

Reports on tasks for scientific cooperation

Report of experts participating in Task 3.2.13

October 2003

Assessment of the dietary exposure to organotin compounds of the population of the EU Member States

Directorate-General Health and Consumer Protection

INDEX

1 GENERAL PART	7
1.1 FOREWORD	8
1.2 SUMMARY	9
1.3 GLOSSARY	11
1.4 ABBREVIATION CODES FOR PARTICIPATING COUNTRIES	12
1.5 LIST OF PARTICIPANTS	13
1.6 INTRODUCTION	16
1.7 BACKGROUND ON ORGANOTIN COMPOUNDS	16
1.8 REFERENCES	18
1.9 ACTIVITY OF THE TASK	19
1.9.1 Background	19
1.9.2 Objective	19
1.9.3 Nature of the co-operation, resources and expertise required	19
1.10 QUESTIONNAIRE FOR DATA COLLECTION	20
1.10.1 Form 1 OTC Occurrence Data For Individual Food Samples	20
1.10.2 Form 2: Evidence of Analytical Quality Assurance	20
1.10.3 Form 3: Food Consumption data	20
1.10.4 Form 4: Dietary intakes	21
1.10.5 Table A Subgroups for fishery products	22
2 OVERVIEW OF SUBMITTED DATA: STATISTICS, SUMMARIZING TABLES AND DISCUSSION	24
2.1 OCCURRENCE DATA	25
2.1.1 Statistics	25
2.1.2 Summarizing Tables	26

Table 1. Submission of occurrence data on OTC .Distribution of the species in groups and correlation with submitting contry	28
2.1.2.1 OTC occurrence/food groups vs. submitting countries	31
Tables 2-7. Range of occurrence data on OTC.Distrubution of the species in groups and correlation with submitting country	33
Table 8. Fresh Molluscs and mussels	41
Table 9. Fresh Crustaceans	41
Table 10. Fresh Fish Marine waters	42
Table 11. Fresh Fish/Fresh Water (lake, Farm)	42
Table 12. Fresh Fish/Fresh Water (inland waterways, harbours, brackish)	43
Table 13. Fully preserved canned or fermented fish and fish products + semipreserved fish and fish products, including MCE	43
2.1.3 Discussion	41
2.1.3.1 Ranges of occurrence data vs food groups:	41
2.1.3.2 Origin and Quality of the Occurrence data	44
2.2 FOOD CONSUMPTION DATA	45
2.2.1 Statistics and Summarizing Tables	45
Table 14. Synoptic table for submitted food consumption data	45
2.2.2 Discussion	46
2.2.2.1 Food Consumption data for Food Species	46
2.2.2.2 Food Consumption data for Food Groups	46
2.2.2.3 Type of Survey to collect food consumption data	47
Table15. “Type of Survey used to collect food consumption data”	48
2.3 DIETARY INTAKE DATA	49
2.3.1 Statistics and general overview	49
2.3.2 Summarizing Tables	51
Table 16. Synoptic table for submitted otc intake data	49
Table 17. Fish food groups used to present daily intake data on OTC	53
Tables 18-41. Daily intake/body weight for OTC	55
2.3.3 Discussion	80
2.3.3.1 Overview	80

2.3.3.2 Population (Mean and High Level)	80
2.3.3.3 Consumers only (mean and high levels)	82
2.3.3.4 Other studies of intake	83
2.3.3.4.1 Children:	83
2.3.3.4.2 Coastal population from Norway	84
2.3.3.4.3 Other Otc	84
Tables 42-43. Intake estimation for children	85
Table 44. Intake estimation foer coastal municipalities	87
3 CONCLUSIONS	88
3.1 OCCURENCE	89
3.1.1 Analytical Quality Assurance	89
3.1.2 Origin of the occurrence data	90
3.2 FOOD CONSUMPTION	90
3.3 DIETARY INTAKE	90
3.4 FINAL OBSERVATIONS	91
4. ACKNOWLEDGEMENTS	92
ANNEX 1 SUMMARIES OF SUBMISSIONS	93
1. SUMMARIES OF SUBMITTED OCCURRENCE DATA	94
1.1 Belgium	95
Table 45. BE OCCURRENCE	96
1.2 Denmark	97
Table 46. DK OCCURRENCE	99
1.3 Greece	101
Table 47. HE OCCURRENCE	103
1.4 Germany	104
Table 48. Sample collected year/sample analysed/year	104
Table 49. Evidence for AQA	107
Table 50. DE OCCURRENCE	109

1.5 The Netherlands	113
Table 51. NL OCCURRENCE	115
1.6 France	120
Table 52. FR OCCURRENCE	121
1.7 Italy	124
Table 53. IT OCCURRENCE	126
1.8 Norway	128
Table 54. NO OCCURRENCE	129
2 SUMMARIES OF SUBMITTED FOOD CONSUMPTION DATA	132
2.1 Belgium	133
Table 55. BE – FOOD CONSUMPTION	134
2.2 Germany	135
Table 56. DE – FOOD CONSUMPTION	136
2.3 Denmark	138
Table 57. DK – FOOD CONSUMPTION	139
2.4 France	140
Tables 58-59. FR – FOOD CONSUMPTION	142
2.5 Greece	145
Table 60. HE – FOOD CONSUMPTION	146
2.6 Italy	147
Table 61. IT – FOOD CONSUMPTION	148
2.7 The Netherlands	150
Table 62. NL – FOOD CONSUMPTION	150
2.8 Norway	152
Tables 63-65. NO – FOOD CONSUMPTION	154
3. SUMMARIES OF SUBMITTED INTAKE DATA	160
3.1 Belgium	161
3.2 Denmark	162
Table 66. DK INTAKE	163
3.3 Germany	164
Tables 67-74. DE INTAKE	165

3.4 France	178
3.5 Italy	179
Tables 75-76. IT INTAKE	180
3.6 The Netherlands	182
Tables 77-78. NL INTAKE	183
3.7 Greece	186
Tables 79-80. HE INTAKE	187
3.8 Norway	189
Tables 81-86. NO INTAKE	191
4. ANNEX 2: QUESTIONNAIRE	197
4.1 Questionnaire for data submission	198
4.2 Food Categorisation System	205
4.3 ANNEXES to Questionnaire:	212
5. ANNEX 3: REFERENCES FOR QUESTIONNAIRE	225
5.1 REFERENCES FOR QUESTIONNAIRE	226

1. GENERAL PART

1.1 FOREWORD

According to Council Directive 93/5/EEC "on the assistance to the Commission and cooperation by the Member States in the scientific examination of questions relating to food" Member States of the European Union can cooperate on problems facing the Commission in the area of food. Directive 93/5/EEC also indicates that an inventory of Tasks to be undertaken has to be published as a Commission Decision at least every six months. For each Task, the participating Member States, the Member State which provides coordination and time limit for completion will be indicated. The rationale for each Task is to provide harmonised and reliable information to be used by the Commission for the management of problems related to food.

With this aim the Competent Authorities responsible for Scientific Cooperation in the Member States nominate experts in the specific field of interest that will provide the Coordinator with the information necessary to prepare a final report.

In principle the final report should contain factual information, but it should be underlined that gathering and presenting scientific data, especially deriving from sources of different origin, can require a degree of interpretation by experts and by Coordinator.

It is therefore important to stress that the interpretation and views in the present report are not necessarily those of the participating Member States or those of the European Commission.

1.2 SUMMARY

In the context of the scientific cooperation, the Scoop Task 3.2.13 “Assessment of the dietary exposure to organotin compounds (OTC) of the population of the EU Member States” was set up. The participating countries were Belgium (B), Denmark (DK), France (F), Germany (D), Greece (H), Italy (I), The Netherlands (NL), Norway (NO). Italy was the coordinating country.

The participating countries provided data available at the national level on occurrence of 6 OTC: Tributyltin (TBT), Dibutyltin (DBT), Monobutyltin (MBT), Triphenyltin (TPT), Diphenyl tin (DPT), Monophenyltin (MPT).

Occurrence of OTC was related to marine and fresh water fish, crustaceans, molluscs, processed and canned fish. The analytical quality of the data was guaranteed by the National Experts according to agreed parameters. The amount of the data was very different between the countries, but a general profile can be derived from the provided data. Bivalve molluscs accumulate TBT and derivatives more than the other fish species but also fresh-water fish group represents a source of exposure. Fresh marine fish presents high levels of OTC in liver and lower levels in the flesh. Fresh crustaceans and canned/processed fish groups present the lowest levels of OTC. Less data were available for TPT and derivatives, but their occurrence profile is not significantly different from TBT and derivatives.

Calculations comparing consumption of foods with OTC occurrence levels indicated consumer exposure that ranges from picograms to fraction of micrograms/day/kg body weight. The obtained data have different background and therefore present some uncertainty factors but some evidences have been highlighted a) bivalve molluscs seem to be for the general population the major source of OTC; also marine fish and fresh water fish may contribute to daily intake while crustaceans are a minor source; b) some data for bivalve molluscs in high level consumers account for more than 30% of the ADI

suggested for TBT by CSTE in 1988 (0.25 ug/day/kg bw). Also the cumulative data for both TBT and TPT intake by some coastal populations approximate the above mentioned ADI for TBT and the ADI established by WHO, (1991) for TPT and derivatives (0-0.5 ug/day/kg bw).

1.3 GLOSSARY

AQA	analytical quality assurance;
CRM	certified reference material;
CV-AAS:	cold vapour - atomic absorption spectrometry;
DA:	dry ashing;
ETA-AAS	atomic absorption spectrophotometry electrothermal atomization;
FAAS:	flame - atomic absorption spectrometry;
GC- QFAAS:	gas chromatography-quartz furnace - atomic absorption spectrometry;
GC-FPD:	gas chromatography-flame photometric detection;
GC-MS:	gas-chromatography-mass-spectrometry;
GF-AAS:	graphite furnace - atomic absorption spectrometry;
HG-AAS:	hydride generation - atomic absorption spectrometry;
HPLC:	high performance liquid chromatography;
ICP AES	inductively coupled plasma atomic emission spectrometry;
ICP MS	inductively coupled plasma mass spectrometry;
ICP-AES:	inductively coupled plasma - atomic emission spectrometry;
ICP-MS:	inductively coupled plasma - mass spectroscopy (specify high resolution or quadrupole, I.E. HR-ICP-MS OR Q-ICP-MS);
LE:	liquid extraction;
LOD	limit of detection;
LOQ	limit of quantification;
ME:	microwave extraction;
MS:	mechanically shaken;
NP:	no pre-treatment;
PG:	pressure digestion (includes microwave digestion);
PTDI	provisional tolerance daily intake;
PTWI	provisional tolerance weekly intake;
R:	reflux;
SCF	scientific committee for food;
SCOOP	scientific co-operation on questions relating to food (directive 93/5/EEC);
SE:	soxhlet extraction;
SPE:	solid phase extraction;
SPME:	solid phase micro extraction;
US:	ultrasonically shaken;
VM:	voltammetric methods;
WG:	wet digestion;
OTC:	organotin compounds

1.4 ABBREVIATION CODE OF PARTICIPATING COUNTRIES

COUNTRY	COUNTRY CODE
Belgium	BE
Denmark	DK
France	FR
Germany	DE
Greece	HE
Italy	IT
The Netherlands	NL
Norway	NO

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1.6 INTRODUCTION

The purpose of the present Report is to provide a scientific basis for the evaluation and management of risk to public health arising from dietary exposure to OTC. In particular this requires the identification of the major dietary sources of OTC and the estimation of the average and upper range intakes by both the whole population and the consumers only and by any high risk subgroups for each Member State.

In the context of the Scientific Cooperation a specific Task on OTC was proposed by the Commission to the Member States and the coordination of the task was assigned to Italy, by the Commission Decision 2001/773/EC of 26 October 2001 as updated in Commission Decision 2002/916/EC of 21 November 2002.

The participating countries in this task were: Belgium, Denmark, France, Germany, Greece, Italy, The Netherlands and Norway. The list of participants is reported in the previous paragraph. The United Kingdom withdrew from this Task in May 2002 because they declared not to have data suitable for the purpose of the Task.

1.7 BACKGROUND ON ORGANOTIN COMPOUNDS (OTC)

In this last decade, there is a growing concern on the toxicological and ecotoxicological aspects of organotins. The major uses of organotin for commercial applications are PVC Heat Stabilizers, Biocides, Catalysts and Agrichemicals.

Organotin compounds reach humans primarily through the diet (in particular, fish and fish products). Organotin compounds are widely diffused in the aquatic environment as a result of their use as antifouling agents and as biocides in agricultural practices. The triorganotins (three tin-carbon bonds) are primarily used for antifouling applications, with some use as a wood preservative and as pesticides. The mono- and di- organotin compounds (one and two tin-carbon bonds respectively) are used primarily as PVC stabilisers with a smaller but widespread use as catalyst for certain chemical reactions. Certain mono- and dialkyltins have been approved as PVC stabilizers for food contact (5). Since the 1960s, Triphenyltin (TPT) and tributyltin (TBT) compounds have been used extensively as algicides and molluscicides in antifouling products. Use of triorganotins in

antifouling paints has been restricted in many countries because of their recognized effects on the aquatic ecosystem. Triphenyltin is used as a non-systemic fungicide with mainly protective action (4). Therefore, these chemicals occur mainly in aquatic organisms and intake of seafood may be an important source of human exposure. From a toxicological standpoint, two groups of substances may be recognized, tributyltin and triphenyltin compounds, both with immunotoxic properties. Tributyltin compounds exhibit a strong endocrine disrupting potential in environmental biota as well as in mammals. Phenyltin compounds affect various systems and functions including the reproductive and developmental outcomes.

No official ADI/TDI values are universally agreed for TBT and derivatives. For TBT, the ADI of 1.6 µg/kg/day is the one used in some scientific reports and adopted by the Japanese authorities. According to the opinion of CSTEE (Scientific Committee Toxicity, Ecotoxicity and Environment) expressed in 1998 (1) “ For human risk assessment a lower ADI (0.25 µg/kg/day) is recommended. “¹

For TPT a value of ADI for oral exposure was established by JMPR (FAO/WHO Joint Meeting Pesticide Residues) (2) (3) in 0-0.5 µg/day/kg bw. ²

¹ From CSTEE opinion (reference 1): (... the ADI of 1.6 ug/kg/day is the one adopted by the Japanese authorities. Perhaps a more cautionary level of 0.25 ug/kg/day should be used as the ADI. Such an ADI is recommended by the work of Vos. et al. (6) on the immune system in the rat. The WHO (7) considers that this endpoint is still controversial for human risk assessment. The US EPA in IRIS currently gives a Bench Mark Dose (BMD10) of 0.03 mg/Kg/day based on the work of Vos et al. (6) based on the immunotoxic response in rats; taking a safety factor of 100 this leads to an ADI of 0.30 ug/kg/day. IRIS goes on to state that no information was located regarding toxicity of TBTO in humans following oral exposure. Human data summarised by Boyer (8) suggest that tributyltin oxide is a potent non-allergenic dermal irritant. Indeed the effects of TBT in humans are not well documented, except for induction of apoptosis in granulocytes and human thymocytes. A value for an accurate ADI of TBT for man has not yet been universally agreed. The current acceptable values range from 5.0-0.25 ug/kg/day, (7, 8, 9):”

1.8 REFERENCES

- 1) Opinion on The report by WS Atkins International Ltd (vol. A) "Assessment of the Risks to Health and to the Environment of Tin Organic Compounds in Antifouling Paint and of the Effects of Further Restrictions on their Marketing and Use", opinion expressed at the 6th CSTEE plenary meeting, Brussels, 27 November 1998
http://europa.eu.int/comm/food/fs/sc/sct/outcome_en.html
- 2) Pesticide residues in food -- 1991 Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and a WHO Expert Group on Pesticide Residues. Rome, Food and Agriculture Organization of the United Nations, pp. 57-62 (FAO Plant Production and Protection Paper 111).
- 3) Pesticide residues in food -- 1991, Evaluations 1991 Part II -- Toxicology. Geneva, World Health Organization/PCS 92.52 , 1992, pp. 173-208.
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WHO 1999
- 5) Directive 2001/62/EC and consolidated EEC Directive 2002/72/EC of 15 August 2002 on materials and articles in contact with foodstuffs.
- 6) Vos, J.G.; De Klerk, A. ; Krajnc, E.I ; Van Loveren, H. and Rozing, I. Toxicol. Appl. Pharmacol. 105: 144-155, 1990
- 7) WHO. Environmental Health Criteria 116. Tributyltin Compounds. Genova 1990.
- 8) Boyer, I.J. Toxicology. 55: 253-298,1989
- 9) De Mora, S.J.; Pelletier, E. Environm. Technol. 18 : 1169-1177, 1997

² evaluated as "Fentin compounds"

1.9 ACTIVITY OF THE TASK

1.9.1 Background: The Scoop task 3.2.13 - *Assessment of the dietary exposure to organotin compounds (OTC) of the population of the EU Member States* - was undertaken within the framework of Cooperation by Member States in the scientific examination of questions relating to food (Commission Decision of 94/652/EC). The participating countries were Belgium, Denmark, France, Germany, Greece, Italy, The Netherlands and Norway. Italy was the coordinating country. The United Kingdom withdrew from the Task in May 2002.

1.9.2 Objective: The purpose of the activity was to provide a scientific basis for the evaluation and management of risks to public health arising from dietary exposure to OTC. Therefore, the task was devoted to collect all the available information on the occurrence and dietary intake of OTC in the EU Member States. In particular, this required the identification of the major dietary sources of these compounds and the estimations of the average and upper range intakes by the whole population for each member state. Furthermore, information on the dietary intake of any high risk sub-group would have been desirable.

1.9.3 Nature of the co-operation, resources and expertise required

The participating national institutes aimed to provide the latest national information in accordance with the agreed format. Any relevant information collected over the last five years, i.e. from 1996, was to be included. However, also earlier data were acceptable if others were not available.

The information to be collated should have been primarily concerned with:

- levels of OTC (preferably of specific compounds) in foodstuffs;
- food consumption data at the national level;
- dietary intake and relevant exposure data for OTC at the national level.

1.10 QUESTIONNAIRE FOR DATA COLLECTION

In order to collect the required data, a Questionnaire was developed

The Questionnaire is composed by four different Forms:

Form 1 OTC Occurrence data for individual food samples

Form 2: Evidence of analytical Quality Assurance

Form 3: Food Consumption Data

Form 4: Dietary intakes

and an **Instruction sheet**

A short synthesis of the Questionnaire is presented below, while in Annex 2 to this Report the full Questionnaire is reported.

1.10.1 FORM 1 OTC OCCURRENCE DATA FOR INDIVIDUAL FOOD SAMPLES : It reports information about Organotin compounds (OTCs) detected in individual foodstuffs; the concentration found (in µg/kg) should be provided for each individual food analysed, with the results given as fresh weight. The calculations are referred to the cationic form, in the case of salts. The mean (median if not available) minimum and maximum values could be provided, too. Information is required for each specific organotin compound, but, if available, information on total OTC can be supplied in free sheets or in any other way. To perform unequivocal attribution of the OTC compounds, a list of chemicals name and their CAS numbers has been provided, too. (Annex 2 to this Report) Bearing in mind the possible degradation of the analytes, a particular attention has been posed on the description of the collection and treatment of samples prior to the analysis.

1.10.2 FORM 2: EVIDENCE OF ANALYTICAL QUALITY ASSURANCE: The relevant template reports information about quality assurance of the analytical laboratory for each item included in the occurrence template General information about Method Validation, Accreditation, Proficiency test, use of Certified Reference Materials are collected, too.

1.10.3 FORM 3: FOOD CONSUMPTION DATA :The dedicated Table reports estimates of the food consumption for the food items for which occurrence data are available. The difficulties in obtaining food consumption data which are exactly relevant to the particular food are well known. Therefore, it has been suggested that the experts provide any information that they have available to them on consumption of relevant foods and beverages together with sufficient information to allow the limitations of the data to be assessed. To this aim, a separate sheet (infosheet 02 Food consumption data – Description of survey methods) without a predefinite format has been provided to be filled with relevant information. These data are the necessary tool to perform a comparison between particularly to identify the main dietary sources of organotin compounds in each country. For each of the food items or groups of foods the experts have been required to give:

- the best estimate of the mean consumption (expressed as g/person/day) for the whole population;
- the best estimate of high consumption (95th percentile as a rule, but also 90th or 97.5th percentile can be reported);

In order to organize the collection, main groups of foods have been distinguished, on the basis of the food classification adapted from a CODEX system.

