (EQS = Ecological Quality Standard; the EQS's are mentioned in the EC Water Framework Directive)

AQ-1 Nutrients in Seawater					
Year	2012	Number of Rounds / Year	2	Number of Materials	3
Distribution	January, August				

Introduction

This study covers the determination of nutrients in the seawater test materials. The test materials are prepared in bulk, following the well-defined methods of A. Aminot and R. Kerouel (Analytical Chimica Acta 248(1991), pp.277-283 and Marine Chemistry 49(1995) pp.221-232).

Test Materials

Low nutrient seawater (LNSW), collected from the Eastern Atlantic Ocean during the late spring and summer months after the main plankton bloom, is used to prepare the test materials. This seawater is filtered to remove bacteria and particles. The pH of the seawater is adjusted to pH ~ 7.2 using 0.1M hydrochloric acid. The seawater is spiked, mixed thoroughly and dispensed into appropriate 250 ml bottles for distribution. The dispensed materials are sterilised by autoclaving.

Homogeneity testing is performed on each batch of test materials produced. The nutrient test materials are stable for the period of the test, and have also been shown to be stable for a period of some months even after opening but used under the correct conditions following the storage instructions.

Determinands and Concentration Ranges

The nutrients to be determined are given in the table below. The nitrogen species should be analysed in the distributed glass bottle and the silica and phosphorus species in the distributed plastic bottle.

The table below also shows:

- the expected concentration range for the determinands in the spiked seawater materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range		Error		AA-EQS
		Seawater	Seawater (spiked)	Const	Prop	
Ammonia	µmol/L	0.2–5	0.2–5	0.1	6.0%	
TOxN	µmol/L	0.05–15	0.05–15	0.05	6.0%	
Nitrite	µmol/L	0.01–2	0.01–2	0.01	6.0%	
Phosphate	µmol/L	0.05–5	0.05–5	0.05	6.0%	
Silicate	µmol/L	0.5–10	0.5–10	0.1	6.0%	
Total-N	µmol/L	5–25	5–25	0.5	6.0%	
Total-P	µmol/L	0.1–5	0.1–5	0.05	6.0%	

*Data-assessment for unspiked samples will be carried out by calculating with a proportional error of 12.5%
Determinands in bold are in the scope of the accreditation*

AQ-2 Nutrients in Estuarine and Low Salinity Open Water					
Year	2012	Number of Rounds / Year	2	Number of Materials	4
Distribution	January, August				

Introduction

This study covers the determination of nutrients in the estuarine water and low salinity open water test materials. The test materials are prepared in bulk, following the well-defined methods of A. Aminot and R. Kerouel (Analytical Chimica Acta 248(1991), pp.277-283 and Marine Chemistry 49(1995) pp.221-232).

Test Materials

Low nutrient seawater (LNSW), collected from the Eastern Atlantic Ocean during the late spring and summer months after the main plankton bloom, is used to prepare the estuarine test materials. The low salinity open water material is collected from the Baltic. These materials are filtered to remove bacteria and particles. The seawater is diluted with ultrapure demineralised water to produce the estuarine water matrix. The pH of the materials is adjusted to pH ~ 7.2 using 0.1M hydrochloric acid. The materials are spiked, mixed thoroughly and dispensed into appropriate 250 mL bottles for distribution. The dispensed materials are sterilised by autoclaving. Homogeneity testing is performed on each batch of test materials produced. The nutrient test materials are stable for the period of the test and have also been shown to be stable for a period of some months even after opening but used under the correct conditions following the storage instructions.

Determinands and Concentration Ranges

The nutrients to be determined are given in the table below. The nitrogen species should be analysed in the distributed glass bottle and the silica and phosphorus species in the distributed plastic bottle.

The table below also shows:

- the expected concentration range for the determinands in the spiked seawater materials
- the constant and proportional error that will be used for assessment of the results.

Salinity is requested as an indicative measurement in support of methodology and should be analysed in the sample material distributed in a separate bottle labeled salinity only.

Determinand	Unit	Concentration Range		Error		AA-EQS
		Estuarine water (spiked)	Low salinity open water (spiked)	Const	Prop	
Ammonia	µmol/L	2–50	0.2–5	0.1	6.0%	
TOxN	µmol/L	10–100	0.05–15	0.05	6.0%	
Nitrite	µmol/L	0.5–25	0.01–2	0.01	6.0%	
Phosphate	µmol/L	1–15	0.02–5	0.05	6.0%	
Silicate	µmol/L	5–100	0.5–20	0.1	6.0%	
Total-N	µmol/L	10–200	2–20	0.5	6.0%	
Total-P	µmol/L	1–20	0.02–2	0.05	6.0%	
Salinity	Psu			0.001	0.1%	

Data-assessment for unspiked samples will be carried out by calculating with a proportional error of 12.5%. Determinands in bold are in the scope of the accreditation

AQ-3 Metals in Seawater					
Year	2012	Number of Rounds / Year	2	Number of Materials	3
Distribution	April, October				

Introduction

This study covers the determination of trace metals in the seawater and low salinity seawater test materials.

Test Materials

The test materials are prepared in bulk from filtered seawater. Low salinity seawater test material is prepared by dilution with ultra-pure demineralised water. All test materials are preserved with 2 mL trace metal analysis grade nitric acid per litre of test material. Normally 1 spiked seawater, 1 unspiked seawater and 1 spiked low salinity seawater are supplied for each exercise.

Homogeneity of the test materials is assumed, as they were prepared in bulk and thoroughly mixed, before being dispensed into 1 litre polypropylene bottles for distribution. The test materials are stable for the purposes of the exercise.

Determinands and concentration ranges

The trace metals to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration Range		Error		AA-EQS
		Low Salinity Seawater (spiked)	Seawater (spiked)	Const	Prop	
Arsenic	µg/L	0.2–10	0.05–5	0.5	12.5%	
Boron	µg/L	200–5000	1000–5000	0.4	12.5%	
Cadmium	µg/L	0.05–1	0.001–0.5	0.005	12.5%	0.08
Chromium	µg/L	0.5–10	0.01–5	0.1	12.5%	
Cobalt	µg/L	0.01–5	0.001–0.5	0.2	12.5%	
Copper	µg/L	0.2–5	0.05–5	0.2	12.5%	
Iron	µg/L	0.2–10	0.05–10	0.4	12.5%	
Lead	µg/L	0.1–2	0.0002–15	0.01	12.5%	7.2
Manganese	µg/L	0.1–2	0.02–2	0.4	12.5%	
Nickel	µg/L	0.1–2	0.2–5	0.2	12.5%	20
Silver	µg/L	0.1–2	0.02–2	0.2	12.5%	
Tin	µg/L	0.1–5	0.02–1	0.2	12.5%	
Vanadium	µg/L	0.2–5	0.1–5	0.2	12.5%	
Zinc	µg/L	0.2–10	0.5–20	0.4	12.5%	

AQ-4 Mercury in Seawater					
Year	2012	Number of Rounds / Year	2	Number of Materials	3
Distribution	April, October				

Introduction

This study covers the determination of mercury in the seawater test materials.

Test Materials

The test materials are prepared in bulk from filtered seawater. All test materials are preserved with 2 mL trace metal analysis grade nitric acid per litre of test material. Normally 3 spiked seawater test materials are supplied for each exercise.

Homogeneity of the test materials is assumed, as they were prepared in bulk and thoroughly mixed, before being dispensed into 1 litre glass bottles for distribution. The test materials are stable for the purposes of the exercise.

Determinands and concentration ranges

Mercury should be determined in each test material. The table shows:

- the expected concentration range in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Seawater (spiked)	Const	Prop	
Mercury	ng/L	0.1—100	0.2	12.5%	50

AQ-5 Halogenated Organics in Seawater					
Year	2012	Number of Rounds / Year	1	Number of Materials	3
Distribution	April				

Introduction

This study covers the determination of halogenated organics in seawater test materials.

Test Materials

The seawater for this study is collected from the Eastern Atlantic Ocean and is filtered to remove bacteria and particles. The low salinity test material is prepared by dilution with ultra-pure demineralised water. The test materials are thoroughly mixed and dispensed into 1 litre glass bottles. These bottles are individually spiked with a methanol solution containing the organochlorines to be analysed. The participants are asked to dilute the supplied standard solutions using the supplied seawater test materials to produce the spiked test materials.

Homogeneity of the test materials is assumed, as they are spiked to the same concentration level. The test materials are stable for the purposes of the exercise.