The main groups of food are:

- 1) Dairy products
- 2) Fats and oils, and fat emulsions (type water-in-oil)
- 3) Edible ices, including sherbet and sorbet
- 4) Fruits and vegetables (incl. mushrooms & fungi, roots and tubers, pulses and legumes), and nuts & seeds
- 5) Confectionery
- 6) Cereals and cereal products, incl. flours & starches from roots & tubers, pulses & legumes, excluding Cereals, cereal products
- 7) Bakery wares
- 8) Meat and meat products, including poultry and game
- 9) Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)
- 10) Eggs and egg products
- 11) Sweeteners, including honey
- 12) Salts, spices, soups, sauces, salads, protein products, etc
- 13) Foodstuffs intended for particular nutritional uses
- 14) Beverages, excluding dairy products
- 15) Ready-to-eat savouries
- 16) Composite foods (e.g. casseroles, meat pies) - foods that could not be placed in categories 1-15.

Taking into account the existing information, and thus expecting that the major amount of OTC occurrence data would have been collected for fish, molluscs and similars, further subdivision was made for the group number 9 “Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)”. Table A reports the subgroups for fish foods. The complete classification is reported in Annex 2 to this Report.

1.10.4 FORM 4: DIETARY INTAKES: This form resumes the mean OTC occurrence data from Form 1 and the food consumption data from Form 3. These data shall be properly combined in order to estimate dietary intake for each OTC compound. For occurrence data below the LOD a values of LOD/2 should be used. The procedure used to estimate mean and high level intake should be clearly described in a separate sheet, (infosheet 02 Dietary intakes – *Description of assumptions and calculation criteria*). It has been indicated as particularly helpful if the intake data allow to identify the major food sources of the organotin compounds in the diet. Experts have been also requested to provide estimates of intakes for specific population groups and especially high-risk groups.

1.10.5 TABLE A SUBGROUPS FOR FISHERY PRODUCTS (...extract from food categorisatren)

9 Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)

9.1 Fresh fish and fish products, incl. MCE

9.1.1 Fresh fish Muscle meat of fish

- 9.1.1.1 Muscle meat of wedge sole (*Dicoglossa cuneata*),
- 9.1.1.2 eel (*Anguilla anguilla*)
- 9.1.1.3 spotted seabass (*Dicentrarchus punctatus*)
- 9.1.1.4 horse mackerel or scad (*Trachurus trachurus*)
- 9.1.1.5 grey mullet (*Mugil labrosus labrosus*)
- 9.1.1.6 common two-banded seabream (*Diplodus vulgaris*)
- 9.1.1.7 grunt (*Pomadasys benneti*)
- 9.1.1.8 european pilchard or sardine (*Sardina pilchardus*),
- 9.1.1.9 european anchovy (*Eneraulis encrasicolus*)
- 9.1.1.10 luvar or louvar (*Luvarus imperialis*)
- 9.1.1.11 Anglerfish (*Lophius spp.*)
- 9.1.1.12 atlantic catfish (*Anarhichas lupus*)
- 9.1.1.13 bass (*Dicentratus labrax*)
- 9.1.1.14 blue line (*Molva dipterygia*),
- 9.1.1.15 halibut (*Hippoglossus hippoglossus*),
- 9.1.1.16 little tuna (*Eutyunnus spp.*),
- 9.1.1.17 marlin (*Makaira*),
- 9.1.1.18 pike (*Esox lucius*),
- 9.1.1.19 plain bonito (*Orgynopsis unicolor*),
- 9.1.1.20 poruguese dogfih (*Centroscymnes coelolepis*),
- 9.1.1.21 rays (*raja spp.*),
- 9.1.1.22 redfish (*Sebstes marinus*, *S. mentella* *S. viviparus*),
- 9.1.1.23 sail fish (*Istiophorus platypterus*),
- 9.1.1.24 scabbard fish (*Lepidopus caudatus*, *Aphanopus carbo*),
- 9.1.1.25 shark (all species),
- 9.1.1.26 snake mackerel (*Lepidocybium flavobrunneum*, *Ruvettus pretiosus*, *gempylus serpens*)
- 9.1.1.27 sturgeon (*Acipenser spp.*),
- 9.1.1.28 swordfish (*Xiphias gladius*)
- 9.1.1.29 tuna (*Thunnus spp.*).
- 9.1.1.30 Other (specify species and add lines; please mark with X code, e .g. 9.1.1.30 X1, 9.1.130X2 etc)

9.1.2 Fresh bivalve molluscs

- 9.1.2.1 Mussels
- 9.1.2.2 Oysters

- 9.1.2.3 Clams
- 9.1.2.4 Other(specify species and add lines; please mark with X code e.g. 9.1.2.4X1, 9.1.2.4X2 etc)

9.1.3 *Fresh cephalopodes (with or without viscera)*

- 9.1.3.1 Squid
- 9.1.3.2 Octopus
- 9.1.3.3 Cattle-fish
- 9.1.3.4 Other(specify species and add lines; please mark with X code e.g. 9.1.3.4X1, 9.1.3.4X2 etc)

9.1.4 *Fresh crustaceans.*

- 9.1.4.1 Crab (tested whole, white and brown meat, or just white meat)
- 9.1.4.2 Lobsters (tested whole, white and brown meat, or just white meat)
- 9.1.4.3 Shrimp
- 9.1.4.4 Other(specify species and add lines; please mark with X code e.g. 9.1.4.4X1, 9.1.4.4X2 etc)

9.1.5 *Echinoderm*

9.2 Processed fish and fish products, incl. MCE

- 9.2.1 Frozen fish, fish fillets and fish products, incl. MCE
- 9.2.2 Frozen battered fish, fish fillets and fish products, incl. MCE
- 9.2.3 Frozen minced and creamed fish products, incl. MCE
- 9.2.4 Cooked and/or fried fish and fish products, incl. MCE
- 9.2.4.1 Cooked fish
- 9.2.4.2 Cooked molluscs, crustaceans and echinoderms
- 9.2.4.3 Fried fish and fish products, incl. MCE

9.3 Semi-preserved fish and fish products, incl. MCE

- 9.3.1 Fish and fish products, incl. MCE, marinated and/or in jelly
- 9.3.2 Fish and fish products, incl. MCE, pickled and/or in brine
- 9.3.3 Salmon substitutes, caviar and other fish roe products.
- 9.3.4 Semi-preserved fish and fish products, incl. MCE other than 9.3.1 - 9.3.3

9.4 Fully preserved, Canned or fermented fish and fish products incl. MCE.

- 9.4.1 Fish canned in oil
- 9.4.2 Fish canned in brine
- 9.4.3 Fermented fish

2. OVERVIEW OF SUBMITTED DATA:

**STATISTICS, SUMMARIZING TABLES AND
DISCUSSION**

2.1 OCCURRENCE DATA

2.1.1 STATISTICS

8 Countries submitted data on OTC occurrence in various species of fish, and mollusc groups. United Kingdom went out of the Task in May 2002.

The countries which submitted occurrence data are: Belgium, Denmark, France, Germany, Greece, Italy, The Netherlands, Norway.

The occurrence data sent by the various countries have been summarized in Annex 1 where is reported, for each Country, a brief description of the data and Tables resuming for each detected compound the mean concentrations, the minimum and the maximum detected levels, the year and the number of samples. In the Technical Annex on CD all the raw data are reported, fully traceable with respect to all the necessary details (Analytical Methods, Analytical Quality Assurance, References etc.,)

The comparative examination of the available OTC occurrence data, highlighted the big differences existing in the data send by the 8 Countries; therefore, a comparison between the amount and the type of data send by the Countries would have been difficult without a further grouping of the fish species.

In fact, only for mussels, or more generally for molluscs, OTC data were send by all the 8 Countries, while for the majority of the reported fish species, the data were send by only one Country. (DE) For other common fish species (e.g. eel, cod, crab, flounder, etc.) data were send by 3-4 Countries.

The OTC compounds for which the major number of the participating Countries submitted data are:

ORGANOTIN COMPOUND	ABBREVIATION	CAS NUMBER
Tributyltin	(TBT)	688-73-3
Dibutyltin	(DBT)	1002-53-5
Monobutyltin	(MBT)	78763-54-9
Triphenyltin	(TPT)	5424-25-9
Diphenyltin	(DPT)	1135-99-5
Monophenyltin	(MPT)	1124-19-2

However, it must be said that for TBT and derivatives all the Countries submitted data while data on TPT and derivatives were submitted by 5/8 countries. Data on Tetrabutyltin and Tetraphenyltin were submitted only by Germany and are reported in ANNEX 2 (Table 50, Tables 67-74).

Occurrence data on MOT, (Monoctyltin) DOT, (Dioctyltin) and TOT (Trioctyltin) in fish and fish products were submitted only by Germany, but in limited number of samples and always <LOD. For these reasons these compounds will be no more considered in this Report. On the other hand, Germany itself did not use these data to calculate intake.

2.1.2 SUMMARIZING TABLES

With the unique purpose to describe the submissions for OTC occurrence data, the following re-grouping of the foods have been done:

- 1) Mussels
- 2) Fresh molluscs and bivalve molluscs other than mussels
- 3) Fresh Fish /Marine water
- 4) Fresh Fish /Fresh water(Farm, Lake)
- 5) Fresh Fish/ Fresh water(Inland waterways, harbour, brackish water)
- 6) Fresh crustaceans
- 7) Fresh Cephalopodes
- 8) Semipreserved fish and fish products including Molluscs, Crustaceans Echinoderms (MCE)

- 9) Fully preserved, Canned or fermented fish and fish products including MCE
- 10) Other foods (fish oil, birds etc)

Table 1 "**Submission of occurrence**" data on otc reports all the fishery foods send by the 8 Countries, re- grouped according to the above ten classes and the Country that send data for each group. It must be underlined that the "x" mark in the Table 1 means that a Country send OTC data about the group (at least about one of the species in that class) and not that each Country send OTC data for all the fish species reported in the group.

**TABLE 1 SUBMISSION OF OCCURRENCE DATA ON OTC.
GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY**

FOODS	DE	FR	BE	NO	HE	NL	DK	IT
FRESH MOLLUSCS AND BIVALVE MOLLUSCS OTHER THAN MUSSELS Clams, Cockles, Common whelks, Grooved Carpet shells, Modiola Barbatus, Scallop, Oyster	x	x	x		x	x	x	x
MUSSELS Greenshell mussels, Blue mussels, Mussels	x	x	x	x	x	x	x	x
FRESH CRUSTACEANS Shrimps, lobster, crab, crab hepatopancreas, crab brownmeat	x			x		x	x	x
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike, Bream, White bream, Bream liver, Burbot, Carp, Char Trout, Fresh trout, salmon trout, rainbow trout, Nase, Nile perch, Perch, Pike, Pikeperch, Roach, Rudd, Salmon, salmon filet, Tench, White fish, Zante	x			x		x		x
FRESH CEPHALOPODES Octopus, sepia	x				x			
FRESH FISH/ MARINE WATER Bass, sea bass, Black goby, Boyer's sand smelt, Bream, sea bream, gethead bream, Cardinal fish, Coal fish, Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver, Flounder, flounder liver and muscle, Goatfish, Gopes, Halibut greenland halibut, halibut filet, Grey mullet, mullet, Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish, Sardine, Sole, Sprat, Tuna, Whiting	x		x	x		x	x	x
FULLY PRESERVED, CANNED OR FERMENTED FISH AND FISH PRODUCTS INCL. MCE. Anchovis, Canned fish, Canned Herrings, Canned mackerel, Cod liver canned in oil, Filets of Mackerel, Fried Herrings, Minced salmon in its own juice, Saira in its own juice, Sardines, Sardines in olive oil, Tuna in brine	x				x			

	DE	FR	BE	NO	HE	NL	DK	IT
SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE								
Mixed seafood, Mussels marinated, herring marinated, smoked herring, smoked eel, Smoked salmon	x							
GASTEROPODS			x					
FRESH FISH, FRESH WATER (INLAND HARBOUR, BRACKISH WATER) Barbel, Bream, White bream, Carp, Chub, Eel, salmon trout, Nase, Perch, Pike, Pikeperch, Plaice, Rau, Roach, Salmon, Tench	x							
OTHER								
Oily fish,	x							
Fish oil						x		
BIRDS Mute swan – liver, Eider – liver, Greater black – backed gull – liver							x	

The above Table 1 shows a synoptic view about the situation and the availability of OTC occurrence data, but other topics need to be stressed.

1) *The contribution of each country is very different in the number of the food species for which data were submitted*

Germany submitted occurrence data on 69 species, The Netherlands on 14 species, Denmark on 12 species, Italy on 10 species, Norway on 9 species, Greece on 7 species, Belgium on 5 species, France on 3 species.

2) *For the same species, the amount of occurrence data submitted by the 8 Countries is very different, too.*

The representativity of the occurrence data could be strongly influenced by the amount of samples reported. In fact, when data are not generated during a monitoring programme or in a targeted study, just a high number of spot samples could represent a solid base for representativity, otherwise the amount of detected OTC could be scarcely significant. Except for FR and BE that declared to have few occurrence data, the National Experts considered the presented data as suitable to represent OTC occurrence profile. In some cases (IT, DK) the National Experts marked a part of the presented OTC occurrence data as not representative of the situation of food actually eaten (old data, harbour area, highly industrial region and fish do not destined to be eaten).

3) *For the same fish species, more than a cluster of data was provided by some Countries*

This makes not easy a comparison between the occurrence data from the different Countries. However, a unique figure with a total mean (with minimum and maximum) for each country, preferable for the purpose of this Scoop, is difficult to get in the case of different studies.

4) *Generally, 7/8 Countries did not perform the calculation of the mean of OTC occurrence in the individual fish species that they have submitted.*

- a) when food consumption data were not available at the national level for these species, neither as single species nor in a group (DK,)
- b) when food groups were established at the national level for calculating the dietary intake (DE, HE, NO, IT) or

- c) when data were deemed by the National Experts not representative for intake calculations (BE, DK, FR, IT).

Only NL submitted mean calculations for occurrence for all the samples they submitted, independently from the availability of food consumption data. NO made assumptions for some food groups and, in the meantime presented mean data for some single fish species.

2.1.2.1 OTC occurrence / food groups vs. submitting countries.

On the basis of the above considerations, to describe and to collate occurrence data, summarizing tables are shown; in these tables the ranges of OTC occurrence are correlated to seven food groups (6 fish food + 1 other) and to the submitting country.

The following criteria have been selected to extract and to collect the data from the raw data tables (see Annex on CD-ROM):

- 1) The data have been grouped separately for each OTC, therefore 6 separate Tables (Tables 2-7) have been reported;
- 2) The occurrence data marked by the National Experts as “not representative” have **not** been reported in the Tables 2-7. Therefore, occurrence data for France and Belgium have not been reported at all. In fact the National Experts deemed the whole set of their data “not representative” being not enough in their amounts or being too old to describe the actual situation; so these data will not be discussed here. However the data submitted by FR and BE are reported in the summaries of occurrences data in this Report and in extended form in the Technical Annex on CD-ROM.
- 3) Where available, the mean occurrence values calculated by the National Expert have been used and the data have been marked in the Tables 2-7 with (*). The mean values calculated with $<LOD = LOD/2$ have been reported in the Tables. The other data ($<LOD=0$) are reported in Summaries (annex 1) or in the Technical Annex on CD
- 4) Where a mean value was not available, the range of the available experimental data have been reported in the Tables 2-7 and the data have been marked with (**); it must be said that also where more than a cluster of occurrence data for the same species was provided by a country, without calculating the mean, the data were reported as a range, too.
- 5) It was not possible to calculate a mean figure for occurrence in each one of the seven fish groups because of the different background of the data. For an example, the mean data presented by Germany are based on several hundreds or even 1 or 2 thousands of data,

while, in other cases, the data referred to the same fish group, for other countries, are specific for just one-two species of the group and are based on less than 10 samples.

However, even with the above limitations, some indications can be derived from the data as appears in summarizing Tables 2-7 reported in the following pages:

TABLE 2 RANGE OF OCCURRENCE DATA ON TRIBUTYL TIN (TBT) . GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY (data in µg/kg)						
* mean values for the group ** experimental ranges for one or more species						
	DE	NO	HE	NL	DK	IT
FRESH MOLLUSCS, BIVALVE MOLLUSCS and MUSSELS Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatus,Scallop,Oyster, Greenshell mussels,Blue mussels,Mussels	49.42*	108.9** (only mussels)	21.9*	13-32**	7.57-56.64**	2-90**
FRESH CRUSTACEANS Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat	2.97*	29-145.4**		14**	4.64**	15.6**
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char Eel, , Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe	22.34*					11**
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench	43.81*	198** only eel		7.8-18**		19.7-44**
FRESH CEPHALOPODES Octopus,sepia			2 (<lod)			
FRESH FISH/ MARINE WATER Bass, sea bass,Black goby,Boyer's sand smelt,Bream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mullet,Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish,Sardine,Sole,Sprat,Tuna,Whiting	8.78*	6.1-96.5**		1-17**	31-43.1**	12.1-38**
PROCESSED FISH, (Group A) SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE (Group B) Mixed seafood,Mussels marinated, herring marinated,smoked herring,smoked eel,Smoked salmon, canned fish	7.44*		2* (<lod)			
OTHER						
Fish oil				27**		

BIRDS Mute swan – liver, Eider – liver, Greater black – backed gull – liver					0.37**	
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TABLE 3 SUBMISSION OF OCCURRENCE DATA ON DIBUTYLTIN (DBT)						
GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY (data in ug/kg)						
* mean values for the group ** experimental ranges for one or more species						
	DE	NO	HE	NL	DK	IT
FRESH MOLLUSCS, BIVALVE MOLLUSCS and MUSSELS Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatus,Scallop,Oyster, Greenshell mussels,Blue mussels,Mussels	16.46*	32.7** only mussels	27.1*	2.5-8.5 **	4.91- 45.13**	4-70.3 **
FRESH CRUSTACEANS Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat	0.87*	18- 28.4**		1.6 **	7.07**	4.2**
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char, Eel , Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe	5.13*					0.5**
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Eel Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench	2.69*	38.9** only eel		0.8-2.1 **		0.5- 10.2**
FRESH CEPHALOPODES Octopus,sepia			5(<lod)			
FRESH FISH/ MARINE WATER Bass, sea bass,Black goby,Boyer's sand smelt,Bream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mullet,Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish,Sardine,Sole,Sprat,Tuna,Whiting	1.67*	2-48.4 **		0.1-2.5 **	11.28- 216.7 **	0.5-10 **
PROCESSED FISH, SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE Mixed seafood,Mussels marinated,herring marinated,smoked herring,smoked eel,Smoked salmon, canned fish	2.75*		5(<lod)			
OTHER						
Fish oil				27**		

BIRDS Mute swan – liver, Eider – liver, Greater black – backed gull – liver					0.29- 164.16**	
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TABLE 4 SUBMISSION OF OCCURRENCE DATA ON MONOBUTYLTIN (MBT)						
GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY (data in µg/kg)						
* mean values for the group ** experimental ranges for one or more species						
	DE	NO	HE	NL	DK	IT
FRESH MOLLUSCS BIVALVE MOLLUSCS and MUSSELS Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatus,Scallop,Oyster, Greenshell mussels,Blue mussels,Mussels	5.15*	9.3** only mussels	25*	0.6-2.3**	1.94-31.72**	13.7 - 66.8**
FRESH CRUSTACEANS Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat	0.87*	5.8-12**		1.6**	6.37**	6**
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char,Eel, Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe	4.78*					
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench	3.23*	17.3** only eel		0.2-1.2**		7.6**
FRESH CEPHALOPODES Octopus,sepia			3(<lod)			
FRESH FISH/ MARINE WATER Bass, sea bass,Black goby,Boyer's sand smelt,Bream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mullet,Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish,Sardine,Sole,Sprat,Tuna,Whiting	1.3*	1.5-6.3**		0.1 – 1.0**	0.22 – 14.37**	3.8-6.7**
PROCESSED FISH, SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE Mixed seafood,Mussels marinated,herring marinated,smoked herring,smoked eel,Smoked salmon, canned fish	13.55*		3(<lod)			

OTHER						
Fish oil				<2.4**		
BIRDS Mute swan – liver, Eider – liver, Greater black – backed gull – liver					4.07 – 16.67**	

TABLE 5 RANGE OF OCCURRENCE DATA ON TRIPHENYLTIN (TPT)						
GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY (data in µg/kg)						
* mean values for the group ** experimental ranges for one or more species						
	DE	NO	HE	NL	DK	IT
FRESH MOLLUSCS BIVALVE MOLLUSCS and MUSSELS Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatus,Scallop,Oyster, Greenshell mussels,Blue mussels,Mussels	5.54*	19.9** only mussels		5.3-12**	47.76**	1.6-3.5**
FRESH CRUSTACEANS Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat	1.08*	18-38**		3**	42.46**	2.4**
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char,Eel, Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe	11.56*					
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER) Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench	20.67*	868** only eel		28-42**		4.9**
FRESH CEPHALOPODES Octopus,sepia						
FRESH FISH/ MARINE WATER Bass, sea bass,Black goby,Boyer's sand smelt,Bream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mullet,Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish,Sardine,Sole,Sprat,Tuna,Whiting	4.48*	27-438.8**		2.1 – 22**	28.31 – 90.13**	5.2 – 19.9**
PROCESSED FISH, SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE Mixed seafood,Mussels marinated,herring marinated,smoked herring,smoked eel,Smoked salmon, canned fish	4.04*					
OTHER						
Fish oil				6.4**		

BIRDS Mute swan – liver, Eider – liver, Greater black – backed gull – liver					1.47- 46.39**	
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TABLE 6 RANGE OF OCCURRENCE DATA ON DIPHENYLTIN (DPT)						
GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY (data in µg/kg)						
* mean values for the group ** experimental ranges for one or more species						
	DE	NO	HE	NL	DK	IT
FRESH MOLLUSCS BIVALVE MOLLUSCS and MUSSELS Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatius,Scallop,Oyster, Greenshell mussels,Blue mussels,Mussels	2.19*	0.56** only mussels		0.7-1.1 **	1.15**	1.1 – 1.4 **
FRESH CRUSTACEANS Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat	0.77* (<LOD)	1.2 – 3.8**		0.5**	1.15**	2.4**
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char,Eel, Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe	2.67*					
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench	6.9*	26.4** only eel		3-3.9**		2.3**
FRESH CEPHALOPODES Octopus,sepia						
FRESH FISH/ MARINE WATER Bass, sea bass,Black goby,Boyer's sand smelt,Bream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mullet,Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish,Sardine,Sole,Sprat,Tuna,Whiting	0.82*	3.7 – 125.5 **		0.3 – 1.7**	2.99 – 8.12**	2.8 – 5.7 **
PROCESSED FISH, SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE Mixed seafood,Mussels marinated,herring marinated,smoked herring,smoked eel,Smoked salmon, canned fish	2.16* (<lod)					
OTHER						
Fish oil				<11**		

BIRDS Mute swan – liver, Eider – liver, Greater black – backed gull – liver					1.15 – 12.49**	
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TABLE 7 RANGE OF OCCURRENCE DATA ON MONOPHENYLTIN (MPT) . GROUPING OF THE SPECIES AND CORRELATION WITH SUBMITTING COUNTRY (data in µg/kg)						
* mean values for the group ** experimental ranges for one or more species						
	DE	NO	HE	NL	DK	IT
FRESH MOLLUSCS BIVALVE MOLLUSCS and MUSSELS Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatus,Scallop,Oyster, Greenshell mussels,Blue mussels,Mussels	2,0*	0.4** only mussels (<lod)		0.1 – 0.2**	0.33**	1.1 – 22.5**
FRESH CRUSTACEANS Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat	0.5* (<lod)	0.85 – 3.1**		0.1**	0.33**	3.3**
FRESH FISH/ FRESH WATER (LAKE, FARM) Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char,Eel, Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe	2.5* (<lod)					
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER) Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench	3.5*	10.8** only eel		0.4**		3.4**
FRESH CEPHALOPODES Octopus,sepia						
FRESH FISH/ MARINE WATER Bass, sea bass,Black goby,Boyer's sand smelt,Bream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mullet,Herring, Mackerel, jack Mackerel, Marlin, Ocean perch, Plaice, plaice filet, Redfish,Sardine,Sole,Sprat,Tuna,Whiting	1.45* (<lod)	0.9 – 63.5**		0.1- 0.8**	1.07**	5.2 – 10.2**
PROCESSED FISH, SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE Mixed seafood,Mussels marinated,herring marinated,smoked herring,smoked eel,Smoked salmon, canned fish	2.5* (<lod)					

OTHER						
Fish oil				<2.8**		
BIRDS					0.33**	
Mute swan – liver, Eider – liver, Greater black – backed gull – liver						

2.1.3 DISCUSSION

2.1.3.1 Ranges of occurrence data vs food groups:

In addition to the Tables collating data separately for each one of the OTC, the following schemes with the collation of the ranges of occurrence data with respect to food groups have been prepared, too.

<u>TABLE 8 FRESH MOLLUSCS BIVALVE MOLLUSCS AND MUSSELS</u>	
TBT	2-108.9 ug/kg (6/6 countries)
DBT	2.5-70.3 ug/kg (6/6 countries)
MBT	0.6-66.8 ug/kg (6/6 countries)
TPT	1.6-47.76 ug/kg (5/6 countries)
DPT	0.56-2.19 ug/kg (5/6 countries)
MPT	0.1-22.5 ug/kg (4/6 countries)

It can be observed, as expected, that mollusc group accumulates TBT and derivatives more than other groups. This behaviour is confirmed looking more in depth in the raw data and in the summarizing tables. Mussel and Clams show the higher levels. TPT and derivatives are detected in molluscs in amounts lower than TBT and derivatives. The amount of data for mussels is higher than the amount of data for all the other molluscs.

<u>TABLE 9 FRESH CRUSTACEANS</u>	
TBT	2.97-145.4* ug/kg (5/6 countries)
DBT	0.87-28.4 ug/kg (5/6 countries)
MBT	0.87-12 ug/kg (5/6 countries)
TPT	1.08-42.46ug/kg (5/6 countries)
DPT	0.5-3.8 ug/kg (5/6 countries)
MPT	0.1-3.3 ug/kg 5/6 countries)

*This datum (145 ug/kg) was a unique high value in only one set of data. Without this datum the range would have been: 2.97-29 ug/kg (5/6 countries).

It can be observed that Fresh crustaceans group shows OTC levels lower than the other main groups. The same trend is observed in TBT and derivatives and in TPT and derivatives;TPT group show lower occurrence levels.

<u>TABLE 10 FRESH FISH MARINE WATER-</u>	
TBT	1-96.5 ug/kg (5/6 countries)
DBT	0.1-216.7 ug/kg (5/6 countries)
MBT	0.1-14.37 ug/kg (5/6 countries)
TPT	2.1-438.8 ug/kg (5/6 countries)
DPT	0.3-125.5 ug/kg (5/6 countries)
MPT	0.1-63.5 ug/kg 5/6 countries)

Data on fresh fish (marine water) show a high scatter between the countries .

However it must be said that, in this group, the highest data for both TBT and TPT groups are referred to liver “(cod liver, flounder liver, bream liver etc).It is interesting to highlight that data from Germany do not report data on fish liver and that the mean values for this group in Germany are, for each OTC, lower than 10 ug/kg. Also the data from NL and IT, that do not include data on fish liver, are all lower than 17 ug/kg and 33 ug/kg, respectively.

<u>TABLE 11 FRESH FISH/FRESH WATER (LAKE, FARM)</u>	
TBT	11-22.34 ug/kg 2/6 countries)
DBT	0.5-5.13 ug/kg (2/6 countries)
MBT	4.78 ug/kg (1/6 countries)
TPT	11.56 ug/kg (1/6 countries)
DPT	2.67 ug/kg (1/6 countries)
MPT	2. 5 ug/kg 1/6 countries)

In this case practically all the data came from Germany submission. In fact the means presented by Germany came from more than 2000 raw data, and range from < LOD – 22,34 ug/kg (all the OTC). But, as underlined in the submission from Germany, “high levels of TBT and TPT were analysed in fresh fish from lakes” (e.g. TBT in bream, whitefish, carp or TPT in char, perch)

TABLE 12 FRESH FISH/FRESH WATER (INLAND, HARBOUR BRACKISH)	
TBT	7.8-198 ug/kg (4/6 countries)
DBT	0.5-38.9 ug/kg (4/6 countries)
MBT	0.2-17.3 ug/kg (4/6 countries)
TPT	4.9-868* ug/kg (4/6 countries)
DPT	2.3-26.4 ug/kg (4/6 countries)
MPT	0.4-10.8ug/kg (4/6 countries)

This datum 868 (µG/KG) is unique. Without this datum the range would be 4,9-42 ug/kg (3/6 countries)

This group, is composed by the submission of 4 countries : DE, NO, NL, IT. Also in this case it must be said that mean data from DE came from more than 1300 data on 16 different fish species, while the other countries submitted data on 1-2 species, essentially on eel. It must be said that eel was introduced in this group, but it could be also in the group fresh fish/fresh water (farm,lake). In this and in other similar cases (e.g pike perch) the grouping is not easy because the data submitted are not specified and when both the allocations were possible, the species have been introduced in this group. The data from Germany show in some cases high levels of TBT and TPT in with fish, pike perch, roach, but the mean values were for all the OTC from < LOD to 43,81 ug/kg. (if values < LOD = LOD/2 the range is 2,5-43,81 ug/kg)

TABLE 13 FULLY PRESERVED CANNED OR FERMENTED FISH AND FISH PRODUCTS + SEMIPRESERVED FISH AND FISH PRODUCTS, INCLUDING MCE	
TBT	2*-7.44 ug/kg (2/6 countries)
DBT	2.75-5* ug/kg (2/6 countries)
MBT	3*-13.55 ug/kg (2/6 countries)
TPT	4.04 ug/kg (1/6 countries)
DPT	2.16 * ug/kg (1/6 countries)
MPT	2.5* ug/kg (1/6 countries)

The values marked with * are below the LOD. They have been calculated with the assumption: $<LOD=LOD/2$. Once more, the group reports essentially the data from Germany, as clearly shown in the Tables. The data show average low levels for all the OTC. The apparently high level for MBT (13,55 ug/kg) is due to the presence of 1 unusually high value for a sample of “Canned Fish” (1920 ug/kg).

Group “OTHER” : the data are reported in the Tables 2-7 , but are not discussed here because they refer just to one country and one group (ex. birds, gasteropods, fish oil,). For the description of these data, information can be found in the summaries in Annex 1 and details in the Annex on CD-ROM.

2.1.3.2 Origin and Quality of the Occurrence data

One important observation is referred to the origin of the occurrence data. In fact, a big part of the presented occurrence data had been generated in the frame of environmental monitorings and therefore they are not strictly representative of the food that is really eaten from the people, or they represent just part of it.

In the case of Germany the submitted data (more than 9000 raw data) came from a recent national monitoring plan, specifically targeted, and therefore are a solid basis to describe an occurrence OTC profile in food destined to the consumers. Also data from Norway, even more limited in numbers with respect to Germany cover a wide range of fish products that are consumed by the Norwegian population. In the other Countries, national public programs or research projects are still going on to get available more complete information.

The analytical quality of the submitted data was guaranteed by the National Experts that had previously selected the data according to agreed parameters (see Annex about Questionnaire) and then had presented data together with the relevant and required details about Analytical Quality Assurance (see Annex 1 for submitted data and details on CD-ROM).

Therefore, in those cases when OTC data in the occurrence tables from the Countries are marked with “ NOT REPRESENTATIVE” it does not mean that data are analytically unacceptable, but that they are not adequate to estimate intake and therefore they have not to be used for this purpose.

2.2. FOOD CONSUMPTION DATA

2.2.1 STATISTICS AND SUMMARIZING TABLES

All the participating Countries presented data about Food consumption, obtained by national surveys. The data have been summarized in Annex 1 where is reported, for each Country, a brief description of food consumption data, the methods used to measure food consumption, the year of the survey and Tables resuming for each fish group or fish species the food consumption data expressed by consumer or by population (mean and high levels) (Tables 55-65). The whole set of raw data is reported in the Technical Annex on CD-ROM.

This chapter presents only some general comments and remarks about the submitted food consumption data. The following Table 14 reports a synoptic overview useful to compare the data.

TABLE 14 SYNOPTIC TABLE FOR SUBMITTED FOOD CONSUMPTION DATA									
		FISH GROUP				FISH SPECIES			
		by population		by consumer		by population		by consumer	
		mean	high 95-97perc	mean	high 95-97 perc	mean	high 95-97perc	mean	high 95-97 perc
BE (2 groups)				x	x				
DE 6 groups	adult	x	x	x	x				
	child	x	x	x	x				
DK						x			
FR	adult	x	x	x	x				
	child	x	x	x	x				
HE (2 groups)		x	x	x	x				
IT (several groups)		x		x					
NL						x	x		
NO		x (1997)	x (1997)	x (1997)	x (1997)	x(1999)	x(1999)	x(1999)	x(1999)
	coastal							x(2000)	x(2000)

2.2.2 DISCUSSION

From the comparative examination of the available food consumption data, some basic differences existing in the data sent by the 8 Countries can be stressed; in fact, also at a first glance the above Table shows that the high majority of the food consumption data are just for food groups and not for single species, with the following details:

2.2.2.1 Food Consumption data for Food Species

1. Only 3/8 Countries (DK, NL, NO) submitted food consumption data specific for the reported fish species.
2. Only 1/8 Countries (NO) presented data for species referred both to consumers and to a special section of them (coastal population, very high consumers of fish)

2.2.2.2 Food Consumption data for Food Groups:

1. The majority of the Countries (6/8 Countries : BE, DE, FR,HE,IT, NO) presented food consumption studies referred to fish groups, without specifying consumption of single species, but with the following differences :
2. 4/8 Countries (DE, FR ,HE, NO) presented food consumption data on fish groups, expressed by population and by consumer (both mean and high levels values)
3. 1/8 Countries (IT) presented only mean values for food consumption data on fish groups, expressed by population and by consumers,
4. 1/8 Countries (BE) presented data on fish groups, but only by consumers (mean and high values)
5. Only 2/8 Countries (DE, FR) presented food consumption data for both adults and children
6. Fish groups developed for the surveys are different between the Member States. In fact, there are not common rules or settled scientific criteria to group foods or, specifically, fish foods and therefore the grouping has been made on the basis of national strategies. Obviously, some similarities can be found between the grouping of the countries, (e.g crustaceans, marine fresh fish) but the contribution of each individual species within the group is not known. For example, a group in which appears “crustaceans” is present in

Table for DE (Fresh crustaceans), in HE (Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm) and in FR (Crustaceans and Echinoderms), but no more specifications are available about the percentage of consumption to be allocated to crustaceans within the group. Moreover, the allocation of single crustacean species (e.g. shrimps, crab etc) within the group is at the same manner not known. Therefore, a comparison between the groups is neither immediately feasible nor obtainable by regrouping single species.

2.2.2.3 Type of Survey to collect food consumption data

Different methods exist to produce estimates of food consumption. Two main type of studies have been performed with different instruments to carry out them:

- 1) household surveys (e.g.purchase)
- 2) individual surveys (diary records, interview , food frequency questionnaires etc)

Table 15“*Type of survey*” , in the following page describe the different methods used to collect the food consumption data used for this Task. It must be reminded that to calculate OTC intakes the average body weight of 70 kg has been used by DK, HE,IT,NL,NO, while Germany used average body weights laid down by the German Food Surveys of 70.5 kg (mean) for adults and 20.9 kg (mean) for children.

TABLE 15

TYPE OF SURVEY USED TO COLLECT FOOD CONSUMPTION DATA

	Type of survey	Method	Adult		Children		years
			participants	body weight (kg)	participants	body weight (kg)	
BE	no info	no info	no info	no info	no info	no info	
DE	individual	interview	19115 > 18 years	70.5 (mean)	889 (4-6 years)	20.9 (mean)	1985-1988
DK	household	purchase questionnaire	2000 (6000 individuals)				1999-2000
FR	individual	diary record	1985 >15 years	66.4	1018 (3-14 years)	31.6	1998-1999
HE	household	purchase	6258 households				1998-1999
IT	household mixed	questionnaire, purchase, individual record	1200 (2734 individuals)				1994-1996
NL	household	dietary records	2774 (6250 individuals, age 1-97)	65.8			1997-1998
NO	individual	frequency questionnaire	6015 (age 18-79)	74			1999
	individual (coastal municipalities)	frequency questionnaire	5502 (age 18-79)	76			2000

2.3 DIETARY INTAKE DATA

2.3.1 STATISTICS AND GENERAL OVERVIEW

The daily intake data calculated and submitted by the participating Countries have been summarized in Annex 1 where is reported, for each Country, a brief description of the intake data and Tables resuming for each fish group or fish species the calculated daily intake expressed by consumer or by population (mean and high levels) and referred to bodyweight, too.(Tables 66-86) This chapter presents some general comments, some summarizing Tables and remarks about the submitted OTC intake data. The whole set of raw data is reported in the Technical Annex on CD-ROM.

The following Table 16 reports a synoptic overview useful to compare the submitted data.

TABLE 16												
SYNOPTIC TABLE FOR SUBMITTED OTC INTAKE DATA												
	Intake		Fish Groups	Fish species	Population		Consumer		Adult	Child	<LOD =0	<LOD= LOD/2
	Yes	Not			mean	high level	mean	high level				
BE		N										
DE	Y		x		x	x	x	x	x	x	x	x
DK	Y			x	x			x				x
FR		N										
HE	Y		x		x	x	x	x			x	x
IT	Y		x		x		x	x			x	x
NL	Y			x	x	x		x			x	x
NO	Y		x	x	x	x	x	x	x			x

As shown in the above Table, an immediate comparison between the submitted intake data allows the following observations:

- intake data on OTC have been calculated by 6/8 Countries, (DE,DK,HE,IT,NL,NO),
- 2/8 (BE, FR) did not calculate intakes.
- 3/6 Countries have been provided intake data only with respect to fish food groups, while 2/6 Countries presented intake calculations referred only to fish species; 1/6 country (NO) calculated intake with respect to both groups and species.
- 6/6 Countries presented daily intake data calculated for adults
- 1/6 Countries (DE) presented intake data calculated for children
- 1/6 Countries (NO) presented intake data calculated for a potentially very high consumer group (coastal municipalities).

Intake data have been calculated by the National Experts on the basis of mean occurrence values, for species or for groups. These mean values, just to calculate intakes, were obtained by assuming that when occurrence values were below the LOD they were equal to LOD/2. This assumption was agreed during the meeting with participating Countries as a worst case scenario and a reasonable compromise between the overestimation for $<LOD=100\%LOD$ and the underestimation for $<LOD=0$. However, it must be said that this option could lead to calculate never detected OTCs as they were present. This is the case, for example, of Occurrence data for Canned Fish submitted by Greece, or of DPT in Fresh Crustaceans and MPT in Processed fish and fish products submitted by Germany. In these and in similar cases OTC intakes should be only considered as potential and in the Tables a footnote marks these data.

Even though 6/8 Countries presented intake data, a strict comparison between these data is not possible. In fact, a different background exists behind the data; this appears clearly from the comparison of raw data on CD ROM, but it is also evident from the occurrence and food consumption data described for each Country in Annex 1 in this Report.

In short,

- for 3/6 Countries (DE, HE,IT) intake data came from occurrence experimental data on OTC in fish species, grouped according to nationally available food consumption data and therefore intake is referred to fish groups (no allocation of single species within the groups can be done)

- for 2/6 Countries (DK, NL) intake data came from occurrence experimental data on OTC in fish species combined with nationally available food consumption data on single fish species and therefore intake is referred only to these fish species.
- for 1/6 Countries (NO) intake data are based not only on occurrence experimental data, but some assumptions have been made (i.e. TBT in mackerel and salmon was assumed to be the same as in herring) to estimate a complete figure of OTC intake from fish foods .

2.3.2 SUMMARIZING TABLES

Bearing in mind what previously discussed, to get available a synoptic view of the submitted intake data and to describe the range of the intakes calculated by the participating countries, Tables referred to fish food groups have been prepared. (see Table 17 *FISH FOOD GROUPS USED TO PRESENT DAILY INTAKE DATA ON OTC*) The following criteria have been used:

- 1) Six fish food groups practically similar to those indicated by DE have been used to group data from all the countries, being this solution the most suitable to attribute the species to the groups and to have always at least two submitting countries for each group; however, it must be reminded that , even though the name of the groups is similar to those given by DE, the composition of the group in the Tables 17 here presented may be different. In fact, in some cases the assumptions made by the Countries were different by those made by DE, e.g. HE grouped together molluscs and crustaceans, while they are distinct for DE. In these cases, all the possible indications have been given in the Tables 18-41 to identify the differences; on the other hand, as already underlined, these Tables 18-41 for Intake should be used just as a raw description of the profile of the reported intake data;
- 2) To the aim of an easy reading of the Tables 18-41, intake data have been reported in the format “ng/ day/kg body weight “ and not as “0.00X ug/ day /kg body weight ”. It should be noted during the reading of the text that ” ng/ day/kg body weight “ is the unit for intake, while occurrence is expressed in µg/kg
- 3) In order not to overcrowd the Tables , only the daily intakes expressed in ng/ day /kg body weight have been reported and, even though 4 Countries presented data calculated both with <LOD= 0 and <LOD= LOD/2, only these last data have been reported ; the other data are reported in the summaries of submitted intake data(Annex 1

in this Report) and all the details, fully traceable, are reported in Technical Annex on CD.