Determinands and Concentration Ranges

The organochlorines to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration Range		Error		AA-EQS
		Low Salinity Seawater (spiked)	Seawater (spiked)	Const	Prop	
α -HCH	ng/L	2–50	0.2–20	0.2	12.5%	2
β -HCH	ng/L	1–50	0.2–20	0.2	12.5%	2
γ -HCH	ng/L	2–50	0.5–20	0.2	12.5%	2
δ -HCH	ng/L	1–50	0.2–20	0.2	12.5%	2
HCB	ng/L	0.5–20	0.1–10	0.2	12.5%	10
HCBD	ng/L	2–50	0.2–20	0.2	12.5%	100
Aldrin	ng/L	2–200	1–20	0.5	12.5%	5
Dieldrin	ng/L	2–100	1–20	0.5	12.5%	5
Endrin	ng/L	2–200	1–20	0.5	12.5%	5
Isodrin	ng/L	2–200	1–20	0.5	12.5%	5
pp'-DDD	ng/L	1–50	0.1–10	0.5	12.5%	25
pp'-DDE	ng/L	1–50	0.2–10	0.5	12.5%	25
op'-DDT	ng/L	1–50	0.2–20	0.5	12.5%	25
pp'-DDT	ng/L	1–50	0.2–20	0.5	12.5%	10
Endosulphan-I	ng/L	1–20	0.2–10	0.2	12.5%	0.5
Endosulphan-II	ng/L	0.5–20	0.1–10	0.2	12.5%	0.5
Pentachlorobenzene	ng/L	2–100	0.2–5	0.5	12.5%	0.7
1,2,3-TCB	ng/L	2–50	1–20	0.5	12.5%	400
1,2,4-TCB	ng/L	5–100	1–20	0.5	12.5%	400
1,3,5-TCB	ng/L	2–50	0.5–20	0.5	12.5%	400
Trifluralin	ng/L	2–50	0.5–20	0.5	12.5%	30

AQ-6 Volatile Organics in Seawater					
Year	2012	Number of Rounds / Year	1	Number of Materials	2
Distribution		April			

Introduction

This study covers the determination of volatile organochlorine compounds (VOC's) in seawater test materials.

Test Materials

The seawater for this study is collected from the Eastern Atlantic Ocean and is filtered to remove bacteria and particles. The test materials are thoroughly mixed and dispensed into 1 litre glass bottles. These bottles are individually spiked with methanol solutions containing the volatile organic compounds (VOC's) to be analysed.

Glass beads are added to the spiked test materials to reduce the headspace volume in order to prevent volatilisation of the added VOC's.

Homogeneity of the test materials is assumed, as they were spiked to the same concentration level. The test materials are stable for the purposes of the exercise.

Determinands and Concentration Ranges

The VOC's to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Seawater (spiked)	Const	Prop	
Benzene	µg/L	0.2–50	0.1	12.5%	8
Carbontetrachloride	µg/L	0.2–10	0.1	12.5%	12
Chloroform	µg/L	0.5–20	0.1	12.5%	2.5
1,2-Dichloroethane	µg/L	1–10	0.1	12.5%	10
Dichloromethane	µg/L	0.2–20	0.1	12.5%	20
Trichloroethene	µg/L	0.2–10	0.1	12.5%	10
1,1,1-Trichloroethane	µg/L	0.2–10	0.1	12.5%	
1,1,2-Trichloroethane	µg/L	1–20	0.1	12.5%	
Tetrachloroethene	µg/L	0.2–10	0.1	12.5%	10

AQ-7 Pentachlorophenol in Seawater					
Year	2012	Number of Rounds / Year	1	Number of Materials	3
Distribution	April				

Introduction

This study covers the determination of pentachlorophenol (PCP) in seawater test materials. As PCP is usually determined by a special method this exercise is offered separately.

Test Materials

The seawater for this study is collected from the Eastern Atlantic Ocean and is filtered to remove bacteria and particles. The test materials are thoroughly mixed and dispensed into 1 litre glass bottles. These bottles are individually spiked with methanol solutions containing PCP.

Homogeneity of the test materials is assumed, as they were spiked to the same concentration level. The test materials are stable for the purposes of the exercise.

Determinands and Concentration Ranges

The table shows:

- the expected concentration range for the determinand in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Seawater (spiked)	Const	Prop	
Pentachlorophenol	ng/L	20—2000	10	12.5%	400

AQ-8 Triazines and Organophosphorus Compounds in Seawater					
Year	2012	Number of Rounds / Year	1	Number of Materials	3
Distribution	April				

Introduction

This study covers the determination of triazines and organophosphorus compounds in seawater and low salinity seawater test materials.

Test Materials

The seawater for this study is collected from the Eastern Atlantic Ocean and is filtered to remove bacteria and particles. The low salinity test material is prepared by dilution with ultra-pure demineralised water. The test materials are thoroughly mixed and dispensed into 1 litre glass bottles. These bottles are distributed together with methanol standard solutions containing the compounds to be analysed. The participants are asked to dilute the supplied standard solutions using the supplied seawater test materials to produce the spiked test materials. Homogeneity of the test materials is assumed, as they are spiked to the same concentration level. The test materials are stable for the purposes of the exercise.

Determinands and Concentration Ranges

The triazines and organophosphorus compounds to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration range		Error		AA-EQS
		Low salinity Seawater with SS	Seawater with SS	Const	Prop	
Alachlor	ng/L	20–500	2–200	1	12.5%	300
Atrazine	ng/L	20–500	5–200	1	12.5%	600
Azinphos-ethyl	ng/L	20–500	5–200	1	12.5%	
Azinphos-methyl	ng/L	20–500	5–200	1	12.5%	
Chlorfenvinphos	ng/L	20–500	5–200	1	12.5%	100
Chlorpyrifos	ng/L	20–500	2–200	1	12.5%	30
Coumaphos	ng/L	20–500	2–100	1	12.5%	
Demeton	ng/L	50–500	5–200	1	12.5%	
Diazinon	ng/L	20–500	5–200	1	12.5%	
Dichlorvos	ng/L	20–500	2–200	1	12.5%	
Dimethoate	ng/L	20–500	5–100	1	12.5%	
Diuron	ng/L	50–500	5–200	1	12.5%	200
Fenchlorphos	ng/L	20–500	2–200	1	12.5%	
Fenitrothion	ng/L	20–500	2–200	1	12.5%	
Fenthion	ng/L	20–500	5–200	1	12.5%	
Irgarol-1051	ng/L	50–500	2–200	1	12.5%	
Isoproturon	ng/L	20–500	2–200	1	12.5%	300
Malathion	ng/L	20–500	5–200	1	12.5%	
Omethoate	ng/L	50–500	5–200	1	12.5%	
Parathion-ethyl	ng/L	20–500	5–200	1	12.5%	
Parathion-methyl	ng/L	20–500	5–200	1	12.5%	
Simazine	ng/L	20–500	5–200	1	12.5%	1000
Triazophos	ng/L	50–500	10–500	1	12.5%	

AQ-11 Chlorophyll and Pheopigments in Seawater					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	April, October				

Introduction

This study covers the determination of chlorophyll and pheopigments in seawater, filtered residue test materials. Algae cultures of e.g. Chaetocheros and Pyramimonas are used to prepare the filtered residues.

Test Materials

Test materials are prepared from algae cultures and sub-sampled onto Whatman GF/F, 47 mm filter papers each test material is immediately 'flash frozen' in liquid nitrogen. The sequence in which the test materials are filtered is recorded. Selected filters at regular intervals are chosen for homogeneity testing. The test materials are homogeneous for the purposes of the LP study.

Determinands and Concentration Ranges

The pigments to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Filtered Residues	Const	Prop	
Chlorophyll-a	µg/L	0.1—20	0.05	12.5%	
Chlorophyll-b	µg/L	0.01—5	0.01	12.5%	
Chlorophyll-c	µg/L	0.02—2.5	0.01	12.5%	
Pheopigments	µg/L	0.02—2.5	0.01	12.5%	

Determinands in bold are in the scope of the accreditation

AQ-12 Organotins in Seawater					
Year	2012	Number of Rounds / Year	1	Number of Materials	2
Distribution	April				

Introduction

This study covers the determination of organotin compounds in the seawater test materials.

Test Materials

The seawater for this study is collected from the Eastern Atlantic Ocean and is filtered to remove bacteria and particles. The test materials are spiked, thoroughly mixed and dispensed into 1 litre glass bottles for distribution. Homogeneity of the test materials is assumed, as they are produced in bulk. The test materials are stable for the purposes of the exercise.

Determinands and concentration ranges

The organotin compounds to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration Range		Error		AA-EQS
		Seawater (spiked)	Seawater with SS	Const	Prop	
Tributyltin(TBT)	µg Sn/kg	0.001—0.2	0.001—0.1	0.05	12.5%	0.0002
Dibutyltin(DBT)	µg Sn/kg	0.001—0.05	0.001—0.05	0.05	12.5%	0.0002
Monobutyltin(MBT)	µg Sn/kg	0.001—0.02	0.001—0.02	0.05	12.5%	0.0002
Triphenyltin(TPT)	µg Sn/kg	0.001—0.2	0.001—0.2	0.05	12.5%	
Diphenyltin(DPT)	µg Sn/kg	0.001—0.1	0.001—0.1	0.05	12.5%	
Monophenyltin(MPT)	µg Sn/kg	0.001—0.05	0.001—0.05	0.05	12.5%	

AQ-13 Polycyclic Aromatic Hydrocarbons in Seawater					
Year	2012	Number of Rounds / Year	1	Number of Materials	3
Distribution	April				

Introduction

This study covers the determination of PAH's in seawater test materials.