- 4) The intake data have been reported as they were provided by the National Experts, without calculating mean intake values, when the Expert did not deem it suitable;
- 5) On the basis of points 3) and 4) mean daily intake values were reported for DE, HE, IT, while for DK and NL all the calculated daily intakes are reported. Therefore, for each food group, in the same table, mean daily intake values (DE, HE, IT) appear together with daily intakes for specific fish food species (DK, NL and in some cases NO). This option, undoubtedly not rigorous, has been deemed the unique feasible to present the available data in a usable format.
- 6) The last line of each of the Tables 18-41 shows the range of the reported daily intakes; this range is simply the lowest and the highest daily intake of the Table, without any treatment of the data.
- 7) Other relevant studies for intakes have been summarized in separate Tables. These studies are concerned with
 - a) estimation of intakes for children, submitted by Germany, (Tables 42-43)
 - b) estimation of intakes for coastal municipalities, submitted by Norway; these groups have large availability of fish foods and are a special sections of consumers. (Table 44)
 - c) intake data about other OTC (TeBT, TePT)

TABLE 17 FISH FOOD GROUPS USED TO PRESENT DAILY INTAKE DATA ON OTC

FISH FOODS	SPECIES
MOLLUSCS (fresh molluscs and mussels)	Clams,Cockles,Common whelks, Grooved Carpet shells, Modiola Barbatus,Scallop, Oyster Greenshell mussels,Blue mussels,Mussels
FRESH CRUSTACEANS	Shrimps,lobster,crab, crab hepatopancreas, crab brownmeat
FRESH FISH/ FRESH WATER (LAKE, FARM)	Blue Pike,Bream, White bream, Bream liver,Burbot,Carp,Char, , Trout, Fresh trout, salmon trout, rainbow trout,Nase,Nile perch, Perch, Pike,Pikeperch,Roach,Rudd,Salmon, salmon filet, Tench,White fish,Zanthe
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER	Barbel,Bream, White bream, Carp,Chub,Eel, salmon trout, Nase,Perch, Pike,Pikeperch,PlaiceRau,Roach,Salmon, Tench
FRESH FISH/ MARINE WATER	Bass, sea bass,Black goby,Boyer's sand smeltBream, sea bream, gilthead bream,Cardinal fish,Coal fish,Cod (cod liver, cod muscle, cod fish filet codfish kotolett), Dab, dab liver, Father lasher-liver,Flounder, flounder liver and muscle, Goatfish,Gopes,Halibut greenland halibut, halibut filet,Grey mullet, mulletHerring, Mackerel, jack Mackerel, Marlin,Ocean perch,Plaice, plaice filet, , Redfish,Sardine,Sole,Sprat,Tuna,Whiting, fresh cephalopodes(Octopus, sepia)
FULLY PRESERVED, CANNED OR FERMENTED FISH AND FISH PRODUCTS INCL. MCE. SEMIPRESERVED FISH AND FISH PRODUCTS INCL MCE	Mixed seafood,Mussels marinated,herring marinated,smoked herring,smoked eel, smoked salmonAnchovis,Canned fish,Canned Herrings,Canned mackerel,Cod liver canned in oil,Filets of Mackarel,Fried Herrings,Minced salmon in its own juice,Saira in its own juice,Sardines,Sardines in olive oil,Tuna in brine

**TABLE 18 - MOLLUSCS-
DAILY INTAKE/BODY WEIGHT –TBT/ DBT/MBT-
DATA EXPRESSED BY POPULATION
ng /day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	n. s. *		n. s.*		n. s.*	
DK mussels	0.012 0.024 0.008 0.022		0.0076 0.0063 0.0032 0.0021		0.0008 0.0066 0.0049 0.0136	
HE group³	0.81	15.7	1.0	32.7	0.9	38.9
IT group⁴	2.46		1.5		2.4	
NL mussels	0.13	0.18	0.05	0.07	0.014	0.020
NO mussels	1.6	7.8	0.47	2.36	0.13	0.64
RANGE of the reported intake values	0.008 - 2.5	0.18-15.7	0.0021 - 1.5	0.07-32.7	0.0008 - 2.4	0.02-38.9

TABLE 19 -MOLLUSCS

³ HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

⁴ Mussels and clams

* not significant, very low data

**-DAILY INTAKE/BODY WEIGHT– TPT/ DPT/MPT – DATA EXPRESSED
BY POPULATION
ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	n. s.*		n. s.*			
DK mussels	no data	no data	no data	no data	no data	no data
HE group⁵	no data	no data	no data	no data	no data	no data
IT group⁶	0.16		0.08		0.71	
NL mussels	0.07	0.10	0.004	0.006	0.0006	0.0009
NO mussels	0.29	1.43	0.008	0.04	0.0057	0.029
RANGE of the reported intake values	0.07-0.29	0.10-1.43	0.004-0.08	0.006-0.04	0.0006-0.71	0.0009-0.029

⁵ HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

⁶ Mussels and clams

* not significant, very low data.

TABLE 20 MOLLUSCS**-DAILY INTAKE/BODY WEIGHT– TBT/ DBT/MBT
DATA EXPRESSED BY CONSUMERS****ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	13.0	88.3	4.34	29.4	1.36	9.2
DK,NL mussels	no data	no data	no data	no data	no data	no data
HE group⁷	11.6	82.8	14.3	172.3	13.1	204.9
IT group⁸	21.09		12.86		20.73	
NO mussels	1.56	7.79	0.47	2.36	0.13	0.64
RANGE	1.56-21.09	7.79-88.3	0.47-14.3	2.36-172.3	0.13-20.73	0.64-204.9

⁷ HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

⁸ Mussels and clams

**TABLE 21 MOLLUSCS-
DAILY INTAKE/BODY WEIGHT–TPT/ DPT/MPT
DATA EXPRESSED BY CONSUMERS
ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	1.46	9.89	0.58	3.91	0.53	3.57
DK, NL mussels	no data	no data	no data	no data	no data	no data
HE group⁹	no data	no data	no data	no data	no data	no data
IT group¹⁰	1.34		0.67		6.07	
NO mussels	0.29	1.43	0.008	0.04	0.0057	0.029-3.57
RANGE of the reported intake values	0.29-1.46	1.43-9.89	0.008-0.67	0.04-3.91	0.0057-6.07	0.029-3.57

⁹ HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

¹⁰ Mussels and clams

**TABLE 22 FRESH CRUSTACEANS –
DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT- DATA EXPRESSED BY
POPULATION
ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	0.02	0.28	0.01	0.08	0.01	0.08
DK	no data	no data	no data	no data	no data	no data
HE group¹¹	no data	no data	no data	no data	no data	no data
IT group	0.22		0.06		0.09	
NL shrimp	0.10	0.12	0.012	0.013	0.012	0.013
NO crab	0.8-2.8	1.24-18.2	0.51-0.69	0.77-4.45	0.23-0.34	0.51-1.5
RANGE of the reported intake values	0.02-2.8	0.12-18.2	0.01-0.69	0.013-4.45	0.01-0.34	0.013-1.5

¹¹ HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

**TABLE 23 FRESH CRUSTACEANS –
DAILY INTAKE/BODY WEIGHT FOR - – TPT/ DPT/MPT – DATA
EXPRESSED BY POPULATION
ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	0.01	0.1	0.01	0.07	0.00	0.05
DK	no data	no data	no data	no data	no data	no data
HE group¹²	no data	no data	no data	no data	no data	no data
IT group	0.03		0.03		0.05	
NL shrimp	0.022	0.025	0.0036	0.0042	0.0007	0.0008
NO crab	0.51-0.86	0.77-5.6	0.029-0.086	0.043-0.56	0.029-0.057	0.043-0.37
RANGE of the reported intake values	0.01-0.86	0.025-5.6	0.004-0.086	0.004-0.56	0.00-0.057	0.0008-0.37

¹² HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

TABLE 24 FRESH CRUSTACEANS

**-DAILY INTAKE/BODY WEIGHT FOR– TBT/ DBT/MBT – DATA
EXPRESSED BY CONSUMERS**

ng/day/kg bw

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	0.49	1.63	0.14	0.48	0.14	0.48
DK,NL	no data	no data	no data	no data	no data	no data
HE group*						
IT	4.50		1.21		1.73	
NO crab	5.6-1.65	5.4-18.2	1.03-1.37	3.34-4.46	0.45-0.69	1.49-2.23
RANGE	0.49-4.50	1.63-18.2	0.14-1.37	0.48-4.46	0.14-1.73	0.48-2.23

* HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

TABLE 25-FRESH CRUSTACEANS
DAILY INTAKE/BODY WEIGHT– TPT/ DPT/MPT –
DATA EXPRESSED BY CONSUMERS
ng/day/kg bw

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	0.18	0.59	0.13	0.42	0.08	0.27
DK,IT,NL	no data	no data	no data	no data	no data	no data
HE group¹³						
NO crab	1.03-1.71	3.34-5.57	0.06-0.17	0.18-0.56	0.06-0.11	0.18-0.37
RANGE of the reported intake values	0.18-1.71	0.59-5.57	0.06-0.17	0.18-0.56	0.06-0.11	0.18-0.37

¹³ HE group is for molluscs, crustaceans and echinoderms, but the experimental data are only on molluscs

TABLE 26 FISH -FRESH WATER (FARM LAKE)

**DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT-FRESH
DATA EXPRESSED BY POPULATION
ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	0.40	7.31	0.09	1.68	0.09	1.56
DK,HE,IT,NL	no data	no data	no data	no data	no data	no data
NO						
Salmon farmed	6.7	15.6	0.69	1.6	0.17	0.4
RANGE of the reported intake values	0.40-6.7	7.31-15.6	0.09-0.69	1.6-1.68	0.09-0.017	0.4-1.56

TABLE 27 FISH -FRESH WATER (FARM LAKE)

**DAILY INTAKE/BODY WEIGHT – TPT/ DPT/MPT-FRESH
DATA EXPRESSED BY POPULATION
ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	0.21	3.78	0.05	0.87	0.04	0.82
DK,HE,IT,NL	no data	no data	no data	no data	no data	no data
NO						
Salmon farmed	2.31	5.4	0.34	0.8	0.086	0.2
RANGE of the reported intake values	0.21-2.31	3.78-5.4	0.05-0.34	0.8-0.87	0.04-0.086	0.2-0.82

TABLE 28 FISH -FRESH WATER (FARM LAKE)
DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT-FRESH
DATA EXPRESSED BY CONSUMER
ng/day/kg bw

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	10.3	26.58	2.36	6.10	2.20	5.69
DK,HE,IT,NL	no data	no data	no data	no data	no data	no data
NO						
Salmon farmed	7.8	15.6	0.8	1.6	0.2	0.4
RANGE of the reported intake values	7.8-10.3	15.6- 26.58	0.8-2.36	1.6-6.19	0.2-2.20	0.4-5.69

TABLE 29 FISH -FRESH WATER (FARM LAKE)

**DAILY INTAKE/BODY WEIGHT – TPT/ DPT/MPT-FRESH
DATA EXPRESSED BY CONSUMER**

ng/day/kg bw

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	5.33	13.76	1.23	3.18	1.15	2.98
DK,HE,IT,NL	no data	no data	no data	no data	no data	no data
NO						
Salmon farmed	2.7	5.4	0.4	0.8	0.1	0.2
RANGE of the reported intake values	2.7-5.33	5.4-13.76	0.4-1.23	0.8-3.18	0.1-1.15	0.2-2.98

**TABLE 30 FRESH WATER (INLAND WATERWAYS,HARBOUR)
DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT-FRESH FISH -
DATA EXPRESSED BY POPULATION
ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	n. s. *		n. s. *		n. s. *	
DK,HE	no data	no data	no data	no data	no data	no data
IT group**						
NL						
eel	0.03	0.08	0.004	0.009	0.002	0.005
NO						
eel	0	2.8	0	0.56	0	0.24
RANGE of the reported intake values	0-0.03	0.08-2.8	0-0.004	0.009-0.56	0-0.002	0.005-0.24

* not significant, very low data

**intake data about eel are included in the fresh fish-marine water group(unique group)

TABLE 31 FISH -FRESH WATER (INLAND WATERWAYS,HARBOUR)
DAILY INTAKE/BODY WEIGHT – TPT/ DPT/MPT- FRESH
DATA EXPRESSED BY POPULATION
ng/day/kg bw

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	n. s.		n. s.		n. s.	
DK, HE	no data	no data	no data	no data	no data	no data
IT group**						
NL						
eel	0.08	0.18	0.006	0.013	0.0008	0.0017
NO						
eel	0	12.4	0	0.37	0	0.16
RANGE of the reported intake values	0-0.08	0.18-12.4	0-0.006	0.013-0.37	0.0-0.0008	0.0017- 0.16

* not significant, very low data.

** intake data about eel are included in the fresh fish-marine water group (unique group)

TABLE 32 FISH -FRESH WATER (INLAND WATERWAYS,HARBOUR)
DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT- FRESH
DATA EXPRESSED BY CONSUMER
ng/day/kg bw

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	15.97	30.92	0.98	1.90	1.18	2.28
DK,HE,NL	no data	no data	no data	no data	no data	no data
IT group*						
NO eel	2.83	14.14	0.56	2.79	0.24	1.21
RANGE of the reported intake values	2.83- 15.97	14.14- 30.92	0.56-0.98	1.90-2.79	0.24-1.18	1.21-2.28

*intake data about eel are included in the fresh fish-marine water group (unique group)

TABLE 33 FISH -FRESH WATER (INLAND WATERWAYS,HARBOUR)
DAILY INTAKE/BODY WEIGHT – TPT/ DPT/MPT- FRESH
DATA EXPRESSED BY CONSUMER
ng/day/kg bw

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	7.53	14.59	2.51	4.87	1.28	2.47
DK,HE,NL	no data	no data	no data	no data	no data	no data
IT group*						
NO						
eel	12.4	62	0.37	1.86	0.16	0.79
RANGE of the reported intake values	7.53-12.4	14.59-62	0.37-2.51	1.86-4.87	0.16-1.28	0.79-2.47

*intake data about eel are included in the fresh fish-marine water group(unique group)

**TABLE 34 FRESH FISH MARINE WATER
DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT-
DATA EXPRESSED BY POPULATION
ng /day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	1.20	7.06	0.23	1.34	0.18	1.05
DK						
Cod liver	0.018		0.006		0.0001	
Cod muscle	0.055		0.55		0.106	
Flounder muscle	0.887		0.33		0.053	
HE	no data	no data	no data	no data	no data	no data
IT group¹⁴	5.21		1.11		1.30	
NL						
Herring	0.47	0.74	0.07	0.11	0.06	0.09
Cod	0.04	0.14	0.004	0.014	0.004	0.014
Mackerel	0.05	0.16	0.01	0.03	0.005	0.015
Plaice	0.002	0.06	0.001	0.03	0.0003	0.006
NO						
Herring	2.22	7.8	0.23	0.80	0.06	0.20
Cod liver	0.97	3.19	0.48	1.58	0.06	0.20
Cod	5.00	15	1.14	3.43	0.29	0.86
Saithe liver	0.97	3.19	0.48	1.58	0.06	0.20
Saithe	3.5	12	0.8	2.7	0.20	0.70
Haddock	1.0	5.5	0.23	1.26	0.06	0.31
Mackerel	2.22	11.1	0.23	1.14	0.06	0.29
Flounder	0.66	2.3	0.43	1.5	0.06	0.20
Salmon (sea)	3.34	15.6	0.34	1.6	0.09	0.40
Fish for sandwich	3.34	8.91	0.34	0.91	0.09	0.23
Saltwater fish	1.4	6.6	0.09	0.4	0.09	0.4
Fish Product	5.7	14.1	1.36	3.36	0.27	0.67
RANGE of the reported intake values	0.002÷5.7	0.06÷14.1	0.004÷1.36	0.014÷3.43	0.0001÷1.30	0.006÷1.05

¹⁴ Marine fish species +eel+salmon (unique food consumption group)

TABLE 35 FRESH FISH MARINE WATER**DAILY INTAKE/BODY WEIGHT – TPT/ DPT/MPT-****DATA EXPRESSED BY POPULATION****ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	0.61	3.60	0.11	0.67	0.20	1.17
DK						
Cod liver	0.041		0.002		0.0006	
Cod muscle	0.042		0.022		0.0063	
Flounder muscle	0.093		0.008		0.0024	
HE	no data	no data	no data	no data	no data	no data
IT group¹⁵	2.17		0.78		1.37	
NL						
Herring	0.13	0.21	0.04	0.07	0.02	0.04
Cod	0.09	0.30	0.01	0.04	0.004	0.01
Mackerel	0.02	0.07	0.008	0.02	0.002	0.007
Plaice	0.03	0.67	0.002	0.05	0.001	0.015
NO						
Herring	0.77	2.7	0.11	0.4	0.029	0.1
Cod liver	4.39	14.4	0.24	0.79	0.2	0.66
Cod	16.57	49.7	5.43	16.29	2.57	7.71
Saithe liver	4.39	14.4	0.24	0.79	0.2	0.66
Saithe	11.6	39.8	3.8	13.03	1.8	6.17
Haddock	3.31	18.23	1.09	5.97	0.51	2.83
Mackerel	0.77	3.86	0.11	0.57	0.029	0.14
Flounder	3.46	12.1	0.91	3.2	0.4	1.4
Salmon (sea)	1.16	5.4	0.17	0.8	0.043	0.2
Fish for sandwich	1.16	3.09	0.17	0.46	0.043	0.11
Saltwater fish	9.5	44.4	5.4	25.2	2.14	10
Fish Product	19	47	6.24	15.4	2.99	7.39
RANGE of the reported intake values	0.02-19	0.21-49.7	0.002-6.24	0.02-25.2	0.001-2.99	0.007-7.71

¹⁵ Marine fish species +eel+salmon (unique food consumption group)

**TABLE 36 FRESH FISH MARINE WATER
DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT-
DATA EXPRESSED BY CONSUMER
ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	3.24	9.28	0.62	1.77	0.48	1.37
DK,HE,NL	no data	no data	no data	no data	no data	no data
IT group¹⁶	12.96		2.75		3.24	
NO						
Herring	3.34	7.8	0.34	0.8	0.09	0.2
Cod liver	0.97	3.19	0.48	1.58	0.06	0.2
Cod	5.5	15	1.26	3.43	0.31	0.86
Saithe liver	0.97	3.18	0.48	1.58	0.06	0.2
Saithe	4.5	12	1.03	2.74	0.26	0.69
Haddock	2	7	0.46	1.6	1.14	0.4
Mackerel	3.34	11.14	0.34	1.14	0.09	0.29
Flounder	0.99	2.96	0.64	1.93	0.09	0.26
Salmon (sea)	5.57	15.6	0.57	1.6	0.14	0.4
Fish for sandwich	3.34	8.91	0.34	0.91	0.09	0.23
Saltwater fish	2.83	6.6	0.17	0.4	0.17	0.4
Fish Product	6	14.1	1.43	3.36	0.29	0.67
RANGE of the reported intake values	0.97- 12.96	2.96-15.6	0.17-2.75	0.4-3.43	0.06-3.24	0.2-1.37

¹⁶ Marine fish species +eel+salmon (unique food consumption group)

TABLE 37 FRESH FISH MARINE WATER

**DAILY INTAKE/BODY WEIGHT – TPT/ DPT/MPT-
DATA EXPRESSED BY CONSUMER
ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	1.65	4.74	0.31	0.88	0.53	1.53
DK ,NL,HE	no data	no data	no data	no data	no data	no data
IT group¹⁷	5.40		1.94		3.40	
NO						
Herring	1.16	2.7	0.17	0.4	0.04	0.1
Cod liver	4.39	14.4	0.24	0.79	0.2	0.66
Cod	18.23	49.7	5.97	16.29	2.83	7.71
Saithe liver	4.39	14.42	0.24	0.79	0.2	0.66
Saithe	14.9	39.77	4.89	13.03	2.31	6.17
Haddock	6.63	23.2	2.17	7.6	1.03	3.6
Mackerel	1.16	3.86	0.17	0.57	0.04	0.14
Flounder	5.19	15.56	1.37	4.11	0.6	1.8
Salmon (sea)	1.93	5.4	0.29	0.8	0.07	0.2
Fish for sandwich	1.16	3.09	0.17	0.46	0.04	0.11
Saltwater fish	19.03	44.4	10.8	25.2	4.29	10
Fish Product	20	47	6.57	15.44	3.14	7.39
RANGE of the reported intake values	1.16-20	2.7-47	0.17-10.8	0.4-25.2	0.04-4.29	0.2-10

¹⁷ Marine fish species +eel+salmon (unique food consumption group)

**TABLE 38 PRESERVED-FERMENTED-SEMPRESERVED-
 PROCESSED-CANNED (etc) FISH –
 DAILY INTAKE/BODY WEIGHT – TBT/ DBT/MBT-
 DATA EXPRESSED BY POPULATION
 ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	0.60	4.67	0.22	1.73	1.08	8.50**
DK,IT,NL,NO	no data	no data	no data	no data	no data	no data
HE group*	0.04*	0.29*	0.11*	0.71*	0.06*	0.43*
RANGE of the reported intake values	0.04*- 0.60	0.29*-4.67	0.11*-0.22	0.71*- 1.73	0.06*-1.08	0.43*-8.50

* never detected, always <lod

**this datum is generated from a group of data in which an unusually high value is present in only one sample (see comments in paragraph *Ranges of occurrence data vs food groups* Table “Fully preserved canned or fermented fish and fish products + semipreserved fish and fish products, including MCE”

**TABLE 39 PRESERVED-FERMENTED-SEMIPRESERVED-
PROCESSED-CANNED (etc) FISH –
DAILY INTAKE/BODY WEIGHT TPT/ DPT/MPT
DATA EXPRESSED BY POPULATION ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	0.32	2.53	0.17	1.35	0.20	1.57
DK,HE,IT,NL NO	no data	no data	no data	no data	no data	no data
RANGE of the reported intake values	0.32	2.53	0.17	1.35	0.20	1.57

**TABLE 40 PRESERVED-FERMENTED-SEMPRESERVED-
PROCESSED-CANNED (etc) FISH –
DAILY INTAKE/BODY WEIGHT FOR TBT/ DBT/MBT
DATA EXPRESSED BY CONSUMERS ng/day/kg bw**

	TBT		DBT		MBT	
	mean	high	mean	high	mean	high
DE group	2.03	7.38	0.75	2.73	3.70	13.44**
DK, IT, NL ,NO	no data	no data	no data	no data	no data	no data
HE group*	0.34*	0.97*	0.86*	2.4*	0.51*	1.4*
RANGE	0.34*- 2.03	0.97*- 7.38	0.75-0.86*	2.4*2.73	0.51*-3.70	1.4*- 13.44**

* never detected, always <lod

**this datum is generated from a group of data in which an unusually high value is present in only one sample (see comments in paragraph *Ranges of occurrence data vs food groups* Table “Fully preserved canned or fermented fish and fish products + semipreserved fish and fish products, including MCE”

**TABLE 41 PRESERVED-FERMENTED-SEMIPRESERVED-
 PROCESSED-CANNED (etc) FISH –
 DAILY INTAKE/BODY WEIGHT TPT/ DPT/MPT
 DATA EXPRESSED BY CONSUMERS ng/day/kg bw**

	TPT		DPT		MPT	
	mean	high	mean	high	mean	high
DE group	1.10	4.01	0.59	2.14	0.68	2.48
DK,HE,IT,NL NO	no data	no data	no data	no data	no data	no data
RANGE of the reported intake values	1.10	4.01	0.59	2.14	0.68	2.48

2.3.3 DISCUSSION

Before starting to discuss the range of intakes, it shall be reminded that, for the reasons previously explained, the available basis of intake data is inadequate for a rigorous comparison between the Countries and therefore the following paragraphs should be read just as a description of the reported data. In fact, the Member States agreed to discuss intakes just from the general point of view, without a detailed comparison between the situation in the different Countries.

2.3.3.1 OVERVIEW

The daily intakes calculated by the participating countries ranged for each OTC from picograms to fractions of micrograms/day/kg body weight; the data are scattered in 3-4 orders of magnitude in the data expressed by population and 1-2 orders of magnitude in the data expressed by consumers. This different homogeneity reflects the different background of the data. In fact, besides the scattering due to the different occurrence levels in the food samples and to the different food consumption patterns between the countries, other complicating factors are linked to the type of submitted data. The data expressed by consumers came only from 4 Countries (DE, HE, IT, NO); these Countries presented intake data calculated for fish groups based on averaged occurrence values. On the contrary, the data expressed by population came from all the 6 Countries that submitted daily intakes (mean levels by population for DE, HE, IT, NO, DK, NL) and the reported ranges include also data on single species.

In addition, within each group the number of submitting countries is different and, as previously discussed in the case of occurrence data, in some cases the submitting countries are just 1 or 2 in addition to Germany. Therefore it would be not correct to sum intakes for each country and to compare the resulting total dietary intakes, because of the different species and amount of species contributing to the group for each country.

2.3.3.2 POPULATION (Mean and High Level)

From the reported intake data, the major source of TBT/DBT/MBT for the general population seems to be **bivalve molluscs** (Table 18-19) and, generally, **marine fish**. (Table 34-35) This can be recognized, with the limitations described above, on the basis of

the submitted data, that for these two groups, came from 6/6 Countries. Obviously, differences can be observed between the intakes of the Countries and this is due not only to different occurrence OTC levels, but also to the different food consumptions. For an example even though occurrence data for TBT (Table 2) are higher for DE (49 µg/kg) than for HE (21.9 µg/kg), being the consumption of bivalve molluscs by general population higher in HE (2.6 g/day) than in DE (0.14 g/day) (Table 60 and 56) the obtained intake data are higher for HE (0.81 ng/day/kg b.w) than for DE (0.099 ng/day/kg b.w) . (Table 18) Another observation is that the occurrence OTC levels are generally higher in the molluscs than in marine fish groups, but, it can be noted that the consumption patterns show an opposite trend; therefore the intakes from these two groups are not so different as it could be expected on the only basis of OTC occurrence.

In the case of TPT and derivatives, the major sources for the general population seems to be marine fish (Table 35) and to a lesser extent, fresh water fish and molluscs. (Tables 27,31 and 19) But it must be said that intake data on TPT/DPT/MPT for marine fish were submitted by 5/6 Countries, data on molluscs from 4/6 Countries and the other data from 1/6-3/6 Countries; therefore these indications are affected by a further margin of uncertainty.

Fresh crustacean group (4/6 submitting Countries) seems to be not an important source in the case of both TBT/DBT/MBT and TPT/DPT/MPT. (Tables 22-23) In fact the levels of occurrence in crustaceans, especially for TBT and derivatives, are lower than for molluscs and marine fish, and also the consumption of crustaceans with respect to mean population, is lower than the consumption of marine fish. Also in the case of Germany data, where crustacean consumption is higher than mollusc consumption (by population) the resulting daily intake for crustaceans is lower than the daily intakes for molluscs.

Intake data for **fresh water fish** from both “**lake and farm**” (Table 26-27) and “**inland waterways, harbour, brackish**” groups (Tables 30-31) are not easily handled because they are submitted always by Germany and only by other 1 or 2 Countries. In addition, the

daily intakes submitted by the other Countries are generally referred to only one species (salmon¹⁸ or eel).

However, also on this basis, it is possible to observe that this type of fish species are not an important source of exposure to TBT/DBT/MBT and TPT/DPT/MPT, if these species are not highly consumed. In fact, the occurrence values for these types of fresh water fish, available for more Countries, are higher than occurrence values for marine fishes. This is evident in the data from Germany, that are obtained from very high number of data (>2000 for lake-farm group, and >1300 for the inland waterways, harbour, brackish groups). In this case, the consumption habits of the population are fundamental; in fact the very low level of daily consumption (by general population) of “inland waterways, harbour, brackish” fish (0.05 g/day) and of farm-lake fish (1.25 g/day) keep the intakes at levels lower than those of marine fish. (Table 56) This observation highlights the general lacking of occurrence and consumption data for these type of fish that potentially represent a source of exposure to TBT and derivatives.

The group of “**preserved-fermented-semipreserved-processed-canned fish etc.**” (Tables 38-39) is formed only by Germany submission and, for TBT and derivatives by Greece submission. In the Greece data OTC were never detected; the German intake data are at levels of subnanogram/day/kg b.w. or below.

2.3.3.3 CONSUMERS ONLY (mean and high levels)

Intake data expressed by consumers were provided by DE, HE,IT,NO; NL and DK did not provided these data. Therefore in the discussion of this section of daily intake data, only submissions from 4/6 Countries or less are available and consequently, there is a further instability of the presented figures.

Nevertheless, some useful information seems to be derivable from the available data

Firstly, the data show that in the case of daily intakes expressed by consumers, the major sources of TBT and derivatives are **bivalve molluscs**. (Table 20) It is worth to note that high level consumers, in the countries where molluscs consumption is high, could be

¹⁸ intake data for salmon from Norway are estimated and not experimental

exposed to levels that are in the order of magnitude of 80-100 ng/day/kg b.w, for TBT, 30-170 ng/day/kg b.w for DBT and 10-200 ng/day/kg b.w for MBT. Also **fresh-water fish groups** seem to be, for consumers, a potential source of intake of TBT and derivatives not less relevant than molluscs (Tables 28 and 32). However, it must be reminded that the groups of **fresh water fish** (“**lake and farm**” and “**inland waterways, harbour, brackish**”) are represented only by the German submission. Daily intakes from **marine fish** were provided by 3/6 Countries (Table 36) . The intake levels of TBT and derivatives are lower than intakes from fresh water-fish groups, but are in the same orders of magnitude (1 – 60 ng/day/kg bw) groups.

As regards TPT and derivatives (3/6submitting countries) the major source seems to be **marine fish**, but it is worth to note that intake data from one Country(NO) are higher than intake data from the other two submitting Countries(DE,IT) and that the limiting factor of the low number of submitting Countries does not allow a precise interpretation of the data.

For TPT and derivatives the contribution to daily intake of the groups of **fresh water fish** (“**lake and farm**” and “**inland waterways, harbour, brackish**”) (Tables 29 and 33) is not significantly different to that of **marine fish**.(Table 37)

Daily intakes from **fresh crustaceans** were provided by 3/6 Countries for TBT and derivatives and by 2/6 Countries for TPT and derivatives. (Table 24-25) As in the case of data by population, the available data show that crustaceans are not an important source of exposure to these OTC, for both mean and high level consumers.

The group of “**preserved-fermented-semipreserved-processed-canned fish etc.**” is formed only by Germany submission and, for TBT and derivatives by Greek submission. In the Greek data OTC were never detected; the German intake data were at levels of subnanograms/day/kg b.w. or below. (Table 40-41)

2.3.3.4 OTHER STUDIES OF INTAKE

2.3.3.4.1 CHILDREN:

Daily intake/b.w. data referred to children (age 4-6 years, b.w. 20 kg) were provided by Germany. (Table 42-43)The data were calculated by population and by consumers, according to the available food consumption data. Intake data by population (mean and high levels) on marine fish and processed fish groups were submitted; low levels of intake of both TBT and derivatives and TPT and derivatives were reported (highest value: 12.56 ng/day/kg b.w, for TBT, high levels). Intake data by consumers on marine fish(mean and high levels), fresh water fish (mean level), fresh crustaceans groups (mean levels), processed fish (mean and high level). The highest daily intake (22.66 ng/day/kg b.w) was calculated for TBT in freshwater fish (lake-farm) group.

2.3.3.4.2 COASTAL POPULATION FROM NORWAY

Daily intake/b.w. data referred to special group of population (consumers only) were provided by Norway. Consumption of fish are based on participants who live in coastal municipalities. Table 44 reports the calculated data. According to Norway, “It is found that the consumption of saltwater fish is significantly higher in the population who lives in coastal areas and therefore they may be a group at risk having a high intake of TBT and TPT and their derivatives” .

2.3.3.4.3 OTHER OTC

Daily intake data referred to TeBT and TePT were provided only by Germany. The data are reported in the Tables 67-74 (Annex 1); it is worth to say that just in few cases (see Table 50) TeBT was detected while TePT was never detected. Therefore the intake data present a value when calculated with $< \text{LOD}$ values equal to $\text{LOD}/2$, while the intake data are equal to zero when $< \text{LOD}$ values are assumed to be zero.

TABLE 42 Intake estimation for Children submitted by Germany

Intake data (ng/day/kg bw) for TBT, DBT, MBT, TPT,DPT,MPT

Children 4-6 years, body weight 20 kg

Data expressed by consumer

			TBT		DBT		MBT		TPT		DPT		MPT	
			mean	high	mean	high	mean	high	mean	high	mean	high	mean	high
9.1.1	DE/1	Fresh Fish farm / Lake	22.66		5.20		4.85		11.73		2.71		2.54*	
9.1.1	DE/3	Fresh Fish marine	6.55	19.04	1.24	3.62	0.97	2.82	3.34	9.71	0.62	1.80	1.08*	3.14*
9.1.4	DE/5	Fresh crustaceans	0.96		0.28		0.28		0.35		0.25*		0.16*	
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	3.09	17.61	1.14	6.51	5.63**	32.07*	1.68	9.56	0.90	5.11	1.04*	5.92*

* never detected, always <LOD

this datum is generated from a group of data in which an unusually high value is present in only one sample (see comments in paragraph *Ranges of occurrence data vs food groups*** Table “Fully preserved canned or fermented fish and fish products + semipreserved fish and fish products, including MCE”

**TABLE 43 Intake data (ng/day/kg bw) for TBT, DBT, MBT, TPT,DPT,MPT
Children 4-6 years, body weight 20 kg
Data expressed by population**

			TBT		DBT		MBT		TPT		DPT		MPT	
			mean	high	mean	high	mean	high	mean	high	mean	high	mean	high
9.1.1	DE/3	Fresh Fish marine	2.69	12.56	0.51	2.39	0.40	1.86	1.37	6.41	0.25	1.19	0.44*	2.07*
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	0.47	5.54	0.17	2.05	0.85**	10.08*	0.25	3.01	0.14	1.61	0.16*	1.86*

* never detected, always <LOD

**this datum is generated from a group of data in which an unusually high value is present in only one sample (see comments in paragraph Ranges of occurrence data vs food groups Table “Fully preserved canned or fermented fish and fish products + semipreserved fish and fish products, including MCE”

TABLE 44 Intake estimation for coastal municipalities (potentially very high consumers) submitted by Norway
Intake data (ng/day/kg bw) for TBT, DBT, MBT, TPT,DPT,MPT Adults, b. w.70 kg;Data expressed by consumer

	TBT		DBT		MBT		TPT		DPT		MPT	
	mean	high	mean	high	mean	high	mean	high	mean	high	mean	high
FISH PRODUCT (general group)	62.67	203.15	12.82	41.66	3.92	13.40	132.05	426.12	40.05	140.72	18.00	61.76
MOLLUSCS mussels	1.56	3.11	0.47	0.94	0.13	0.26	0.29	0.57	0.01	0.02	0.01	0.01
FRESH CRUSTACEANS crab	8.40	29.40	2.06	7.20	0.69	2.40	2.57	9.00	0.26	0.90	0.17	0.60
crab claws	2.07	8.70	1.29	5.40	0.86	3.60	1.29	5.40	0.07	0.30	0.07	0.30
FRESH FISH/ FRESH WATER (LAKE, FARM) salmon farmed	5.57	20.06	0.57	2.06	0.14	0.51	1.93	6.94	0.29	1.03	0.07	0.26
FRESH FISH, FRESH WATER(INLAND HARBOUR, BRACKISH WATER) eel	2.83	5.66	0.56	1.11	0.24	0.49	12.40	24.80	0.37	0.74	0.16	0.31
FRESH FISH/ MARINE WATER												
Herring	3.34	10.03	0.34	1.03	0.09	0.26	1.16	3.47	0.17	0.51	0.04	0.13
Cod liver	0.97	4.02	0.48	1.99	0.06	0.25	4.39	18.19	0.24	0.99	0.20	0.83
Cod	8.50	22.50	1.94	5.14	0.49	1.29	28.17	74.57	9.23	24.43	4.37	11.57
Saithe liver	0.97	4.02	0.48	1.99	0.06	0.25	4.39	18.19	0.24	0.99	0.20	0.83
Saithe	6.00	22.50	1.37	5.14	0.34	1.29	19.89	74.57	6.51	24.43	3.09	11.57
Haddock	1.50	3.50	0.34	0.80	0.09	0.20	4.97	11.60	1.63	3.80	0.77	1.80
Mackerel	4.46	13.37	0.46	1.37	0.11	0.34	1.54	4.63	0.23	0.69	0.06	0.17
Flounder	0.66	2.96	0.43	1.93	0.06	0.26	3.46	15.56	0.91	4.11	0.40	1.80
Salmon (sea)	4.46	20.06	0.46	2.06	0.11	0.51	1.54	6.94	0.23	1.03	0.06	0.26
Fish for sandwich	3.34	8.91	0.34	0.91	0.09	0.23	1.16	3.09	0.17	0.46	0.04	0.11
Saltwater fish	3.30	16.97	0.20	1.03	0.20	1.03	22.20	114.17	12.60	64.80	5.00	25.71

Fish Product	6.30	10.50	1.50	2.50	0.30	0.50	21.00	35.00	6.90	11.50	3.30	5.50
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3 CONCLUSIONS

3 CONCLUSIONS

The 8 participating countries provided data available at the national levels on OTC occurrence, related to marine and freshwater fishes, crustaceans, molluscs, processed and canned fish and on their consumptions. The bulk of information allows to draw conclusions from different points of view and to provide suggestions for future work.

3.1 OCCURRENCE

Data were submitted by 8/8 countries; the available information on the occurrence of 6 OTC (TBT,DBT,MBT,TPT,DPT,MPT) was provided; the amount of submitted data was very different between the countries (number of occurrence data, number of fish species, more than a cluster of occurrence data for the same species, no mean values, different representativity of the occurrence data etc).

Bivalve molluscs accumulate TBT and derivatives more than the other fish species but also fresh-water fish groups may represent a source of exposure. Fresh marine fish presents high levels of OTC in liver. Fresh crustaceans and canned/processed fish group present lower level of OTC. Less data were available for TPT and derivatives, but the occurrence profile is not significantly different from TBT and derivatives.

Only Germany submitted occurrence data, on other OTC compounds MOT (monoctyl tin) DOT, (Dioctyltin) and TOT (Trioctyltin) in fish and fish products; the data are in a limited number of samples and always <LOD. In addition only Germany submitted occurrence data for TeBT (Tetrabutyltin) and TePT (Tetraphenyltin) in various fish species; but these were not considered further.

3.1.1 Analytical Quality Assurance

The analytical quality of the submitted data was guaranteed by the National Experts that had previously selected the data according to agreed parameters (reported in annexes to the questionnaire) and then had presented data together with the relevant and required details about Analytical Quality Assurance. Two Countries marked the whole set of their occurrence data as not suitable to calculate intake because they are too old or in insufficient amount.

3.1.2 Origin of the occurrence data

A big part of the presented occurrence data had been generated in the frame of environmental monitorings and therefore they are not strictly representative of the food that is really eaten from the people, or they represent just part of it.

3.2 FOOD CONSUMPTION

The major amounts of food consumption data are referred to fish groups. Basic differences exist in qualitative/quantitative composition of fish groups between the Member States. In fact, there are not common rules or settled scientific criteria to group foods or, specifically, fish foods and therefore the grouping has been made on the basis of national strategies. Therefore, on the basis of the provided information, only “qualitative” allocation of single species within the groups was possible. Consumption data were often not available for species for which occurrence data were provided. Different methods were used to produce food consumption data.

3.3 DIETARY INTAKE

The daily intakes submitted by the participating Countries ranged for each OTC from picograms to fractions of micrograms/day/kg body weight; the data are scattered in 3-4 orders of magnitude in the data expressed by population and in 1-2 orders of magnitude in the data expressed by consumers. The available intake data is inadequate for a rigorous comparison between the Countries, due to the different background of the intake data (difference in qualitative submission of occurrence data, origin of the occurrence data, differences in methods to estimate food consumption etc). Even with the above limitations, some evidences could be highlighted:

- once more it is confirmed that bivalve molluscs seem to be for the general population the major source of OTC between fish foods ; also marine fish and fresh water fish may contribute to daily intake, while crustaceans are a minor source of intake of OTC.
- daily intakes of OTC referred to consumers suggest that deeper studies should be carried out on high level consumers. In fact taking into account the ADI proposed for

TBT by CSTE in 1998 (1)¹⁹ (0.25 µg/day/kg bw) the data for bivalve molluscs in high level consumers from HE and DE account for more than 30% of the value; it is not agreed an ADI for DBT and MBT, but the contribution of these metabolites, especially DBT, could be relevant. Also the cumulative data for both TBT and TPT intake by coastal population in Norway (Fish, general product) approximate the values of ADI proposed for TBT by CSTE (1) and established for Triphenyltin (4)²⁰ compounds by WHO (0-0.5 µg/day/kg. bw).

Moreover, in the future, further studies data on real foods will be necessary to monitor other OTC used as plastic stabilizers, too. In fact the recent approval of several Organotin stabilizers in the EC Directive 2001/62/EC²¹, on material and articles in contact with foodstuffs harmonized the use of these substances at the EU level. Therefore, the eventual occurrence of these other OTC in packaged foods could be deepened, being this source different from the aquatic environment, until now the unique and monitored as major source identified for exposure to OTC.

3.4 FINAL OBSERVATIONS

The National Experts agreed about the necessity for the future time to plan targeted actions to produce OTC occurrence data on foods really eaten by consumers. The distinction between environmental monitoring and food contamination monitoring could be one of the keypoints for future strategies. Furthermore, it would be highly desirable to get harmonized or agreed guidelines to perform the whole monitoring plan, from the collection of the sample, to the measurements of OTC occurrence, to the production of food consumption data, to data handling to calculate intakes.

¹⁹ Opinion on the report by WS Atkins International Ltd (vol.A) "Assessment of the Risks to Health and to the Environment of Tin Organic Compounds in Antifouling Paint and of the Effects of Further Restrictions on their Marketing and Use", opinion expressed at the 6th CSTE plenary meeting, Brussels, 27 November 1998 http://europa.eu.int/comm/food/fs/sc/sct/outcome_en.html.