Test Materials

The seawater for this study is collected from the Eastern Atlantic Ocean and is filtered to remove bacteria and particles. The test materials are spiked, thoroughly mixed and dispensed into glass bottles for distribution. Homogeneity of the test materials is assumed, as they are produced in bulk. The test materials are stable for the purposes of the exercise.

Determinands and Concentration Ranges

The PAH's to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration range			Error		AA-EQS
		Seawater (Sediment Spiked)	Seawater (Spiked)	Standard Solution	Const	Prop	
Acenaphthene	µg/L	0.2—20	0.5—50	50—2000	0.01	12.5%	
Acenaphthylene	µg/L	0.01—1	0.5—50	50—2000	0.01	12.5%	
Anthracene	µg/L	0.2—20	0.05—5	50—2000	0.01	12.5%	0.1
Benzo[a]pyrene	µg/L	0.1—10	0.001—0.1	50—2000	0.01	12.5%	0.05
Benzo[b]fluoranthene	µg/L	0.1—10	0.001—0.1	50—2000	0.01	12.5%	0.03
Benzo[k]fluoranthene	µg/L	0.1—10	0.001—0.1	50—2000	0.01	12.5%	0.03
Benzo[g,h,i]perylene	µg/L	0.02—2	0.001—0.1	50—2000	0.01	12.5%	0.002
Fluoranthene	µg/L	0.4—40	0.05—5	50—2000	0.01	12.5%	0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.4—40	0.02—2	50—2000	0.01	12.5%	0.002
Naphthalene	µg/L	0.1—10	0.5—50	50—2000	0.01	12.5%	1.2
Phenanthrene	µg/L	0.5—50	0.05—5	50—2000	0.01	12.5%	

AQ-14 DOC in Seawater					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of dissolved organic carbon in the seawater test materials. The test materials are prepared in bulk, following the well-defined methods of A. Aminot and R. Kerouel (Analytical Chimica Acta 248(1991), pp.277-283 and Marine Chemistry 49(1995) pp.221-232).

Test Materials

Low nutrient seawater (LNSW), collected from the Eastern Atlantic Ocean during the late spring and summer months after the main plankton bloom, is used to prepare the test materials. This seawater is filtered to remove bacteria and particles.

Homogeneity testing is performed on each batch of test materials produced. The test materials are stable for the period of the test, and have also been shown to be stable for a period of some months even after opening but used under the correct conditions following the storage instructions.

Determinands and Concentration Ranges

The DOC content should be analysed in the distributed glass bottles.

The table below also shows:

- the expected concentration range for DOC in the spiked seawater materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration range	Error		AA-EQS
		Seawater (spiked)	Const	Prop	
DOC	mg C/L	0.1—20	0.1	6.0%	

BT-1 Trace Metals in Biota					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of trace metals, ash weight, dry weight and total and extractable lipid in biota test materials.

Test Materials

The test materials cover a range of natural biota species from contaminated waters from the North Sea and/or Mediterranean. The supplied biota test materials can consist of fish muscle, fish liver and shellfish tissue. Wet biota test materials are homogenised and sterilised by autoclaving. These biota test materials have been shown to be stable over a number of years when stored at room temperature.

Determinands and concentration ranges

The trace metals to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range			Error		AA-EQS
		Fish Liver Tissue	Fish Muscle Tissue	Shellfish Tissue	Const	Prop	
Arsenic	mg/kg	1–5	1–10	0.2–10	0.02	12.5%	
Cadmium	µg/kg	5–1000	1–50	10–500	20	12.5%	
Chromium	µg/kg	20–1000	50–500	10–5000	20	12.5%	
Copper	µg/kg	2000–10000	100–1000	50–10000	100	12.5%	
Lead	µg/kg	10–1000	10–50	10–1000	5	12.5%	
Mercury	µg/kg	20–100	20–1000	5–500	20	12.5%	
Nickel	µg/kg	20–1000	10–200	10–2000	20	12.5%	
Selenium	µg/kg	200–5000	200–2000	200–1000	10	12.5%	
Silver	µg/kg	20–1000	0.5–50	1–500	5	12.5%	
Zinc	mg/kg	10–50	2–10	2–200	2	12.5%	
Ash-weight	%				0.1	12.5%	
Dry-weight	%				0.1	12.5%	
Total-Lipid	%				0.1	12.5%	
Extractable-Lipid	%				0.1	12.5%	

Determinands in bold are in the scope of the accreditation

BT-2 Chlorinated Organics in Biota					
Year	2012	Number of Rounds / Year	2	Number of	2
Distribution	January, August				

Introduction

This study covers the determination poly chlorinated biphenyls (PCB's), organochlorine pesticides (OCP's), total and extractable lipid in biota test materials.

Test Materials

The test materials cover a range of natural biota species from contaminated waters from the North Sea and/or Mediterranean. The supplied biota test materials can consist of fish muscle, fish liver and shellfish tissue. Wet biota test materials are homogenised and sterilised by autoclaving. These biota test materials have been shown to be stable over a number of years when stored at room temperature.

Determinands and Concentration Ranges

The organochlorines to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration range			Error		AA-EQS
		Fish Liver tissue and Freshwater Fish	Fish Muscle Tissue	Shellfish Tissue	Const	Prop	
PCB28	µg/kg	5–50	0.05–5	0.05–5	0.025	12.5%	
PCB31	µg/kg	1–10	0.03–3	0.03–3	0.025	12.5%	
PCB52	µg/kg	10–100	0.05–5	0.05–5	0.025	12.5%	
PCB101	µg/kg	30–300	0.1–20	0.1–20	0.025	12.5%	
PCB105	µg/kg	10–100	0.05–10	0.05–10	0.025	12.5%	
PCB118	µg/kg	30–300	0.2–20	0.2–20	0.025	12.5%	
PCB138+PCB163	µg/kg	60–600	0.3–30	0.3–30	0.025	12.5%	
PCB138	µg/kg	60–600	0.3–30	0.3–30	0.025	12.5%	
PCB153	µg/kg	100–1000	0.4–40	0.4–40	0.025	12.5%	
PCB156	µg/kg	3–40	0.03–10	0.03–10	0.025	12.5%	
PCB180	µg/kg	20–200	0.05–5	0.05–5	0.025	12.5%	
α-HCH	µg/kg	0.5–5	0.05–5	0.05–5	0.02	12.5%	
β-HCH	µg/kg	0.5–5	0.05–5	0.05–5	0.025	12.5%	
γ-HCH	µg/kg	0.2–5	0.05–5	0.05–5	0.025	12.5%	
δ-HCH	µg/kg		0.05–5	0.05–5	0.025	12.5%	
HCB	µg/kg	5–50	0.02–5	0.02–5	0.025	12.5%	
HCBd	µg/kg	0.1–5			0.025	12.5%	
Dieldrin	µg/kg	10–100	0.2–20	0.2–20	0.025	12.5%	
pp'-DDD	µg/kg	10–100	0.1–10	0.1–10	0.025	12.5%	
pp'-DDE	µg/kg	50–500	0.3–30	0.3–30	0.025	12.5%	
op'-DDT	µg/kg	0.1–2	0.01–1	0.01–1	0.025	12.5%	
pp'-DDT	µg/kg	0.3–10	0.1–10	0.1–10	0.025	12.5%	
Transnonachlor	µg/kg	3–40	0.02–10	0.02–10	0.025	12.5%	
Total-Lipid	%				0.1	12.5%	
Extractable-Lipid	%				0.1	12.5%	

Determinands in bold are in the scope of the accreditation

BT-3 Non ortho CBs, PCDDs and PCDFs in Biota					
Year	2012	Number of Rounds / Year	1	Number of Materials	2
Distribution	January				

Introduction

This study covers the determination of non-ortho poly chlorinated biphenyls (PCB's), polychlorinated dibenzo-p-dioxins (PCDD's), polychlorinated dibenzofurans (PCDF's), total TEQ and total and extractable lipid in biota test materials.

Test Materials

The test materials cover a range of natural biota species from contaminated waters from the North Sea and/or Mediterranean. The supplied biota test materials can consist of fish muscle, fish liver and shellfish tissue. Wet biota test materials are homogenised and sterilised by autoclaving. These biota test materials have been shown to be stable over a number of years when stored at room temperature.