²⁰ Triphenyltin Compounds Concise International Chemical Assessment Document 13 WHO 1999

²¹ Commission Directive 2001/62/EC of 9 August 2001 amending Directive 90/128/EEC relating to plastic materials and articles intended to come into contact with foodstuffs.

A particular effort should be posed to produce daily intake data of OTC on consumers and especially on high-level consumers that show a major risk to approximate or exceed suggested ADI values. A special attention should be dedicated to the individuation of geographic areas national or most probably subnational, where consumption of fish is particularly high, to perform subgrouping for very high consumers.

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ANNEX 1

1. SUMMARIES OF SUBMITTED OCCURRENCE DATA

2. SUMMARIES OF SUBMITTED FOOD CONSUMPTION DATA

3. SUMMARIES OF SUBMITTED INTAKE DATA

1. SUMMARIES OF SUBMITTED OCCURRENCE DATA

1.1 BELGIUM

Belgium submitted data generated in 2001. OTC occurrence data (TBT,DBT) were presented for two fish species (sole, cod) ,gasteropods , mussels , and scallops . The unit used for the reported OTC concentrations is $\mu\text{g}/\text{kg}$ wet weight OTC . Minimum and maximum experimental values were given , without other information.

Sampling procedures no information

Point of sampling

Marine Harbour.

Treatment of samples no information

Analysis of samples

GC/MS (LOD was $20 \mu\text{g}/\text{kg}$) and for mussels ,GC/FPD, (LOD $0.2 \mu\text{g}/\text{kg}$)

Evidence of Analytical Quality Assurance

The analytical method is in development and not yet validated

Table *BE-occurrence* reports the food code and name, the OTC ,the year of sampling the detected values and a remark about their use for calculation of intake.

TABLE 45 BE OCCURRENCE***BELGIUM***

Food group code	Food name	Year of sampling	OTC	Concentration of specific OTC	Mean /Median level of specific OTC (M=mean; Me=median)	Min ug/kg	Max	Representative for intake calcul. (Y/N) Random / Targeted (R/T)
9,1,1,1	Sole	2001	DBT			< 20		Y/T
9,1,2,4	scallops	2001	DBT			< 20		N/T
9,1,1,30	cod	2001	DBT			< 20		
9,1,2,5	Gasteropods	2001	DBT			< 20		
9,1,1,1	Sole	2001	TBT			< 20		Y/T
9,1,2,4	scallops	2001	TBT			< 20	22	N/T
9,1,1,30	cod	2001	TBT			< 20	20	
9,1,2,5	Gasteropods	2001	TBT			< 20		
9,1,2,1	mussels	2002	TBT			1.5	3	

1.2 DENMARK

Occurrence data

The data provided, have been generated between 1998 and 2001.

OTC occurrence data (TBT,DBT,MBT TPT,DPT,MPT) were presented for fresh fish (cod liver and muscle, flounder liver and muscle) for Porpoise, for birds crabs and whelks, and for mussels (only TBT,DBT,MBT). The unit used for the reported OTC concentrations is $\mu\text{g}/\text{kg}$ wet weight. The mean levels of OTC were calculated only for those foods for which food consumption data were available. *Table DK-occurrence* reports Food group codes and name, OTC, the mean concentrations calculated for the specific OTC, the range of the experimentally detected values, the years, the number of samples, the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis. The complete occurrence raw data are reported in Technical Annex on CD ROM

Sampling Sampling was performed by the National Environmental Research Institute Denmark and Danish Forest and Nature Agency.

Fish:

Samples of fish are taken by net between November and January. Fish are stored in water filled plastic containers filled with seawater until the arrival at the lab. No extra measures are done at sampling or transportation to minimize exposure of the fish to sunlight or ambient temperatures. At arrival to the lab, the fish are dissected and frozen at -20 dg. C. If unable to dissect all samples immediately, the samples are frozen and dissected later.

Samples are kept in inert PE plastic bags at -20 dg C and darkness until analysis. Storage time is always below 3 months.

Birds

Samples of birds are obtained by hunting. Samples are kept in inert plastic bags until arrival at the lab, no extra measures are done at sampling or transportation to minimize exposure of the birds to sunlight or ambient temperatures. At arrival to the lab, the birds are dissected, tissues homogenized with a blender and frozen at -20 dg. C. If unable to dissect all samples immediately, the samples are frozen and dissected later.

Samples are kept in inert PE plastic bags at -20 dg C and darkness until analysis. Storage time is always below 3 months.

Porpoise:

Samples of Porpoise are taking from accidental catches by fishing boats. No special measures are taken from the time of catch to the arrival at the lab. At arrival, the porpoise is dissected, and the liver samples are homogenized with a blender and frozen at -20 dg. C.

Samples are kept in inert PE plastic bags at -20 dg C and darkness until analysis. Storage time is always below 3 months.

Crabs and whelks

Crabs and whelks are collected at size-ranges from 55 to 70 mm. After collection they are transported to the lab in water-filled plastic containers. No extra measures are done at sampling or transportation to minimize exposure of the fish to sunlight or ambient temperatures. At arrival to the lab, the crabs and whelks are dissected, homogenized with a blender, pooled in sample sizes of 10 individuals per site and frozen at -20 dg. C. If unable to dissect all samples immediately, the samples are frozen and dissected later.

Samples are kept in inert PE plastic bags at -20 dg C and darkness until analysis. Storage time is always below 3 months.

Mussels

Mussels are collected at size-ranges from 50 to 60 mm. After collection they are transported to the lab in water-filled plastic containers. No extra measures are done at sampling or transportation to minimize exposure of the mussels to sunlight or ambient temperatures. After arriving at the lab, the mussels are kept in running seawater for 12 h for depuration. After depuration, the mussels are dissected, homogenized with a blender, pooled in sample sizes of 25 individuals per site and frozen at -20 dg. C.

Samples are kept in inert PE plastic bags at -20 dg C and darkness until analysis. Storage time is always below 3 months

Chemical analysis

2 g (ww) of defrosted, homogenized tissue are treated with 1M HCL and ultrasonic treatment (US), and adjusted to pH 5 with NaOH and NaAcetate. Organic tin compounds are then extracted using a ethylation with NaEt₄B and liquid extraction (LE) with Pentane. The extracts are reduced under N₂ and detection is by GC-PFPD.

Analytical quality assurance (AQA)

In-house validation, CRM (BCR 646 and BCR 477 and in-house reference material) Proficiency tests (Quasimeme biota, water and sediments) and accreditation (DANAK) are all performed. Performances are satisfactory with recovery within certificate uncertainty thereby eliminating the need for correcting the data based on recovery. Z-scores are within ± 2 .

TABLE 46 DK
OCCURRENCE

Denmark

Food group code	Food name	OTC	Concentration in food (µg/kg)		Range of detected values (µg/kg)	n of samples	year	Representative for intake calcul. (Y/N) Random / Targeted (R/T)
			calculated with <LOD=0	calculated with <LOD=LOD/2				
9.1.1.30x1	Cod - liver	TBT	no<LOD	31.03	30.79-31.28		1999	Y/T
9.1.1.30x1	Cod - liver	DBT	no<LOD	11.28	9.42-13.15		1999	Y/T
9.1.1.30x1	Cod - liver	MBT	no<LOD	0.22	0.22-0.22		1999	Y/T
9.1.1.30x1	Cod - liver	TPT	no<LOD	71.80	60.74-82.85		1999	Y/T
9.1.1.30x1	Cod - liver	DPT	no<LOD	2.99	2.30-3.68		1999	Y/T
9.1.1.30x1	Cod - liver	MPT	no<LOD	1.07	0.66-1.49		1999	Y/T
9.1.1.30x2	Cod-muscle	TBT	no<LOD	29.0	22.72-81.61		1999	N/T
9.1.1.30x2	Cod-muscle	DBT	no<LOD	28.94	7.46-50.43		1999	N/T
9.1.1.30x2	Cod-muscle	MBT	no<LOD	5.59	0.22-10.96		1999	N/T
9.1.1.30x2	Cod-muscle	TPT	no<LOD	2.22	1.47-2.95		1999	N/T
9.1.1.30x2	Cod-muscle	DPT	no<LOD	1.15	1.15-1.15		1999	N/T
9.1.1.30x2	Cod-muscle	MPT	no<LOD	0.33	0.33-0.33		1999	N/T
9.1.1.30x4	Flounder-liver	TBT	no<LOD	43.08	10.75-97.00		1999	Y/T
9.1.1.30x4	Flounder-liver	DBT	no<LOD	216.70	92.03-392.45		1999	Y/T
9.1.1.30x4	Flounder-liver	MBT	no<LOD	14.37	6.07-28.73		1999	Y/T
9.1.1.30x4	Flounder-liver	TPT	no<LOD	90.13	30.66-188.70		1999	Y/T
9.1.1.30x4	Flounder-liver	DPT	no<LOD	8.12	1.15-22.07		1999	Y/T
9.1.1.30x4	Flounder-liver	MPT	no<LOD	0.33	0.33-0.33		1999	Y/T
9.1.2.1	Blue Mussel	TBT	no<LOD	28.75	18.57-41.54		2001	Y/T
9.1.2.1	Blue Mussel	DBT	no<LOD	17.75	8.44-25.51		2001	Y/T
9.1.2.1	Blue Mussel	MBT	no<LOD	1.94	0.22-5.48		2001	Y/T
9.1.2.1	Blue Mussel	TBT	no<LOD	56.64	6.38-332.79		2000	Y/T
9.1.2.1	Blue Mussel	DBT	no<LOD	14.71	0.98-76.41		2000	Y/T

9.1.2.1	Blue Mussel	MBT	no<LOD	15.30	1.08-130.08		2000	Y/T
9.1.2.1	Blue Mussel	TBT	no<LOD	18.61	3.52-70.94		1999	Y/T
9.1.2.1	Blue Mussel	DBT	no<LOD	7.43	0.29-26.29		1999	Y/T
9.1.2.1	Blue Mussel	MBT	no<LOD	11.39	0.83-107.33		1999	Y/T
9.1.2.1	Blue Mussel	TBT	no<LOD	50.65	4.56-230.31		1998	Y/T
9.1.2.1	Blue Mussel	DBT	no<LOD	4.91	0.65-17.70		1998	Y/T
9.1.2.1	Blue Mussel	MBT	no<LOD	31.72	3.32-186.90		1998	Y/T

1.3 GREECE

Greece submitted occurrence OTC data (TBT,DBT,MBT) in fresh bivalve molluscs, octopus and canned tuna samples, generated between 2001 and 2002. The mean concentration of TBT, DBT, MBT in the whole set of data for fresh seafood was calculated as a group, according to the grouping of consumption data presented by Greece. Therefore, for the group “Fresh bivalve molluscs, cephalopodes, crustaceans and echinoderm” the mean concentration was 21.9 µg/kg (TBT) 27 µg/kg (DBT) and 25 µg/kg (MBT) with LOD/2 when the experimental values were <LOD.

Occurrence data for Canned Tuna in Brine were presented, too; they were correlated to the group “Canned fish, fish roe, caviar, fish pies “. The experimental values were always <LOD, and the mean concentrations, calculated as above, were 2 µg/kg (TBT), 5 µg/kg (DBT), 3 µg/kg (MBT). Table HE reports Food group codes and name, OTC, the mean concentrations calculated 1) with <LOD=0 and 2)with <LOD =LOD/2, the range of the experimentally detected values, the year, the number of samples, the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis. The detailed occurrence data are reported in in Technical Annex on CD ROM

Point of the sampling

Fresh seafood was from Open Sea and was collected both from Farm and from fishing ground of the Greek area. Octopus samples were from fishing ground of Morocco and Canned tuna samples were produced in Italy.

Treatment of the samples

The individual samples were consisted of 50-70 fresh bivalve molluscs or 2.5 kg of octopus (3 individuals). Immediately after sampling, the samples were transported to the laboratory where all the bivalves and approximately 1 kg of octopus were homogenized. Approximately 100 g of sub-

sample were removed from the homogenized sample and placed in a dark glass bottle and stored at -20°C for analysis.

The canned tuna sample was consisted of 5 cans. They were opened and the brine was removed, the content was homogenized and a sub-sample of 100 g was placed in dark glass bottle and stored at -20°C for analysis.

Analysis of samples

Approximately 0.5 – 1.0 g of wet homogenized sample was placed in a glass beaker, dissolved with TMAH (25%), sonicated for 5 min, diluted with water (15 ml), transferred in a volumetric flask and the pH of the solution was adjusted to 5 by adding 1 ml of acetic acid and 10 ml of an acetate buffer. 1 ml of tetraethylborate solution (2%) was added, along with 1 ml of hexane and the flask was shaken for 5 min. Then the flask was stood for 20 min and then centrifuged for 10 min to separate the organic extract. 1 μl of this extract was injected into the GC-FPD instrument (column: HP-1, id: 0.53 mm). Calibration was performed with high purity ethylated organotin standards in hexane obtained by IVM, the The Netherlands. CRM 477 was analyzed in parallel with samples.

EVIDENCE OF AQA

The method was validated. The Laboratory uses certified reference materials for TBT, DBT, MBT in mussels (CRM 477). Class 100 Clean room facilities are used

TABLE 47 HE _MEAN OCCURRENCE GREECE

Food group code	Food name	OTC	Mean Concentration in food group (µg/kg)		Range of detected values (µg/kg)	n of samples	year	Representative for intake calcul. (Y/N) Random / Targeted(R/T)
			calculated with <LOD =0	calculated with <LOD =LOD/2				
9.1.2, 9.1.3, 9.1.4 and 9.1.5	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	TBT	21.4	21.9	<4 - 61	16	2001 - 2002	Y/R
9.1.2, 9.1.3, 9.1.4 and 9.1.5	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	DBT	25.6	27.1	<10 - 127	16	2001 - 2002	Y/R
9.1.2, 9.1.3, 9.1.4 and 9.1.5	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	MBT	24.1	25	<6 - 151	16	2001 - 2002	Y/R
9,4	Canned fish, fish roe, caviar, fish pies	TBT	0	2	<4	1	2001 - 2002	Y/R
9,4	Canned fish, fish roe, caviar, fish pies	DBT	0	5	<10	1	2001 - 2002	Y/R
9,4	Canned fish, fish roe, caviar, fish pies	MBT	0	3	<6	1	2001 - 2002	Y/R

1.4 GERMANY

OCURRENCE DATA

The National Contact point analysed and evaluated 9000 single occurrence data, that were produced between 2000 and 2002.. The reported data are referred to monitoring studies performed in different regions from the Country (Länder).. OTC occurrence data were provided for 69 different types of sea foods. Mean concentrations of TBT, DBT, MBT, TPT,DPT, MPT have been calculated after grouping occurrence data in 6 food groups, according to the food consumption data in Germany. Also data on Tetrabutyltin (TeBT) and Tetraphenyltin (TePT) were submitted and are reported. Mean concentrations were calculated both with < LOD =0 and <LOD=LOD/2. In the raw data (see technical annex on CD ROM) the single species and the occurrence data are reported.

TABLE 48 Sample collected year /sample analysed year

	Fresh fish farm lake	Fresh Fish Inland waterways harbour	Fresh Fish marine	Mussels	Fresh crustaceans	Processed fish.Fish products
SUAH Staatliches Untersuchungsamt Hessen	00/00	00/00	00/00	00/00	00/00	00/00 01/01
B Berlin	01/01 02/02	01/01	02/02			
Bay Bayern	00/00 00/01 01/01	01/01	00/01 01/01	00/01 01/01		01/01
BaWü Baden Württemberg	00/01 01/01	01/01 02/02	01/01	01/01 02/02		
NRW Nordrhein Westfalen		00/01	01/01			
NRWM Nordrhein Westfalen Münster	01/01	01/01				

RLP Rheinland Pfalz	00/00	99/00	00/00 01/01	00/00		99/00
SLH Schleswig Holstein		01/02	01/02	01;02/ 02	01/02	
CUX Cuxhaven		99/00	00/00 00/01 01/01	00/00	00/00	00/01 01/01
MV Mecklenbur g Vorpommer n			01/02			

Sampling procedures , Point of sampling, sample pretreatment

DE/SUAH :All samples were homogenized in the laboratory and were stored cooled at -18°C till they were analyzed.

DE/BAY /01:The fish of the monitoring were sampled by professional fishermen at the south-bavarian lakes (Ammersee, Bodensee, Chiemsee, Tegernsee a.o.) and could mostly come into commerce.All samples were stored at -20°C between sampling and analysis.

DE/BAY /02 :All samples were collected in shops in northern Bavaria. Transportation has been done under cooled conditions. Samples were stored at 4°C between sampling and analysis (Fish products).

Chemical Analysis

Cux 001 (official German § 35 standard-procedure)

Decomposition of the matrix by TMAH-reagent; Ethylation with $\text{NaB}(\text{Et})_4$; Simultaneous Extraction into n-hexane; Clean-up on a deactivated Florisil/ Al_2O_3 – Column;

GC Conditions Column: 60 m / 0,25 mm / 0,25 μ DB-5; Carrier H_2 ; Injection: 2 μl pss; Detection: FPD with enhanced oxidant (40 % O_2); Quantification: using TPrT and DOcT as internal standards Control of GC-Results by means of GC-MS/MS (Ion trap).

NRW/ 01

a)

1. Extraction: (DE 002)

5 g sample + ISTD tetrapentyltin+ 30 ml toluol;30 min shake and 5 min centrifugation;Filter by sodium sulfat and evaporate to 1 ml.

2. Derivatisation: (DE 003)

Derivatisation with methylmagnesiumchloride

3. Cleaning: (DE 002)

Cleaning by SPE: 10 g florisil, 10 g aluminiumoxide and 10 g sodium sulfat

4. Measuring:GC/LRMS, SIM, EI

b)

Method of the "Staatliche Veterinäruntersuchungsamt für Fisch und Fischereiwaren" Cuxhaven (preliminary method M/DE/Cux 001, 16.06.2000):

2 g sample + ISTD (TprT);Decomposition of the matrix with TMAH

(tetramethylammoniumhydroxide);Derivatisation with sodium tetraethylborate;Cleaning with kieselgel;Measuring by GC/HRMS, SIM, EI

SUAH

Determination of Organotin compounds in fish and mussels with GC techniques. Method of the official German §35 standard-procedure (february 2002)

BAY/01

Sample preparation for the speciation of OT-compounds in marine biomaterials is using a tetramethylammoniumhydroxide solubilisation. Derivatisation and extraction is carried out in situ at pH 4.5 using tetraethylborate in the presence of isooctane after adding tripropyltin as internal standard. After shaking 30 min an aliquot of the isooctan-extract was directly injected into the GC-MS.

BAY/02

Samples were homogenized and extracted with acetonitrile in the presence of tropolone after adding the internal Standards monoheptyltin, diheptyltin, and tripropyltin. Derivatisation is carried out at pH 4.2-4.5 using tetraethylborate in the presence of n-hexane. After shaking 15 min at roomtemperature an aliquot of the hexane-extract was directly injected into the GC-MS.

RLP(Official German § 35 Standard procedure)

Samples were homogenized. Decomposition of the matrix by the TMAH-reagent. Ethylation with NaB(Et)₄. Simultaneous extraction into hexane. Clean-up and detection with GC-HRMS

SH

Official German § 35 standard-procedure

BW

Extraction Technique and Pretreatment:alkaline hydrolyse using 20 % tetramethylammonium hydroxide (1 hour at 60°C); LE with methanol/dichloromethane/tropolone by adjustment to pH 5; ethylation of ionic OTC with sodium tetraethylborate and extraction into n-hexene; Instrumental determination:GC-FPD, GC-MSD

TABLE 49
EVIDENCE FOR AQA

	Proficiency testing	Certified Reference Material	Accreditation	In house validation	National Intercomparison exercise
UAH	BGVV Fish Mussels				
B					
Bay	BCR mussel tissue	CRM (TBT, DBT, MBT)			
BaWü				spiked materials, recovery, reagents blank, GC/MS confirmation for low levels	
NRW		BCR CRM for mussels	SAL-NRW-L007.0 5.98	spiked materials	
NRWM					
RLP					BgVV for admission as a official German § 35 standard-procedure
SLH		CRM477 (TBT, DBT, MBT)			
CUX	BGVV Fish Mussels			Control of the results, reconfirmation GC/MS/MS ion trap	BgVV for admission as a official German § 35 standard-procedure
MV					

Table DE-occurrence

The *Table DE -occurrence* reports the food group code, identification and name, the detected OTC, the calculated mean concentrations, the n of samples and the range of the detected values, the year, the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis. The indication DE/1-6 in the second column is referred to the 6 food groups developed in Germany.