Determinands and Concentration Ranges

The parameters to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range			Error		AA-EQS
		Fish Liver Tissue	Fish Muscle Tissue	Shellfish Tissue	Const	Prop	
PCB77	ng/kg	500–4000	10–100	10–100	0.02	12.5%	
PCB169	ng/kg	30–300	0.2–5	0.2–5	0.02	12.5%	
PCB126	ng/kg	200–2000	1–20	1–20	0.02	12.5%	
2,3,7,8-TCDF	ng/kg	10–100	0.03–5	0.03–5	0.02	12.5%	
1,2,3,7,8-PeCDF	ng/kg	3–20	0.03–1	0.03–1	0.02	12.5%	
2,3,4,7,8-PeCDF	ng/kg	3–20	0.05–3	0.05–3	0.02	12.5%	
1,2,3,4,7,8-HxCDF	ng/kg	1–10	0.01–0.2	0.01–0.2	0.02	12.5%	
1,2,3,6,7,8-HxCDF	ng/kg	1–10	0.01–0.2	0.01–0.2	0.02	12.5%	
2,3,4,6,7,8-HxCDF	ng/kg	1–10	0.01–0.5	0.01–0.5	0.02	12.5%	
1,2,3,7,8,9-HxCDF	ng/kg				0.02	12.5%	
1,2,3,4,6,7,8-HpCDF	ng/kg	1–10	0.02–0.5	0.02–0.5	0.02	12.5%	
1,2,3,4,7,8,9-HpCDF	ng/kg				0.02	12.5%	
OCDF	ng/kg	0.2–2	0.02–0.5	0.02–0.5	0.02	12.5%	
2,3,7,8-TCDD	ng/kg	3–30	0.01–0.5	0.01–0.5	0.02	12.5%	
1,2,3,7,8-PeCDD	ng/kg	0.2–2	0.02–1	0.02–1	0.02	12.5%	
1,2,3,4,7,8-HxCDD	ng/kg		0.02–0.2	0.02–0.2	0.02	12.5%	
1,2,3,6,7,8-HxCDD	ng/kg	2–20	0.03–1	0.03–1	0.02	12.5%	
1,2,3,7,8,9-HxCDD	ng/kg	0.5–5	0.02–0.5	0.02–0.5	0.02	12.5%	
1,2,3,4,6,7,8-HpCDD	ng/kg	3–20	0.05–5	0.05–5	0.02	12.5%	
OCDD	ng/kg	3–20	0.05–5	0.05–5	0.02	12.5%	
Total-TEQ (DR CALUX)	ng/kg				0.1	12.5%	
Total-Lipid	%				0.1	12.5%	
Extractable-Lipid	%				0.1	12.5%	

BT-4 Polycyclic Aromatic Hydrocarbons in Biota					
YEAR	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of Polycyclic Aromatic Hydrocarbons (PAH's) and total and extractable lipid in shellfish tissue test materials.

Test Materials

The test materials consist of natural shellfish species from contaminated waters from the North Sea and/or Mediterranean. The supplied wet shellfish tissues are homogenised and sterilised by autoclaving. These test materials have shown to be stable over a number of years when stored at room temperature.

Determinands and Concentration Ranges

The PAH's to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration range	Error		AA-EQS
		Shellfish Tissue	Const	Prop	
Acenaphthene	µg/kg	0.5–100	0.2	12.5%	
Acenaphthylene	µg/kg	0.2–5	0.2	12.5%	
Anthracene	µg/kg	0.2–10	0.2	12.5%	
Benzo[a]anthracene	µg/kg	0.2–10	0.2	12.5%	
Benzo[a]fluorene	µg/kg		0.5	12.5%	
Benzo[a]pyrene	µg/kg	0.2–5	0.2	12.5%	
Benzo[b]fluoranthene	µg/kg	0.2–10	0.2	12.5%	
Benzo[k]fluoranthene	µg/kg	0.2–5	0.2	12.5%	
Benzo[e]pyrene	µg/kg	0.2–10	0.2	12.5%	
Benzo[g,h,i]perylene	µg/kg	0.2–5	0.2	12.5%	
Chrysene	µg/kg	0.2–20	0.2	12.5%	
Chrysene+Triphenylene	µg/kg	0.2–20	0.2	12.5%	
Triphenylene	µg/kg		5	12.5%	
Dibenz[a,h]anthracene	µg/kg	0.2–2	0.1	12.5%	
Dibenzo[a,i]pyrene	µg/kg		0.5	12.5%	
Dibenzothiophene	µg/kg	0.2–5	0.5	12.5%	
Fluoranthene	µg/kg	5–50	0.2	12.5%	
Fluorene	µg/kg	1–50	0.2	12.5%	
Indeno[1,2,3-cd]pyrene	µg/kg	0.2–5	0.2	12.5%	
Naphthalene	µg/kg	1–100	0.2	12.5%	
1-methyl naphthalene	µg/kg		0.2	12.5%	
2-methyl naphthalene	µg/kg		0.2	12.5%	
2- methyl anthracene	µg/kg		0.2	12.5%	
Perylene	µg/kg	0.1–5	0.5	12.5%	
Phenanthrene	µg/kg	2–50	0.2	12.5%	
2-Methylphenanthrene	µg/kg	0.2–5	2	12.5%	
3,6-Dimethylphenanthrene	µg/kg	0.2–2	0.5	12.5%	
Pyrene	µg/kg	1–20	0.2	12.5%	
1-Methylpyrene	µg/kg		2	12.5%	
Total-Lipid	%		0.1	12.5%	
Extractable-Lipid	%		0.1	12.5%	
C1-phenanthrenes/anthracenes	µg/kg		0.2	12.5%	
C2-phenanthrenes/anthracenes	µg/kg		0.2	12.5%	
C3-phenanthrenes/anthracenes	µg/kg		0.2	12.5%	

C1-pyrenes/fluoranthenes	µg/kg		0.2	12.5%	
C2-pyrenes/fluoranthenes	µg/kg		0.2	12.5%	
C1-chrysenes	µg/kg		0.2	12.5%	
C2-chrysenes	µg/kg		0.2	12.5%	
C1-benzofluoranthenes	µg/kg		0.2	12.5%	

Determinands in bold are in the scope of the accreditation

BT-8 Organotins in Biota					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of organotin compounds in biota test materials.

Test Materials

The test materials cover a range of natural biota species from contaminated waters from the North Sea and/or Mediterranean. The supplied wet biota test materials are homogenised and sterilised by autoclaving. These biota test materials have been shown to be stable over a number of years when stored at room temperature.

Determinands and Concentration Ranges

The organotin compounds to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration range	Error		AA-EQS
		Biota	Const	Prop	
Tributyltin(TBT)	µg Sn/kg	0.2—50	0.1	12.5%	
Dibutyltin(DBT)	µg Sn/kg	0.1—10	0.1	12.5%	
Monobutyltin(MBT)	µg Sn/kg	0.5—30	0.1	12.5%	
Triphenyltin(TPT)	µg Sn/kg		0.1	12.5%	
Diphenyltin(DPT)	µg Sn/kg		0.1	12.5%	
Monophenyltin(MPT)	µg Sn/kg		0.1	12.5%	

BT-9 Brominated Flame Retardants in Biota					
Year	2012	Number of Rounds / Year	1	Number of Materials	2
Distribution	January				

Introduction

This study covers the determination of brominated flame retardants (BFR's) in biota.

Test Materials

The test materials cover a range of natural unspiked biota types.

Wet biota test materials are homogenised and sterilised by autoclaving. Biota test materials have been shown to be stable over a number of years when stored at room temperature.

Determinands and concentration ranges

The BFR's to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration range	Error		AA-EQS
		Biota	Const	Prop	
BDE28	µg/kg	0.001—1	0.05	12.5%	
BDE47	µg/kg	0.05—20	0.05	12.5%	
BDE66	µg/kg	0.01—10	0.05	12.5%	
BDE85	µg/kg	0.01—10	0.05	12.5%	
BDE99	µg/kg	0.01—10	0.05	12.5%	
BDE100	µg/kg	0.005—2	0.05	12.5%	
BDE153	µg/kg	0.01—1	0.05	12.5%	
BDE154	µg/kg	0.001—1	0.05	12.5%	
BDE183	µg/kg	0.001—0.1	0.05	12.5%	
BDE209	µg/kg	0.01—0.1	0.05	12.5%	
TBBP-A	µg/kg		0.05	12.5%	
Dimethyl-TBBP-A	µg/kg		0.05	12.5%	
α-HBCD	µg/kg		0.05	12.5%	
β-HBCD	µg/kg		0.05	12.5%	
δ-HBCD	µg/kg		0.05	12.5%	
Total-HBCD	µg/kg		0.05	12.5%	

BT-10 Perfluorinated Alkyl Substances (PFASs)					
Year	2012	Number of Rounds / Year	1	Number of Materials	3
Distribution	August				

Introduction

This study will be organised in collaboration with the Institute for Environmental Studies (IVM) – VU. The study covers the determination of Perfluorinated Alkyl Substances (PFASs) in food and environmental samples. We ask analysis on **at least PFOS and PFOA** in the samples. In addition, laboratories may wish to analyse and submit data on other perfluorocarboxylic acids (PFCAs), perfluorinated sulfonates (PFSAs), (substituted) perfluoroalkyl sulphonamide (e.g. PFOSA) and others.

Test Materials

The test materials come in two packages.:

Package 1. Environmental biota samples containing,

- *2 Fish muscle samples.* Approx. 65 gram fish muscle tissue. The homogenised tissue will be provided in a glass jar. The material has been sterilised. Targeted concentration range: 0-100 ng/g.
- *Standard solution.* An ampoule with a standard solution containing 17 PFCs

Package 2. Food and Beverage samples containing:

- The content of this package will be communicated in a later stage, as well as the price of package 2

Both Packages can be ordered with Quasimeme.

We aim at providing naturally contaminated samples (i.e. no additional spiking took place in the preparation phase), but additional spiking may be needed. The samples will be sent to the laboratories by courier. Detailed instructions on how to store and treat the samples and how to report the data will be sent with the sample shipment.

Determinands and concentration ranges

The PFASs can to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit		Error		AA-EQS
			Const	Prop	
PFBA	ng/kg		0.05	12.5%	
PFPeA	ng/kg		0.05	12.5%	
PFHxA	ng/kg		0.05	12.5%	
PFHpA	ng/kg		0.05	12.5%	
PFOA	ng/kg		0.05	12.5%	
PFNA	ng/kg		0.05	12.5%	
PFDA	ng/kg		0.05	12.5%	
PFUnA	ng/kg	0.001—1	0.05	12.5%	
PFDoA	ng/kg	0.001—0.1	0.05	12.5%	
PFTTrA	ng/kg	0.01—0.1	0.05	12.5%	
PFTeA	ng/kg		0.05	12.5%	
L-PFBS**	ng/kg		0.05	12.5%	
L-PFHxS**	ng/kg		0.05	12.5%	
L-PFHps**	ng/kg		0.05	12.5%	

MS-1 Trace Metals in Sediment					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of metals, total organic carbon (TOC) and carbonate in marine sediments.

Test Materials

The test materials cover a range of natural sediments from contaminated waters from the North Sea and/or Mediterranean. Each batch of material is prepared in bulk. The level of within and between sample homogeneity for the sediment is determined. All materials show to be homogeneous and stable for the purpose of the test.

Determinands and concentration ranges

The metals to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

For aluminium a total method of analysis should be used. For other elements you can use your method of choice, keeping in mind that for some elements in some samples the total method can result in a somewhat higher result compared to a partial method.

Determinand	Unit	Concentration range	Error		AA-EQS
		Sediment	Const	Prop	
Aluminium-AE	%	1–10	0.1	12.5%	
Aluminium-RT	%	1–10	0.1	12.5%	
Arsenic-AE	mg/kg	2–50	1	12.5%	
Arsenic-RT	mg/kg	2–50	1	12.5%	
Cadmium-AE	µg/kg	10–2000	20	12.5%	
Cadmium-RT	µg/kg	10–2000	20	12.5%	
Chromium-AE	mg/kg	10–1000	2	12.5%	
Chromium-RT	mg/kg	10–1000	2	12.5%	
Copper-AE	mg/kg	1–500	1	12.5%	
Copper-RT	mg/kg	1–500	1	12.5%	
Iron-AE	%	0.5–10	0.1	12.5%	
Iron-RT	%	0.5–10	0.1	12.5%	
Lead-AE	mg/kg	5–500	2	12.5%	
Lead-RT	mg/kg	5–500	2	12.5%	
Lithium-AE	mg/kg	10–100	0.1	12.5%	
Lithium-RT	mg/kg	10–100	0.1	12.5%	
Manganese-AE	mg/kg	100–2000	0.1	12.5%	
Manganese-RT	mg/kg	100–2000	0.1	12.5%	
Mercury-AE	µg/kg	50–2500	10	12.5%	
Mercury-RT	µg/kg	50–2500	10	12.5%	
Nickel-AE	mg/kg	5–100	1	12.5%	
Nickel-RT	mg/kg	5–100	1	12.5%	
Scandium-AE	mg/kg	1–20	0.1	12.5%	
Scandium-RT	mg/kg	1–20	0.1	12.5%	
Zinc-AE	mg/kg	20–1500	2.5	12.5%	
Zinc-RT	mg/kg	20–1500	2.5	12.5%	
TOC	%	0.2–10	0.1	12.5%	
Inorganic-carbonate	%	0.05–10	0.05	12.5%	

Determinands in bold are in the scope of the accreditation

*RT = Real Total destructions e.g. HF-destruction, röntgen-diffraction and neutron activation
 AE= Acid extractable and all other methods*

MS-2 Chlorinated Organics in Sediment					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of poly chlorinated biphenyls (PCB's), organochlorine pesticides (OCP's) and total organic carbon (TOC) in marine sediment.

Test Materials

The test materials cover a range of natural sediments from contaminated waters from the North Sea and/or Mediterranean. Each batch of material is prepared in bulk. The level of within and between sample homogeneity for the sediment is determined. All materials show to be homogeneous and stable for the purpose of the test.

Determinands and Concentration Ranges

The organochlorines to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Sediment	Const	Prop	
PCB28	µg/kg	0.1—50	0.025	12.5%	
PCB31	µg/kg	0.1—50	0.025	12.5%	
PCB52	µg/kg	0.1—50	0.025	12.5%	
PCB101	µg/kg	0.2—50	0.025	12.5%	
PCB105	µg/kg	0.1—10	0.025	12.5%	
PCB118	µg/kg	0.1—50	0.025	12.5%	
PCB138+PCB163	µg/kg	0.2—50	0.025	12.5%	
PCB138	µg/kg	0.2—50	0.025	12.5%	
PCB153	µg/kg	0.2—50	0.025	12.5%	
PCB156	µg/kg	0.05—5	0.025	12.5%	
PCB180	µg/kg	0.1—50	0.025	12.5%	
α-HCH	µg/kg	0.02—1	0.02	12.5%	
β-HCH	µg/kg	0.05—2	0.025	12.5%	
γ-HCH	µg/kg	0.05—2	0.025	12.5%	
δ-HCH	µg/kg	0.05—2	0.025	12.5%	
HCB	µg/kg	0.05—20	0.025	12.5%	
HCBD	µg/kg	0.1—10	0.025	12.5%	
Dieldrin	µg/kg	0.1—10	0.025	12.5%	
pp'-DDD	µg/kg	0.1—20	0.025	12.5%	
pp'-DDE	µg/kg	0.1—10	0.025	12.5%	
op'-DDT	µg/kg	0.02—5	0.025	12.5%	
pp'-DDT	µg/kg	0.1—10	0.025	12.5%	
Transnonachlor	µg/kg	0.01—2	0.025	12.5%	
TOC	%	0.2—10	0.02	12.5%	

Determinands in bold are in the scope of the accreditation

MS-3 Polycyclic Aromatic Hydrocarbons in Sediment					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of Polycyclic Aromatic Hydrocarbons (PAHs) and total organic carbon (TOC) in marine sediment.

Test Materials

The test materials cover a range of natural sediments from contaminated waters from the North Sea and/or Mediterranean. Each batch of material is prepared in bulk. The level of within and between sample homogeneity for the sediment is determined. All materials show to be homogeneous and stable for the purpose of the test.

Determinands and Concentration Ranges

The PAH's to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Sediment	Const	Prop	
Acenaphthene	µg/kg	2–500	0.1	12.5%	
Acenaphthylene	µg/kg	2–100	0.2	12.5%	
Anthracene	µg/kg	2–500	0.1	12.5%	
Benzo[a]anthracene	µg/kg	10–1500	0.1	12.5%	
Benzo[a]fluorene	µg/kg	10–1000	0.5	12.5%	
Benzo[a]pyrene	µg/kg	10–1500	0.1	12.5%	
Benzo[b]fluoranthene	µg/kg	10–1500	0.5	12.5%	
Benzo[k]fluoranthene	µg/kg	10–1000	0.1	12.5%	
Benzo[e]pyrene	µg/kg	10–1500	0.2	12.5%	
Benzo[g,h,i]perylene	µg/kg	10–1500	0.2	12.5%	
Chrysene	µg/kg	10–1500	0.2	12.5%	
Chrysene+Triphenylene	µg/kg	10–3000	0.2	12.5%	
Triphenylene	µg/kg	20–3000	0.5	12.5%	
Dibenz[a,h]anthracene	µg/kg	5–500	0.05	12.5%	
Dibenzo[a,i]pyrene	µg/kg		0.5	12.5%	
Dibenzothiophene	µg/kg	2–200	0.1	12.5%	
Fluoranthene	µg/kg	20–3000	0.2	12.5%	
Fluorene	µg/kg	2–300	0.1	12.5%	
Indeno[1,2,3-cd]pyrene	µg/kg	10–1500	0.2	12.5%	
Naphthalene	µg/kg	10–1500	0.5	12.5%	
1-methyl naphthalene	µg/kg		0.2	12.5%	
2-methyl naphthalene	µg/kg		0.2	12.5%	
2-methyl anthracene	µg/kg		0.2	12.5%	
Perylene	µg/kg	10–500	0.2	12.5%	
Phenanthrene	µg/kg	10–2000	0.5	12.5%	
2-Methylphenanthrene	µg/kg	5–1000	0.5	12.5%	
3,6-Dimethylphenanthrene	µg/kg	1–500	0.5	12.5%	
Pyrene	µg/kg	10–3000	0.2	12.5%	
1-Methylpyrene	µg/kg	2–500	0.5	12.5%	
TOC	%	0.2–10	0.02	12.5%	
C1-phenanthrenes/anthracenes	µg/kg		0.5	12.5%	
C2-phenanthrenes/anthracenes	µg/kg		0.5	12.5%	
C3-phenanthrenes/anthracenes	µg/kg		0.5	12.5%	
C1-pyrenes/fluoranthenes	µg/kg		0.5	12.5%	
C2-pyrenes/fluoranthenes	µg/kg		0.5	12.5%	