TABLE 50 DE OCCURRENCE

GERMANY

Food group code	Food Identification (country)	Food name	OTC	Mean concentration in food group (µg/kg)			Range of detected values (µg/kg)	year	Representative for intake calcul. (Y/N) Random / Targeted(R/T)
				calculated with <LOD=0 ²²	calculated with <LOD=L OD/2 ²³	n of samples			
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.85	5.13	359	<LOD / 88	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.13	2.67	291	<LOD / 12	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.55	4.78	358	<LOD / 116	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0	2.5	68	<LOD / <LOD	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	19.79	22.34	362	<LOD / 125	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	TeB T	0	2.5	83	<LOD / <LOD	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	TeP T	0	2.5	54	<LOD / <LOD	2000-2002	Y/R
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	9.92	11.56	344	<LOD / 152	2000-2002	Y/R

²² mean concentrations calculated with <LOD=0 and <LOD=LOD/2 were calculated in some instances with different n

²³ mean concentrations calculated with <LOD=0 and <LOD=LOD/2 were calculated in some instances with different n

9.1.1	DE/2	Fresh Fish Inland water ways/ harbour	DBT	1.63	2.69	237	<LOD / 25	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	DPT	0.42	6.9	218	<LOD / 30	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	MBT	0.16	3.23	236	<LOD / 8	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	MPT	0.11	3.5	61	<LOD / 5	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TBT	16.91	43.81	237	<LOD / 305	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TeBT	0.10	5.79	203	<LOD / 8	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TePT	0	2.5	41	<LOD / <LOD	1999- 2002	Y/R
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TPT	10.05	20.67	224	<LOD / 67	1999- 2002	Y/R
9.1.1	DE/3	Fresh Fish marine	DBT	0.32	1.67	529	<LOD / 15	2000- 2002	Y/R
9.1.1	DE/3	Fresh Fish marine	DPT	0.06	0.83	527	<LOD / 8	2000- 2002	Y/R
9.1.1	DE/3	Fresh Fish marine	MBT	0.12	1.3	530	<LOD / 3	2000- 2002	Y/R
9.1.1	DE/3	Fresh Fish marine	MPT	0	1.45	90	<LOD / <LOD	2000- 2002	Y/R
9.1.1	DE/3	Fresh Fish marine	TBT	3.18	8.78	530	<LOD / 78	2000- 2002	Y/R
9.1.1	DE/3	Fresh Fish marine	TeB T	0	0.82	493	<LOD / <LOD	2000- 2002	Y/R

9.1.1	DE/3	Fresh Fish marine	TePT	0	2.5	44	<LOD / <LOD	2000-2002	Y/R
9.1.1	DE/3	Fresh Fish marine	TPT	5.14	4.48	510	<LOD / 26	2000-2002	Y/R
									Y/R
9.1.2	DE/4	Bivalve molluscs	DBT	16	16.46	161	<LOD / 236	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	DPT	0.14	2.19	145	<LOD / 10	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	MBT	3.43	5.15	212	<LOD / 157	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	MPT	0	2	51	<LOD / 3	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	TBT	53.06	49.42	161	<LOD / 558	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	TeBT	0	2.14	67	<LOD / <LOD	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	TePt	0	2.5	12	<LOD / <LOD	2000-2002	Y/R
9.1.2	DE/4	Bivalve molluscs	TPT	4.89	5.54	118	<LOD / 58	2000-2002	Y/R
									Y/R
9.1.4	DE/5	Fresh crustaceans	DBT	0.67	0.87	15	<LOD / 2	2000-2002	Y/R
9.1.4	DE/5	Fresh crustaceans	DPT	0	0.77	15	<LOD / <LOD	2000-2002	Y/R
9.1.4	DE/5	Fresh crustaceans	MBT	0.67	0.87	15	<LOD / 2	2000-2002	Y/R
9.1.4	DE/5	Fresh crustaceans	MPT	0	0.5	1	<LOD / <LOD	2000-2002	Y/R
9.1.4	DE/5	Fresh crustaceans	TBT	4	2.97	15	<LOD / 12	2000-2002	Y/R
9.1.4	DE/5	Fresh crustaceans	TeBT	0	0.77	15	<LOD / <LOD	2000-2002	Y/R
9.1.4	DE/5	Fresh crustaceans	TPT	8	1.08	13	<LOD / 8	2000-2002	Y/R
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.05	2.75	201	<LOD / 5	1999-2001	Y/R
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0	2.16	201	<LOD / 24,5	1999-2001	Y/R

9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	20.01	13.55	201	<LOD / 1920	1999- 2001	Y/R
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0	2.5	39	<LOD / <LOD	1999- 2001	Y/R
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	6.48	7.44	201	<LOD / 43	1999- 2001	Y/R
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0	0.57	113	<LOD / <LOD	1999- 2001	Y/R
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.47	4.04	187	<LOD / 16	1999- 2001	Y/R

1.5 THE NETHERLANDS

The Netherlands submitted occurrence OTC data for 15 types of food samples. generated between 1999 and 2000. OTC occurrence data (TBT,DBT,MBT TPT,DPT and MPT) were presented for fresh fish (herring, plaice, sole, cod, dab, mackerel, pike perch, whiting and eel) crustaceans (shrimps) and for bivalve molluscs (mussels, oysters, cockle). Occurrence data on Fish oil were presented, too.

NL calculated mean OTC concentrations for all the submitted food samples, independently from their use for intake calculations.

The mean values were calculated with both $<LOD=0$ and with $<LOD=LOD/2$.

Table *NL occurrence* reports the food code and name, the OTC, the calculated mean concentrations and the detected ranges, (the number of samples, the year, the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis. The detailed occurrence raw data are reported in in Technical Annex on CD ROM

Point of sampling

Samples were collected on the fishing grounds in the North Sea, Wadden Sea, Scheldt Estuary and “Markermeer” and “IJsselmeer”. This are the normal places were fish is caught for Dutch consumption.

Treatment of samples

Fish samples were cleaned and 25 filets were mixed to make 1 homogeneous sample. For shrimps 0.5 kg boiled and the peeled species were mixed make one homogeneous sample. For mussels 0.5 kg was mixed and homogenized. Samples analysed:3

Analysis of samples

To maximal 5 g of sample (containing not more than 100 mg fat) 5 ml of water is added and the mixture is homogenised during 15 minutes. The pH is adjusted tot 1.5 to 2.2 by adding hydrochloric acid. The organotin compounds are extracted twice with 12 ml of a 0.02 % solution of tropolon in diethyl ether. The combined ether fractions are dried over sodium sulphate and the volume is reduced to 0.5 ml. After the addition of 0.1 ml of the internal standard solution (dibutyldihexyltin and triphenylhexeyltin in n-hexane), the organotin compounds are pentylated by adding 7.5 ml of

pentylmagnesium bromide in n-hexane. The excess Grignard reagent is neutralised by adding 1 M ammonium chloride in water. The organic fraction is separated and purified over a column filled with 25 g of fully activated alumina. The organotin compounds are eluted with 75 ml of n-hexane / diethyl ether (80/20). The eluate is concentrated to a volume of 1.1 ml and 3 µl is injected into a Varian gas chromatograph equipped with a Varian Saturn IV ion-trap mass-selective detector. The column is a SGE 25QC2 BPX-5 (25 m x 0.22 mm x 0.25 µm) protected by a deactivated fused silica retention gap (2 m x 0.53 mm). Quantification is by peak height recoveries: see performance characteristics for CRM (accuracy); data are corrected for recoveries external calibration at three (nearest out of five) concentration levels

ANALYTICAL QUALITY ASSURANCE

The method was validated. The Laboratory participated to Proficiency testing and uses CRM.

Table 51 NL OCCURRENCE

THE NETHERLANDS

Food group code	Food name	OTC	Mean Concentration in food (µg/kg)		Range of detected values (µg/kg)	n of samples	years	Representative for intake calcul. (Y/N) Random / Targeted(R/T)
			calculated with <LOD=0	calculated with <LOD=LOD/2				
9.1.1.2	Eel	MBT	1.2	1.2	0.7-1.8	3	2000	Y/R
9.1.1.2	Eel	DBT	2.1	2.1	1.2-2.5	3	2000	Y/R
9.1.1.2	Eel	TBT	17	18	<7-32	3	2000	Y/R
9.1.1.2	Eel	MPT	0.3	0.4	<0.3-1	3	2000	Y/R
9.1.1.2	Eel	DPT	0	3	<6-<6	3	2000	Y/R
9.1.1.2	Eel	TPT	42	42	38-47	3	2000	Y/R
9.1.4.3	Shrimp	MBT	1.6	1.6	0.6-4	4	2000	Y/R
9.1.4.3	Shrimp	DBT	1.6	1.6	0.8-2.9	4	2000	Y/R
9.1.4.3	Shrimp	TBT	14	14	4.6-20	4	2000	Y/R
9.1.4.3	Shrimp	MPT	0	0.1	>0.2-0.2	4	2000	Y/R
9.1.4.3	Shrimp	DPT	0.3	0.5	<0.7-1.1	4	2000	Y/R
9.1.4.3	Shrimp	TPT	3	3	<0.3-5.6	4	2000	Y/R
9.1.1.30X1	Herring	MBT	0.2	0.2	<0.12-0.3	2	1999 - 2000	Y/R
9.1.1.30X1	Herring	DBT	2.5	2.5	1.2-3.9	2	1999 - 2000	Y/R
9.1.1.30X1	Herring	TBT	17	17	11-22	2	1999 - 2000	Y/R

9.1.1.30X 1	Herring	MPT	0.8	0.8	<0.2-1.,5	2	1999 - 2000	Y/R
9.1.1.30X 1	Herring	DPT	0.4	1.5	<5.5-0.7	2	1999 - 2000	Y/R
9.1.1.30X 1	Herring	TPT	4.9	4.9	3-6.8,	2	1999 - 2000	Y/R
9.1.1.30X 2	Cod	MBT	0.1	0.1	n=1		2000	Y/R
9.1.1.30X 2	Cod	DBT	0	0.1	n=1		2000	Y/R
9.1.1.30X 2	Cod	TBT	1	1	n=1		2000	Y/R
9.1.1.30X 2	Cod	MPT	0	0.1	n=1		2000	Y/R
9.1.1.30X 2	Cod	DPT	0	0.3	n=1		2000	Y/R
9.1.1.30X 2	Cod	TPT	2.1	2.1	n=1		2000	Y/R
9.1.1.30X 3	Cockle	MBT	0.6	0.6	0.6-0.6	2	2000	Y/R
9.1.1.30X 3	Cockle	DBT	2.5	2.5	2.4-2.5	2	2000	Y/R
9.1.1.30X 3	Cockle	TBT	13	13	13-13	2	2000	Y/R
9.1.1.30X 3	Cockle	MPT	0.2	0.2	0.2-0.2	2	2000	Y/R
9.1.1.30X 3	Cockle	DPT	0.7	0.7	0.5-0.9	2	2000	Y/R
9.1.1.30X 3	Cockle	TPT	5.3	5.3	2.9-7.7	2	2000	Y/R
9.1.1.30X 4	Mackere l	MBT	1	1	n=1		2000	Y/R
9.1.1.30X 4	Mackere l	DBT	2.2	2.2	n=1		2000	Y/R
9.1.1.30X 4	Mackere l	TBT	11	11	n=1		2000	Y/R
9.1.1.30X 4	Mackere l	MPT	0	0.5	n=1		2000	Y/R
9.1.1.30X 4	Mackere l	DPT	0	1.7	n=1		2000	Y/R
9.1.1.30X 4	Mackere l	TPT	5	5	n=1		2000	Y/R
9.1.2.2	Oysters	MBT	0.9	0.9	n=1		2000	Y/R

9.1.2.2	Oysters	DBT	3.1	3.1	n=1		2000	Y/R
9.1.2.2	Oysters	TBT	32	32	n=1		2000	Y/R
9.1.2.2	Oysters	MPT	0.2	0.2	n=1		2000	Y/R
9.1.2.2	Oysters	DPT	1.1	1.1	n=1		2000	Y/R
9.1.2.2	Oysters	TPT	8.2	8.2	n=1		2000	Y/R
9.1.2.1	Mussel	MBT	2.3	2.3	1.5-3	3	2000	Y/R
9.1.2.1	Mussel	DBT	8.5	8.5	5.1-11	3	2000	Y/R
9.1.2.1	Mussel	TBT	21	21	19-22	3	2000	Y/R
9.1.2.1	Mussel	MPT	0.1	0.1	<0.2-0.2	3	2000	Y/R
9.1.2.1	Mussel	DPT	0.7	0.7	<1.4-0.7	3	2000	Y/R
9.1.2.1	Mussel	TPT	12	12	5.6-19	3	2000	Y/R
9.1.1.30X 5	Dab	MBT	0.3	0.3	<0.1-0.4	4	2000	Y/R
9.1.1.30X 5	Dab	DBT	0.5	0.6	<0.4-0.8	4	2000	Y/R
9.1.1.30X 5	Dab	TBT	2.4	2.5	<0.5-4.1	4	2000	Y/R
9.1.1.30X 5	Dab	MPT	0.3	0.5	<0.2-0.3	4	2000	Y/R
9.1.1.30X 5	Dab	DPT	1.7	1.7	0.7-2.8	4	2000	Y/R
9.1.1.30X 5	Dab	TPT	15	15	9.4-21	4	2000	Y/R
9.1.1.30X 6	Plaice	MBT	0.2	0.2	<0.1-0.4	5	2000	Y/R
9.1.1.30X 6	Plaice	DBT	0.8	0.9	<0.2-1.8	5	2000	Y/R
9.1.1.30X 6	Plaice	TBT	1.8	1.9	<0.5-3.9	5	2000	Y/R
9.1.1.30X 6	Plaice	MPT	0.3	0.5	<0.2-0.7	5	2000	Y/R
9.1.1.30X 6	Plaice	DPT	1.3	1.5	<0.5-4.1	5	2000	Y/R
9.1.1.30X 6	Plaice	TPT	22	22	4.7-44	5	2000	Y/R

9.1.1.30X 7	Sole	MBT	0.6	0.6	<0.1-1.6	5	2000	Y/R
9.1.1.30X 7	Sole	DBT	0.7	0.7	<0.2-1.8	5	2000	Y/R
9.1.1.30X 7	Sole	TBT	2.1	2.1	0.2-6.3	5	2000	Y/R
9.1.1.30X 7	Sole	MPT	0.2	0.2	<0.2-0.3	5	2000	Y/R
9.1.1.30X 7	Sole	DPT	1.4	1.4	<0.5-2.1	5	2000	Y/R
9.1.1.30X 7	Sole	TPT	19	19	3.2-35	5	2000	Y/R
9.1.1.30X 8	Pike Perch	MBT	0.1	0.2	<0.1-0.3	2	2000	Y/R
9.1.1.30X 8	Pike Perch	DBT	0.8	0.8	0.6-1	2	2000	Y/R
9.1.1.30X 8	Pike Perch	TBT	7.8	7.8	5.9-9.8	2	2000	Y/R
9.1.1.30X 8	Pike Perch	MPT	0.4	0.4	0.3-0.5	2	2000	Y/R
9.1.1.30X 8	Pike Perch	DPT	3.9	3.9	2.1-5.7	2	2000	Y/R
9.1.1.30X 8	Pike Perch	TPT	28	28	11-44	2	2000	Y/R
9.1.1.30X 9	Whiting	MBT	0.1	0.2	<0.1-0.3	2	2000	Y/R
9.1.1.30X 9	Whiting	DBT	0.5	0.5	<0.2-1	2	2000	Y/R
9.1.1.30X 9	Whiting	TBT	2.4	2.6	<0.5-4.9	2	2000	Y/R
9.1.1.30X 9	Whiting	MPT	0.1	0.1	<0.2-0.2	2	2000	Y/R
9.1.1.30X 9	Whiting	DPT	0	0.4	<0.5-<0.9	2	2000	Y/R
9.1.1.30X 9	Whiting	TPT	3.7	3.7	1.2-6.2	2	2000	Y/R
2.1.3	Fish Oil	MBT	0	1.2	<2.4-<2.5	2	2000	Y/R
2.1.3	Fish Oil	DBT	3	4.6	<4.3-12	2	2000	Y/R
2.1.3	Fish Oil	TBT	12	27	<39-46	2	200 0	Y/R
2.1.3	Fish Oil	MPT	0	1.4	<2.8-<3.0	2	2000	Y/R
2.1.3	Fish Oil	DPT	0	5.9	<11-<12	2	2000	Y/R

2.1.3	Fish Oil	TPT	3.5	6.4	<7.7-14	2	2000	Y/R
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1.6 FRANCE

France submitted data generated in 1993. OTC occurrence data (TBT, DBT, MBT) were presented for different species of molluscs (scallop, several sections) mussels and oysters. The unit used for the reported OTC concentrations is $\mu\text{g}/\text{kg}$ wet weight OTC. Table *FR occurrence* reports the food code and name, the detected OTC the year of sampling the mean concentrations and the range of the detected values, the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis.

The complete raw data are reported on technical Annex on CD-ROM

Origin of the samples

Scallop and Mussel samples were from retail market, oyster from origin

Sampling procedure

Point of sampling The national contact point for consultation of details send to F. Pannier et al., Anal. Chim. Acta, 287 (1994) 17-24 F. Pannier et al., Anal. Chim. Acta, 327 (1996) 287-293

Treatment of samples

The interval between sampling and analysis was 1 week

Analysis of samples

LE-US-HG-GC-QFAAS; (acid method, for oyster, mussels and scallops)

Enzymatic E-HG-GC-QFAAS (enzymatic method for mussel and scallops)

Analytical Quality Assurance

The Laboratory has neither general nor specific accreditation for OTC and did not attend to proficiency tests, but used CRM (NIES freeze-dried fish); the method was validated and spiked samples were analysed, too.

Table 52 FR OCCURRENCE

FRANCE

Food group code	Food name	OTC	Mean Conc. µg/kg	Range of detected values (µg/kg)	n of samples	Year	Representative for intake calculation (Y/N) Random or Targeted (R/T)
9.1.2.2	Oyster	MBT	119	no data	1	1993	N/T
9.1.2.2	Oyster	DBT	109	no data	1	1993	N/T
9.1.2.2	Oyster	TBT	400	no data	1	1993	N/T
9.1.2.1	Mussel	MBT	105	no data	1	1993	N/T
9.1.2.1	Mussel	DBT	212	no data	1	1993	N/T
9.1.2.1	Mussel	TBT	483	no data	1	1993	N/T
9.1.2.1	Mussel	MBT	95	no data	1	1993	N/T
9.1.2.1	Mussel	DBT	202	no data	1	1993	N/T
9.1.2.1	Mussel	TBT	494	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	MBT	101	no data	1	1993	N/T
9.1.2	Scallop adductor	DBT	129	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	TBT	474	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	MBT	70	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	DBT	58	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	TBT	299	no data	1	1993	N/T
9.1.2	Scallop Gonad	MBT	46	no data	1	1993	N/T
9.1.2	Scallop	DBT	52	no data	1	1993	N/T

	Gonad						
9.1.2	Scallop Gonad	TBT	244	no data	1	1993	N/T
9.1.2	Scallop whole animal	MBT	65	no data	1	1993	N/T
9.1.2	Scallop whole animal	DBT	69	no data	1	1993	N/T
9.1.2	Scallop whole animal	TBT	307	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	MBT	124	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	DBT	146	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	TBT	444	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	MBT	116	no data	1	1993	N/T
9.1.2	Scallop adductor muscle	DBT	136	no data	1	1993	N/T
9.1.2	Scallop adductor muscle)	TBT	458	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	MBT	81	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	DBT	74	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	TBT	274	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	MBT	76	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	DBT	69	no data	1	1993	N/T
9.1.2	Scallop mantle and visceral mass	TBT	280	no data	1	1993	N/T
9.1.2	Scallop Gonad	MBT	57	no data	1	1993	N/T

9.1.2	Scallop Gonad	DBT	54	no data	1	1993	N/T
9.1.2	Scallop Gonad	TBT	225	no data	1	1993	N/T
9.1.2	Scallop Gonad	MBT	55	no data	1	1993	N/T
9.1.2	Scallop Gonad	DBT	51	no data	1	1993	N/T
9.1.2	Scallop Gonad	TBT	236	no data	1	1993	N/T

1.7 ITALY

The data provided, have been generated between 1995 and 2000 in four different studies, individually reported .

OTC occurrence data (TBT,DBT,MBT TPT,DPT,MPT) have been presented for fresh fish (gilthead breams, salmon fillets and trout gobies, atherina and eels) for crabs and for mussels. The unit used for the reported OTC concentrations is $\mu\text{g}/\text{kg}$ wet weight

Sampling procedures, Point of the sampling, Treatment of the samples

ref. IT-001: mussel samples were collected in five different busy dockyard areas, one boat-demolition site and two aquaculture areas in southern part of the lagoon of Venice . Samplings were made as follows: 60 individual mussels were collected and subsequently divided into two classes, the first with a maximum length of 2.7 ± 0.2 cm, the other with a maximum length of 4.9 ± 0.4 cm. These classes are respectively referred as YOUNGS and ADULTS. Samples were collected in June and November 1996. After collection, the mussels were removed from their shells, homogenized, frozen, lyophilised and stored at -20°C until analysis.

ref. IT-002: samples of mussels were collected between March and August 1995 from northern Adriatic harbours and coastal environments, then immediately frozen, homogenized and freeze-dried for 48 hours.

ref. IT-003: samples of mussels, gilthead breams, salmon fillets and trouts were collected at retail stores and/or from anglers in the Gulf of Naples. Specimens were collected in glass jars and immediately stored in ice until the arrival on the analytical laboratory. Upon arrival, all the samples were immediately processed. The samples were collected and analyzed between June 1997 and May 1998.

ref. IT-004: samples of mussels, clams, crabs, gobies, atherina and eels were collected in 12 different sites within the Lagoon of Venice. At least 500 g of each species were sampled, then divided into five 100 g subsamples. Each subsample was homogenized and frozen at -20°C until analysis. The samples were collected and analyzed within 1999.