C1-chrysenes	µg/kg		0.5	12.5%	
C2-chrysenes	µg/kg		0.5	12.5%	
C1-benzofluoranthenes	µg/kg		0.5	12.5%	

Determinands in bold are in the scope of the accreditation

MS-6 Organotins in Sediment					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	January, August				

Introduction

This study covers the determination of organotin compounds in marine sediment.

Test Materials

The test materials cover a range of natural sediments from contaminated waters from the North Sea and/or Mediterranean. Each batch of material is prepared in bulk. The level of within and between sample homogeneity for the sediment is determined. All materials show to be homogeneous and stable for the purpose of the test.

Determinands and Concentration Ranges

The organotin compounds to be determined are given in the table below.

The table also shows:

- the expected concentration range for the determinands in the spiked test materials
- the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Sediment	Const	Prop	
Tributyltin(TBT)	µg Sn/kg	1—5000	0.1	12.5%	
Dibutyltin(DBT)	µg Sn/kg	1—5000	0.1	12.5%	
Monobutyltin(MBT)	µg Sn/kg	1—5000	0.1	12.5%	
Triphenyltin(TPT)	µg Sn/kg	0.1—200	0.1	12.5%	
Diphenyltin(DPT)	µg Sn/kg	0.1—200	0.1	12.5%	
Monophenyltin(MPT)	µg Sn/kg	0.1—200	0.1	12.5%	

Determinands in bold are in the scope of the accreditation

MS-7 Brominated Flame Retardants in Sediment					
Year	2012	Number of Rounds / Year	1	Number of Materials	2
Distribution	August				

Introduction

This study covers the determination of brominated flame retardants (BFR's) in sediment.

Test Materials

The test materials cover a range of natural unspiked sediments from contaminated waters from the North Sea and/or Mediterranean.

Sediments are dried and sieved to <0.5 mm before sub-sampling into glass jars for distribution.

Sediment test materials have been shown to be stable over a number of years when stored at room temperature.

Determinands and concentration ranges

The BFR's to be determined are given in the table below. The table also shows:

- the expected concentration range for the determinands in the test materials
- the constant and proportional error that will be used for assessment of the results.

Where available the AA-EQS (EU-WFD) is given.

Determinand	Unit	Concentration range	Error		AA-EQS
		Sediment	Const	Prop	
BDE28	µg/kg	0.01—2	0.05	12.5%	
BDE47	µg/kg	0.1—20	0.05	12.5%	
BDE66	µg/kg	0.01—10	0.05	12.5%	
BDE85	µg/kg	0.01—10	0.05	12.5%	
BDE99	µg/kg	0.1—50	0.05	12.5%	
BDE100	µg/kg	0.01—10	0.05	12.5%	
BDE153	µg/kg	0.1—5	0.05	12.5%	
BDE154	µg/kg	0.01—5	0.05	12.5%	
BDE183	µg/kg	0.1—2	0.05	12.5%	
BDE209	µg/kg	20—200	0.05	12.5%	
TBBP-A	µg/kg		0.05	12.5%	
Dimethyl-TBBP-A	µg/kg		0.05	12.5%	
a-HBCD	µg/kg		0.05	12.5%	
b-HBCD	µg/kg		0.05	12.5%	
g-HBCD	µg/kg		0.05	12.5%	
Total-HBCD	µg/kg	50—200	0.05	12.5%	

BT-7 ASP Shellfish Toxins					
Year	2012	Number of Rounds / Year	2	Number of Materials	2
Distribution	April, October				

Introduction

This study covers the determination of the amnesic shellfish toxins (ASP) in shellfish tissue test materials.

Test Materials

The supplied test materials consist of a standard solution and shellfish tissues, sufficient for one-shot analysis. Each batch of test materials is prepared in bulk, dispensed in 7mL plastic vials and frozen at -20°C.

The level of within and between sample homogeneity and stability is determined. All materials show to be homogeneous and stable for the purpose of the study.

Determinands and concentration ranges

The toxins to be determined are given in the table below.

The table also shows the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration Range	Error		AA-EQS
		Shellfish Tissue	Const	Prop	
Domoic+Epidoic	mg/kg		0.1	12.5%	

DE-10 DSP Shellfish Toxins					
Year	2012	Number of Rounds / Year	2	Number of Materials	4
Distribution	April, October				

Introduction

This study covers the determination of the diarrhetic shellfish toxins (DSP) in shellfish tissue test materials.

Test Materials

The supplied test materials can consist of standard solutions, shellfish tissues and shellfish tissue extracts sufficient for one-shot analysis. Each batch of test materials is prepared in bulk, dispensed in 7 mL plastic vials and frozen at -20°C. The level of within and between sample homogeneity and stability is determined. All materials show to be homogeneous and stable for the purpose of the study.

Determinands and concentration ranges

The Toxins to be determined are given in the table below.

The table also shows the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration range	Error		AA-EQS
			Const	Prop	
Free-Okadaic-Acid	µg/kg		0.1	12.5%	
Free-DTX1	µg/kg		0.1	12.5%	
Free-DTX2	µg/kg		0.1	12.5%	
Total-Free-OA+DTX1+DTX2	µg/kg		0.1	12.5%	
Total-Okadaic-Acid	µg/kg		0.1	12.5%	
Total-DTX1	µg/kg		0.1	12.5%	
Total-DTX2	µg/kg		0.1	12.5%	
Total-hy-OA+DTX1+DTX2	µg/kg		0.1	12.5%	
AZA-1	µg/kg		0.1	12.5%	
AZA-2	µg/kg		0.1	12.5%	
AZA-3	µg/kg		0.1	12.5%	
AZA-total	µg/kg		0.1	12.5%	
Free-Okadaic-Acid TEQ	TEQ		0.1	12.5%	
Free-DTX1 TEQ	TEQ		0.1	12.5%	
Free-DTX2 TEQ	TEQ		0.1	12.5%	
Total-Free-OA+DTX1+DTX2 TEQ	TEQ		0.1	12.5%	
Total-Okadaic-Acid TEQ	TEQ		0.1	12.5%	
Total-DTX1 TEQ	TEQ		0.1	12.5%	
Total-DTX2 TEQ	TEQ		0.1	12.5%	
Total-hy-OA+DTX1+DTX2 TEQ	TEQ		0.1	12.5%	
AZA-1 TEQ	TEQ		0.1	12.5%	
AZA-2 TEQ	TEQ		0.1	12.5%	
AZA-3 TEQ	TEQ		0.1	12.5%	
AZA-total TEQ	TEQ		0.1	12.5%	

DE-14 PSP Shellfish Toxins					
Year	2012	Number of Rounds / Year	1	Number of Materials	4
Distribution	April				

Introduction

This study covers the determination of the paralytic shellfish toxins (PSP) in shellfish tissue test materials.

Test Materials

The supplied test materials can consist of standard solutions, shellfish tissues and shellfish tissue extracts sufficient for one-shot analysis. Each batch of test materials is prepared in bulk, dispensed in vials and frozen at -20°C. The level of within and between sample homogeneity and stability is determined. All materials show to be homogeneous and stable for the purpose of the study.

Determinands and concentration ranges

The Toxins to be determined are given in the table below.

The table also shows the constant and proportional error that will be used for assessment of the results.

Determinand	Unit	Concentration range	Error		AA-EQS
			Const	Prop	
STX	µg/kg		0.1	12.5%	
NEO	µg/kg		0.1	12.5%	
GTX1	µg/kg		0.1	12.5%	
GTX2	µg/kg		0.1	12.5%	
GTX3	µg/kg		0.1	12.5%	
GTX4	µg/kg		0.1	12.5%	
GTX5	µg/kg		0.1	12.5%	
GTX-6	µg/kg		0.1	12.5%	
C1	µg/kg		0.1	12.5%	
C3	µg/kg		0.1	12.5%	
C2	µg/kg		0.1	12.5%	
C4	µg/kg		0.1	12.5%	
dc-STX	µg/kg		0.1	12.5%	
dc-NEO	µg/kg		0.1	12.5%	
dc-GTX2	µg/kg		0.1	12.5%	
dc-GTX3	µg/kg		0.1	12.5%	
dc-GTX1	µg/kg		0.1	12.5%	
dc-GTX4	µg/kg		0.1	12.5%	
11-OH-STX	µg/kg		0.1	12.5%	
Total STX-equiv	µg/kg		2	12.5%	

DE-15 Chlorinated Paraffins in Biota					
Year	2012	Number of Rounds / Year	1	Number of Materials	3
Distribution	August				

Introduction

This study is coordinated by Ms. Ike van der Veen ike.van.der.veen@ivm.vu.nl and Prof.dr. Jacob de Boer, IVM, VU University, Amsterdam, The Netherlands. Please visit the Quasimeme website under Workshop/Studies/Conferences or use control and right-hand mouse on this [link](#) (if reading digital) for more information. The study began in 2010 but participation is available. Please see the timetable in the attached document. For subscribing to this study please contact the above named persons only.

Chlorinated paraffins (CPs), also known as Polychlorinated alkanes (PCAs), are complex mixtures of chlorinated n-alkanes with carbon chain lengths of 10 to 30 and a chlorination degree between 30% and 70% by mass. CPs are used in several industrial applications like flame-retardants in the rubber industry, as high temperature lubricants and cutting fluids in the metalworking industry and as additives in liquids, in paints and textile.

More specific information to follow will be available on our webpage.

Annex 1 Organisation and Structure QUASIMEME

The WEPAL/QUASIMEME staff

The QUASIMEME Project Office at FRS Marine Laboratory, Aberdeen, United Kingdom was established for the EU funded project, QUASIMEME I (1992-1996), and continued to operate as the project co-ordination centre for QUASIMEME from 1996 to 2005, when co-ordination of the project transferred to Wageningen University and Research Centre. A small team was responsible for the QUASIMEME LP studies at Wageningen University and Research Centre from 2005 to January 2012. From 1st of January 2012 onwards, QUASIMEME will be part of WEPAL (Wageningen Evaluating Programs for Analytical Laboratories). Roles and responsibilities of the WEPAL/QUASIMEME team are outlined in the table below. The contact details for the QUASIMEME Project Office are given on the first page of this document.

Name	Role	Responsibilities
Bram Eijgenraam	Manager WEPAL/QUASIMEME	Manager of the WEPAL/QUASIMEME team Data assessment and statistics WEPAL
Wim Cofino	Project advisor	Scientific responsibility of the QUASIMEME Laboratory Performance studies. Chairman of the Scientific Assessment Group Statistics QUASIMEME
Steven Crum	Project coordinator QUASIMEME	Coordination and organisation of the QUASIMEME Laboratory Performance studies Preparation of Aquatic test materials Homogeneity and stability testing Aquatic samples Test material dispatch QUASIMEME Data assessment and statistics QUASIMEME Dispatch of QUASIMEME samples
Steven Tito	Quality Assurance Officer	Quality Assurance
Ann-Marie Ryan	Project Administrator QUASIMEME	Front Office Maintenance of the QUASIMEME database and subscriptions Processing of submitted data QUASIMEME Secretariat to the QUASIMEME Scientific Assessment Group and Advisory Board. QUASIMEME finances Help desk QUASIMEME
Minke van Veldhuizen	Project assistant	WEPAL finances WEPAL secretariat and subscription Help desk WEPAL
Arrienne Matser	Project assistant	Preparation of aquatic test materials
Peter Pellen	Project assistant	Preparation of test materials Processing of submitted data WEPAL Dispatch of samples
Arie Brader	Project assistant	Preparation of test materials

The QUASIMEME Scientific Assessment Group

The QUASIMEME Scientific Assessment Group (SAG) gives advice on the implementation of the scientific programme to the QUASIMEME Project Office and oversees the data assessments and reports on the results of the Laboratory Performance (LP) studies.

The QUASIMEME Project Advisor appoints the members of the SAG, which consist of experts in the field of QA and the assessment of LP studies. The members have experience in the design and operation of LP studies and / or environmental measurements in matrices related to the marine environment. The QUASIMEME Project Advisor is the chairman of the SAG.

Membership of the SAG is confirmed annually. The membership of the SAG will be sufficient in number and breadth of experience to adequately cover the areas included in the QUASIMEME LP studies. Therefore, the size of this group may change in accordance with the needs of the LP studies.

The SAG may recommend specialists to the QUASIMEME Project Advisor to be invited to contribute to specific QUASIMEME activities as required. The contact details for members of the SAG are given following this section.

Terms of Reference of the QUASIMEME SAG were agreed at the annual SAG meeting, 24 - 25 June 1999, and are confirmed annually at SAG meetings.

The SAG will meet at least annually to advise and assist the QUASIMEME Project Office on:

1. The design of the QUASIMEME LP studies and provision of test materials and protocols.
2. The assessment of the LP studies and study reports.
3. The preparation of documentation, both printed and electronic.
4. The preparation of a progress report to the QUASIMEME Advisory Board which will include:
 - An executive summary of the LP studies for the current year.
 - Recommendations of changes in structure or content of the LP studies.
 - A proposed work programme for future LP studies.
 - After presentation to the Advisory Board, a progress report will be published.
5. The SAG will review and make recommendations to the QUASIMEME Project Office on the composition and breadth of expertise which is required to maintain the objective assessment of the programme and the results of the participants' studies.

Membership of the QUASIMEME Scientific Assessment Group		
Name	Address	Tel / Fax / E-mail
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The QUASIMEME Advisory Board

The QUASIMEME Laboratory Performance (LP) studies will have an Advisory Board to advise the Project Office and the Scientific Assessment Group on matters relating to external quality assessment in support of environmental measurements related to the marine environment.

QUASIMEME Advisory Board will consist of representatives from organisations to which QUASIMEME participants submit environmental monitoring data:

1. A representative from the Oslo and Paris Commission (OSPAR) to maintain communication with OSPAR, particularly in relation to the QA requirements of the Joint Assessment and Monitoring Programme (JAMP).
2. A representative to maintain communication with the Helsinki Commission (HELCOM), particularly in relation to the QA requirements of the Baltic Monitoring Programme (BMP) and the Coastal Monitoring Programme (CMP).
3. A representative to maintain communication with the International Council for the Exploration of the Sea (ICES).
4. A representative to maintain communication with the Mediterranean Pollution Programme (MEDPOL).
5. A representative of the QUASIMEME Scientific Assessment Group (if not represented by any other member of the Advisory Board).
6. Representatives of national monitoring programmes. Two representatives from national monitoring programmes will be invited based on the national levels of participation in QUASIMEME. Representatives of other national monitoring programmes may request to attend.
7. The QUASIMEME Project Advisor.
8. A representative to maintain communication with the European Environmental Agency.
9. A representative to maintain communication with the Arctic Monitoring and Assessment Programme (AMAP).

The organisations represented will be responsible for nominating their member of the QUASIMEME Advisory Board. The membership of the QUASIMEME Advisory Board is given following this section.

The membership and terms of reference of the Advisory Board were reviewed and revised by the QUASIMEME Scientific Assessment Group, 24 - 25 June 1999, and agreed by the QUASIMEME Advisory Board, 10 - 11 October 1999, and are confirmed annually at Advisory Board meetings.

The Advisory Board will meet at least annually to:

1. Advise on matters relating to the Quality Assurance and Quality Control requirements for the national and international marine monitoring programmes and to provide links with these programmes.
2. Provide information and advice on the list of determinands required for the national and international monitoring programmes, the matrices and the concentration ranges. Where lists of studies in the current LP studies are being revised, the Board shall indicate the relative priority of the studies to be undertaken.
3. Advise on the level of performance required for specific monitoring programmes in terms of precision and bias for each determinand - matrix combination.
4. Receive and comment on the Progress Report of the QUASIMEME LP studies.
5. Appoint the chairman of the Advisory Board and review the membership of the Advisory Board.
6. Review and revise the terms of reference of the Advisory Board, when necessary.
7. Advise on the management of the QUASIMEME LP studies.
8. Advise QUASIMEME on activities to meet future needs.

Membership of the QUASIMEME Advisory Board		
Name	Address	Tel / Fax / E-mail
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Annex 2 Z-scores

A z-score⁷ is calculated for each participant's data for each matrix / determinand combination which is given an assigned value. The z-score is calculated as follows:

$$\text{z-score} = \frac{\text{Laboratory Result} - \text{Assigned Value}}{\text{Total Error}}$$

It is emphasised that in many interlaboratory studies the between-laboratory standard deviation obtained from the statistical evaluation of the study is used as 'total error' in the formula above. In QUASIMEME the total error is estimated independently taking the needs of present-day international monitoring programme as a starting point. For each determinand in a particular matrix, a proportional error (PE) and a constant error (CE) have been defined. The total error depends on the magnitudes of these errors and on the assigned value:

$$\text{Total Error} = \frac{\text{Assigned Value} \times \text{Proportional Error (\%)}}{100} + 0.5 \times \text{Constant Error}$$

The values for the PE and CE are set by the Scientific Assessment Group and are monitored annually. The values are based on the following criteria:

- Consistency of the required standard of performance to enable participating laboratories to monitor their assessment over time.
- Achievable targets in relation to the current state of the art and the level of performance needed for national and international monitoring programmes.

The assessment is based on ISO 43 as z-scores. The QUASIMEME model is designed to provide a consistent interpretation over the whole range of concentration of analytes provided, including an assessment where Left Censored Values (LCVs) are reported.

The proportional error is set at 6% for nutrients and for standard solutions, and 12.5% for all other matrices. This applies to all determinands. The constant error has been set for each determinand or determinand group (e.g. chlorinated biphenyls). This value was initially set to reflect the limit of determination, but is at present more closely related to the overall laboratory performance. The magnitude of the CE is set to provide a constant assessment in terms of z-score regardless of concentration. Therefore at low concentrations the level of accuracy required to obtain a satisfactory z-score is less stringent than those at high concentrations.

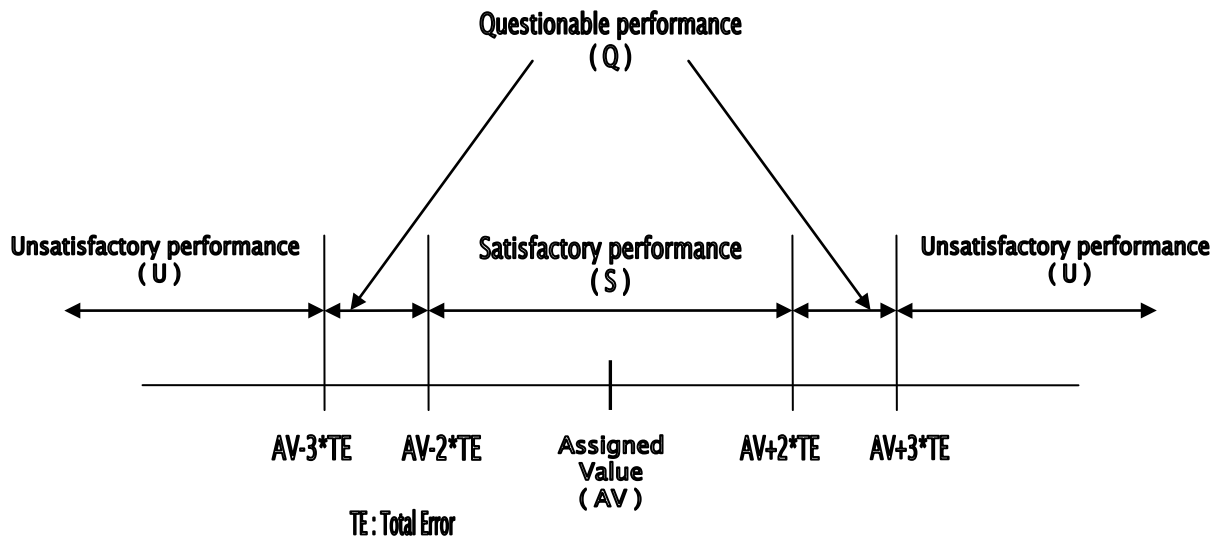
The performance of the laboratories is examined in detail when the total error exceeds 50% of the consensus concentration. If there is good agreement between the laboratories, i.e. the criteria to set an assigned value are met, the CE may be revised to a lower value reflecting the performance of laboratories for this measurement at lower concentrations. These revisions are undertaken at the time of the assessment and ratified by the Scientific Assessment Group. In making any adjustments to the CE an overall assessment of performance at these lower concentrations over a number of different rounds is reviewed. This provides evidence of a long-term trend of improved performance rather than a single set of data. When the agreement is judged to be insufficient, no assigned value is established. In such cases an indicative value is given.

Following usual practices e.g. ISO 43, the z-scores can be interpreted as follows for laboratories which take part in QUASIMEME to assure the quality of their data for use in international marine monitoring programmes:

Z	<2	Satisfactory performance (S)
2<	Z	<3 Questionable performance (Q)
Z	<3	Unsatisfactory performance (U)

⁷ International Harmonized Protocol for Proficiency Testing of (Chemical) Analytical Laboratories. M Thompson, R Wood, Journal of AOAC International Vol. 76, No. 4, 1993

The following figure illustrates the interpretation of the z-scores:



$|z| > 6$ frequently points to gross errors (mistakes with units during reporting, calculation or dilution errors, and so on).

It is not possible to calculate a z-score for left censored values (LCV's). QUASIMEME provides a simple quality criterion:

$LCV/2 < (\text{concentration corresponding to } |z|=3)$: LCV consistent (C) with assigned value

$LCV/2 > (\text{concentration corresponding to } |z|=3)$: LCV inconsistent (I) with assigned value, i.e. LCV reported by laboratory much higher than numerical values reported by other laboratories.

Annex 3 List of Abbreviations

BDE	Brominated diphenylether
PCB	Poly Chlorinated Biphenyl
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DOC	Dissolved Organic Carbon
EQS	Environmental Quality Standard
HBCD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HCBD	Hexachlorobutadiene
HCH	Hexachlorocyclohexane
HpCDD	Heptachlorodibenzodioxin
HpCDF	Heptachlorodibenzofuran
HxCDD	Hexachlorodibenzodioxin
HxCDF	Hexachlorodibenzofuran
OCDD	Octachlorodibenzodioxin
OCDF	Octachlorodibenzofuran
PAHs	Polycyclic aromatic hydrocarbons
PeCDD	Pentachlorodibenzodioxin
PeCDF	Pentachlorodibenzofuran
TBBP-A	Tetrabromobisphenol-A
TCB	Trichlorobenzene
TCDD	Tetrachlorodibenzodioxin
TCDF	Tetrachlorodibenzofuran
TEQ	Toxic equivalent
TOC	Total organic carbon

Annex 4 Application Form

QUASIMEME welcomes subscribers at any time during the year. However, to ensure on time delivery please return your application form before dispatch dates listed on page 6 of our Brochure to:

QUASIMEME Laboratory Performance Studies
 Wageningen UR, Alterra DLO
 P.O. Box 47
 6700 AA Wageningen, The Netherlands
 Phone: +31 (0) 317 48 65 46 (Direct Line)
 Fax: +31 (0) 317 41 90 00
 e-mail: Quasimeme@wur.nl

Please type or print the information requested below. An electronic version of this form is available on the QUASIMEME website or by e-mail from the QUASIMEME Project Office.

Group	* Round	Round	Group	Round	Round	Extra Test Material
AQ-1			BT-1			
AQ-2			BT-2			
AQ-3			BT-3			
AQ-4			BT-4			
AQ-5			BT-7			
AQ-6			BT-8			
AQ-7			BT-9			
AQ-8			BT-10			
AQ-11						
AQ-12						
AQ-13			DE-10			
AQ-14			DE-14			
MS-1						
MS-2						
MS-3						
MS-6						
MS-7						
Total number of groups ordered						
Handling fee					€50	
Total					€	

Each exercise has 2 rounds (see [Brochure](#) for exercises running) each year. If you wish to participate in 1 round of an exercise please enter which round in the boxes provided. If you are unsure how to complete this form please contact the QPO for confirmation to avoid surplus ordering as we are unable to accept returned samples.

I wish to participate in the QUASIMEME Laboratory Performance Studies as indicated above. I agree to the conditions as given in the Quasimeme brochure.

Yes, I wish to be a permanent member of Quasimeme For benefits see our brochure page 8

Contact name for invoice	
QUASIMEME Laboratory code (if applicable)	
Institute	

Address			
Town / City	Region / State		
Country			
Telephone number	Fax number		
E-mail address			
VAT no ⁸ .			
Your reference or purchase order number			
Signature:			
Date:			

Delivery address for the test materials and reports, if different from previous page:

Contact name for delivery of test materials and reports if different from above	
Test material groups	
QUASIMEME Laboratory code (if applicable)	
Institute	
Address	
Town / City	
Region / State	
Country	
Telephone number	
Fax number	
E-mail address	

Contact name for delivery of test materials and reports if being shipped to a Sponsor	
Test material groups	
QUASIMEME Laboratory code (if applicable)	
Institute	

⁸The VAT number must be entered for all (non Dutch) EU institutes to avoid VAT being added.

Street / PO Box no.	
Town / City	
Region / State	
Country	
Telephone number	
Fax number	
E-mail address	

Additional contact names for the QUASIMEME newsletter.

Contact name	E-mail address