Analysis of samples

IT-001:(analysis performed by Dept. of Inorganic, Metallorganic and Analytical Chemistry, University of Padua, Italy):Approx. 0.2 g of homogenized and lyophilised sample were treated with tetramethylammonium hydroxide (25%) and digested at 60°C for 2 hours. Then, pH was adjusted to 4.5 with acetic acid. The resulting solution was made up to 250 mL. A 100 mL portion was withdrawn, added with 1 mL of 2% NaBEt_4 solution and 2 mL of n-hexane, already containing an internal standard. The solution was vigorously stirred for 30 min. The organic phase was finally cleaned-up by filtering on alumina, and injected in the GC/MS.

IT-002: (analysis performed by Dept. of Pharmacology, Lab. of Toxicology, University of Padua, Italy): Approx. 10 g of homogenized sample were pentylated by reacting with a Grignard reaction with pentylmagnesium bromide in ethyl ether. The resulting solution was finally filtered through Florisil, then injected in the GC/MS.

IT-003: (analysis performed by Dept. of Food Science, “Federico II” University, Naples – Italy): 10 mussels or 100 g of fish meat specimens were pooled and homogenized, then derivatized and analysed by capillary gas chromatography – flame photometric detection.

IT-004: (analysis performed by Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto – Dip.to Provinciale di Venezia – Mestre – Italia) : Approx. 500 mg of lyophilised sample was treated with 15 mL of 0.03% tropolone in methanol and 1 mL of concentrated HCl, by sonicating 15 min, taking care to maintain the solution above 40°C. The resulting solution was centrifuged at 3000 rpm for 10 min. The resulting solution was transferred in a separating funnel and added with 15 mL of CH₂Cl₂, then extracted twice with 100 mL of 5% aqueous NaCl. The organic phase was dried over anhydrous sodium sulfate. The organic phase was then reduced to 1 mL and 1 mL of 2 M pentylmagnesium bromide in ethyl ether was added, together with an internal standard. After 5 min at ambient temperature, the solution was added with 2 mL of water, in order to destroy any excess of alkylating reagent. Finally, 2 mL of n-hexane and 5 mL of 1M aqueous H₂SO₄ were added, and vigorously shaken. After phase separation, the organic phase was transferred to a test tube, reduced to about 1 mL and loaded on a small column packed with SiO₂, and eluted with n-hexane - toluene (1:1). The obtained solution was reduced to a small volume and injected in the gas chromatograph – mass spectrometer.

EVIDENCE OF AQA

Laboratory IT 004 uses CRM 477 Reference material

TABLE IT OCCURRENCE

The mean levels of OTC were calculated only for those foods for which food consumption data were available, even if as a group, and that were deemed as representative. Data were submitted for TBT, DBT, MBT, TPT, DPT, MPT. Table IT occurrence reports Food group codes and name, OTC, the mean concentrations calculated 1) with $\langle \text{LOD} = 0$ and 2) with $\langle \text{LOD} = \text{LOD}/2$, the range of the experimentally detected values, the number of samples, the years, the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis. The other occurrence data are reported in Technical Annex on CD ROM

TABLE 53 IT OCCURRENCE

ITALY

Food group code	Food name	OTC	Concentration in food (µg/kg)		Range of detected values (µg/kg)	n of samples	year	Representative for intake calculation (Y/N) Random or Targeted (R/T)
			calculated with <LOD=0	calculated with <LOD =LOD/2				
9.1.2.1	mussel	TBT	20.0	20.0	2-260	no data	1995	Y/R
9.1.1.13	sea bass	TBT	20.4	24.0	<LOD - 120	13	1998	Y/R
9.1.1.13	sea bass	DBT	3.4	10.0	<LOD - 26	13	1998	Y/R
9.1.1.30x10	gilthead bream	TBT	19.2	38.0	<LOD - 260	15	1998	Y/R
9.1.1.30x10	gilthead bream	DBT	0.0	0.5	<LOD - 0.5	15	1998	Y/R
9.1.3.4.x.1	salmon (fillet)	TBT	22.2	44.0	<LOD - 64	6	1998	Y/R
9.1.3.4.x.1	salmon (fillet)	DBT	0.0	0.5	<LOD - 0.5	6	1998	Y/R
9.1.3.4.x.2	trout	TBT	9.7	11.0	<LOD - 20	8	1998	Y/R
9.1.3.4.x.2	trout	DBT	0.0	0.5	<LOD - 0.5	8	1998	Y/R
9.1.2.1	mussel (free)	TBT	5.0	5.0	1-86	49	1998	Y/R
9.1.2.1	mussel (farmed)	DBT	4.0	4.0	1-71	66	1998	Y/R
9.1.2.1	mussel (free)	DBT	4.0	4.0	1-28	49	1998	Y/R
9.1.2.1	mussel (farmed)	TBT	2.0	2.0	1-21	66	1998	Y/R
9.1.2.1	mussel	TBT	87.5	87.5	7.5-154	29	1999	Y/R
9.1.2.1	mussel	MBT	13.7	13.7	2-35	29	1999	Y/R
9.1.2.1	mussel	DPT	0.02	1.1	<LOD -1.5	29	1999	Y/R
9.1.2.1	mussel	MPT	0.02	1.1	<LOD -1.5	29	1999	Y/R
9.1.2.1	mussel	DBT	21.8	21.8	1.5-63	29	1999	Y/R
9.1.2.1	mussel	TPT	0.9	1.6	<LOD - 3.5	29	1999	Y/R
9.1.2.3	clams	DBT	70.3	70.3	12.8-185	28	1999	Y/R
9.1.2.3	clams	MBT	66.8	66.8	7-214	28	1999	Y/R

9.1.2.3	clams	MPT	22.5	22.5	1.5-78.2	28	1999	Y/R
9.1.2.3	clams	DPT	0.2	1.4	<LOD -1.5	28	1999	Y/R
9.1.2.3	clams	TBT	90.4	90.4	17.6-134	28	1999	Y/R
9.1.2.3	clams	TPT	0.2	3.5	<LOD - 6	28	1999	Y/R
9.1.4.1	crab	TBT	15.6	15.6	7.5-25.5	29	1999	Y/R
9.1.4.1	crab	MPT	3.3	3.3	1-5.5	29	1999	Y/R
9.1.4.1	crab	DPT	1.8	2.4	<LOD - 7	29	1999	Y/R
9.1.4.1	crab	TPT	2.2	2.4	<LOD - 7	29	1999	Y/R
9.1.4.1	crab	MBT	6.0	6.0	2-12	29	1999	Y/R
9.1.4.1	crab	DBT	4.2	4.2	1-8	29	1999	Y/R
9.1.1.30.x.1	black goby	DPT	5.4	5.7	<LOD - 23	24	1999	Y/R
9.1.1.30.x.1	black goby	MPT	5.2	5.2	2-12	24	1999	Y/R
9.1.1.30.x.1	black goby	TPT	20.1	19.9	<LOD - 86	24	1999	Y/R
9.1.1.30.x.1	black goby	DBT	5.8	5.8	1-11	24	1999	Y/R
9.1.1.30.x.1	black goby	MBT	3.8	3.8	2-5.5	24	1999	Y/R
9.1.1.30.x.1	black goby	TBT	12.1	12.1	1.5-33	24	1999	Y/R
9.1.1.30.x.2	boyer's sand smelt	DBT	8.2	8.2	2.5-18	27	1999	Y/R
9.1.1.30.x.2	boyer's sand smelt	DPT	1.9	2.8	<LOD - 8.5	27	1999	Y/R
9.1.1.30.x.2	boyer's sand smelt	MPT	10.2	10.2	6-15	27	1999	Y/R
9.1.1.30.x.2	boyer's sand smelt	TPT	4.7	5.2	<LOD - 13.5	27	1999	Y/R
9.1.1.30.x.2	boyer's sand smelt	TBT	33.1	33.1	1.5-80	27	1999	Y/R
9.1.1.30.x.2	boyer's sand smelt	MBT	6.7	6.7	1-15.5	27	1999	Y/R
9.1.1.2	eel	MBT	7.6	7.6	3-20	27	1999	Y/R
9.1.1.2	eel	DBT	10.2	10.2	2-29	26	1999	Y/R
9.1.1.2	eel	DPT	1.7	2.3	<LOD - 4.5	26	1999	Y/R
9.1.1.2	eel	MPT	2.8	3.4	<LOD - 6.5	26	1999	Y/R
9.1.1.2	eel	TPT	4.7	4.9	<LOD - 8.5	26	1999	Y/R
9.1.1.2	eel	TBT	19.7	19.7	11-31	26	1999	Y/R

1.8 NORWAY

Norway send OTC occurrence data (TBT,DBT,MBT TPT,DPT,MPT) for 9 types of food samples that is , 7 species of fresh fish (cod liver and muscle, flounder herring, bream, dab, eel), crabs and mussels. The unit used for the reported OTC concentrations is µg/kg wet weight. The data provided, have been generated between 1997 and 2001

Analytical method

The samples are added an internal standard and dissolved with an alkaline solution. After pH-adjustment, the organotin compounds are extracted with organic solutions and the samples are purified with gel permeation chromatography. The samples are analyzed with GC-AED (atomic emission detector).Equipment: Hewlett-Packard 5890 gas chromatograph with a HP 5921A Atomic emission detector.

Reference: N. Følsvik, J.A. Berge, E.M. Brevik and M. Walday: Quantification of organotin compounds and determination of imposex in populations of dogwhelks (*Nucella lapillus*) from Norway. *Chemosphere* 1999, Vol 38 (3), 681-91.

EVIDENCE OF AQA

NO/ 01 :The analyses are carried out at Norwegian Institute for Water Research (NIVA). The method is routinely used to determine butyl- and phenyl-organic tin compounds. NIVA is not accredited for this method.

Table *NO occurrence*

The Table reports Food group codes and name, OTC, the mean concentrations the range of the experimentally detected values,the number of samples the years , the representativity for intake calculations, and whether samples were taken on a random (R) or targeted (T) basis. . When detected values were <LOD, the mean values were calculated with both <LOD=0 and with <LOD=LOD/2.

Occurrence raw data, reporting more information about TBT DBT ,MBT,TPT,DPT,MPT, are reported in the technical Annex on CD ROM

TABLE 54 NO OCCURRENCE

NORWAY

Food group code	Food name	OTC	Mean Concentration in food (µg/kg)		Range of detected values (µg/kg)	n	Year of sampling	Representative for intake calculation (Y/N) Random or Targeted (R/T)
			calculated with <LOD=0	calculated with <LOD=LOD/2				
9.1.1.30	Cod	TBT	34.9	35.2	<4.9-151	8	1997-2000	Y/T
9.1.1.30	Cod	DBT	7.8	8.25	3.9-31	8	1997-2000	Y/T
9.1.1.30	Cod	MBT	0	1.6	<1.5-<3.0	8	1997-2000	Y/T
9.1.1.30	Cod	TPT	115.9	115.9	33-413	8	1997-2000	Y/T
9.1.1.30	Cod	DPT	37.6	37.8	<2.3-78	8	1997-2000	Y/T
9.1.1.30	Cod	MPT	18	18.1	<1.7-40	8	1997-2000	Y/T
9.1.1.30	flounder	TBT	23	23		1	1997	Y/T
9.1.1.30	flounder	DBT	15	15		1	1997	Y/T
9.1.1.30	flounder	MBT	0	<3.0		1	1997	Y/T
9.1.1.30	flounder	TPT	121	121		1	1997	Y/T
9.1.1.30	flounder	DPT	32	32		1	1997	Y/T
9.1.1.30	flounder	MPT	14	14		1	1997	Y/T
9.1.1.30	Herring	TBT	78	78		1	2000	Y/T
9.1.1.30	Herring	DBT	8.4	8.4		1	2000	Y/T
9.1.1.30	Herring	MBT	1.6	1.6		1	2000	Y/T
9.1.1.30	Herring	TPT	27	27		1	2000	Y/T
9.1.1.30	Herring	DPT	3.7	3.7		1	2000	Y/T
9.1.1.30	Herring	MPT	0	0.9		1	2000	Y/T
9.1.1.30	bream	TBT	29.5	30.7	<4.9-59	2	2000	Y/T
9.1.1.30	bream	DBT	0	2	<4.0-<4.0	2	2000	Y/T
9.1.1.30	bream	MBT	0	1.5	<3.0-<3.0	2	2000	Y/T
9.1.1.30	bream	TPT	221.5	221.5	118-325	2	2000	Y/T
9.1.1.30	bream	DPT	125.5	125.5	115-136	2	2000	Y/T
9.1.1.30	bream	MPT	49.5	49.5	48-51	2	2000	Y/T
9.1.1.2	eel	TBT	198	198	16-505	3	1998-2000	Y/T
9.1.1.2	eel	DBT	38.9	38.9	14-94	3	1998-2000	Y/T
9.1.1.2	eel	MBT	17.3	17.3	7-37	3	1998-2000	Y/T
9.1.1.2	eel	TPT	868	868	31-2331	3	1998-2000	Y/T
9.1.1.2	eel	DPT	10.7	26.4	<2.3-32	3	1998-2000	Y/T

9.1.1.2	eel	MPT	7.7	10.8	<1.7-23	3	1998-2000	Y/T
9.1.	cod liver	TBT	96.5	96.5	9.8-539	15	1997-2001	Y/T
9.1.	cod liver	DBT	48.4	48.4	6.1-206	15	1997-2001	Y/T
9.1.	cod liver	MBT	6.1	6.3	<0.8-37	14	1997-2001	Y/T
9.1.	cod liver	TPT	438.8	438.8	47-1944	13	1997-2001	Y/T
9.1.	cod liver	DPT	22.7	24.4	<2.3-124	15	1997-2001	Y/T
9.1.	cod liver	MPT	18.7	20	<1.7-198	15	1997-2001	Y/T
9.1.	bream liver	TBT	33	33	12-54	2	1999	Y/T
9.1.	bream liver	DBT	7.5	8.5	<4.0-15	2	1999	Y/T
9.1.	bream liver	MBT	1.3	2	2.5-<3.0	2	1999	Y/T
9.1.	bream liver	TPT	97.5	97.5	5-142	2	1999	Y/T
9.1.	bream liver	DPT	101.5	101.5	37-166	2	1999	Y/T
9.1.	bream liver	MPT	63.5	63.5	20-107	2	1999	Y/T
9.1.	dab liver	TBT	6.1	6.1	1.9-13	3	2000	Y/T
9.1.	dab liver	DBT	14.7	14.7	6.1-24	3	2000	Y/T
9.1.	dab liver	MBT	1.5	2	<1.5-4.4	3	2000	Y/T
9.1.	dab liver	TPT	101.3	101.3	50-198	3	2000	Y/T
9.1.	dab liver	DPT	28.3	28.3	17-46	3	2000	Y/T
9.1.	dab liver	MPT	17.3	17.3	10-31	3	2000	Y/T
9.1.4.1	Crab, brown meat	TBT	145.4	145.4	3.9-586	6	2000	Y/T
9.1.4.1	Crab, brown meat	DBT	28.4	28.4	5.1-104	5	2000	Y/T
9.1.4.1	Crab, brown meat	MBT	5.8	5.8	2.4-105	5	2000	Y/T
9.1.4.1	Crab, brown meat	TPT	38	38	3.8-106	5	2000	Y/T
9.1.4.1	Crab, brown meat	DPT	3.22	3.8	<1.0-14	5	2000	Y/T
9.1.4.1	Crab, brown meat	MPT	2.6	3.1	<1.7-10	5	2000	Y/T
9.1.4.1	Crab, claw meat	TBT	29	29		1	2000	Y/T
9.1.4.1	Crab, claw meat	DBT	18	18		1	2000	Y/T
9.1.4.1	Crab, claw meat	MBT	12	12		1	2000	Y/T
9.1.4.1	Crab, claw meat	TPT	18	18		1	2000	Y/T
9.1.4.1	Crab, claw meat	DPT	0	1.2		1	2000	Y/T
9.1.4.1	Crab, claw meat	MPT	0	0.85		1	2000	Y/T
9.1.2.1	Blue mussels	TBT	108.9	108.9	41.5-266	15	1999	Y/T

9.1.2.1	Blue mussels	DBT	32.7	32.7	9.8-74.5	15	1999	Y/T
9.1.2.2	Blue mussels	MBT	9.3	9.3	1.3-20.7	15	1999	Y/T
9.1.2.1	Blue mussels	TPT	19.9	19.9	10.6-47.2	15	1999	Y/T
9.1.2.1	Blue mussels	DPT	0.12	0.56	<0.46-1.1	15	1999	Y/T
9.1.2.1	Blue mussels	MPT	0.1	0.4	<0.33-<1.65	15	1999	Y/T

2. SUMMARY OF SUBMITTED FOOD CONSUMPTION DATA

2.1 BELGIUM

Belgium submitted data about consumption of fish (9.1.1) and bivalves (9.1.2) expressed by consumer and high consumers, reported in *Table BE Food Consumption* . The sources of consumption data were not specified.No other information have been made available.

TABLE 55 BE FOOD CONSUMPTION

BELGIUM

Food group code	Food name	Year	Data by Consumer (g/day)		Data by Population (g/day)	
			Mean	high consumers	Mean	high consumers
9,1,1	fish	no data	13.37	47.7	no data	no data
9,1,2,	bivalves	no data	0.66	no data	no data	no data

2.2 GERMANY

According to the consumption data in Germany six food groups were established for calculating the dietary intake:

1. DE/1 Fresh fish from lakes and farms
2. DE/2 Fresh fish from inland waterways and harbours. These fish may be caught by anglers and are used mainly for private consumption.
3. DE/3 Fresh fish from open sea, ocean etc. (marine water)
4. DE/4 Bivalve molluscs
5. DE/5 Crustaceans
6. DE/6 Fish products

No data on consumption of specific foods were presented

Frozen fish, fish fillets from marine water (open sea, ocean) which was originally categorized 9.2.1. was not listed in group DE/6 but was inserted in group DE/3. This is in accordance to the German food consumption data obtained from the German National Food Consumption Survey (DE 001).

Mollusc products were combined with DE/4 fresh bivalve molluscs according to the German food consumption data.

Data on food consumption were obtained from the German National Food Consumption Survey (DE 001). This study was conducted in 1985-1988 in which 19.115 adults > 18 years and 889 children (4-6 years) were interviewed. The average body weight was 70.5 kg for adults (mean) and that for children was 20.9 kg (mean).

Food consumption data for each food group DE/1 - DE/6 with regard to mean and high consumers (97.5 percentile) are presented in tables 3a for adults and 3b for children and are reported in *Table DE Food Consumption*.

TABLE 56 DE - FOOD CONSUMPTION

GERMANY

(Adults >= 18 years)							
Bodyweight: mean=70.5 kg, median=70 kg							
Food group code	Food Identification (country)	Food name	Year	Data by Consumer (g/day)		Data by Population (g/day)	
				Mean	high consumers (97.5 Perc)	Mean	high consumers (97.5 perc)
9.1.1	DE/1	Fresh Fish farm / Lake	1985-88	32.27	83.3	1.25	22.9
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	1985-88	25.51	49.4	n.c.	n.c.
9.1.1	DE/3	Fresh Fish marine	1985-88	25.82	74	9.53	56.31
9.1.2	DE/4	Bivalve molluscs	1985-88	18.44	125.01	n.c.	n.c.
9.1.4	DE/5	Fresh crustaceans	1985-88	11.62	38.4	0.48	6.6
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	1985-88	19.09	69.45	5.6	43.91
(children 4 - 6 years)							
Bodyweight: mean=20.9 kg, median=20 kg							
9.1.1	DE/1	Fresh Fish farm / Lake	1985-88	20.29		n.c.	n.c.
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	1985-88			n.c.	n.c.
9.1.1	DE/3	Fresh Fish marine	1985-88	14.91	43.36	6.12	28.60
9.1.2	DE/4	Bivalve molluscs	1985-88			n.c.	n.c.
9.1.4	DE/5	Fresh crustaceans	1985-88	6.46		n.c.	n.c.
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	1985-88	8.31	47.34	1.25	14.88

n.c. = not calculated (part of consumers <2,5%)

2.3 DENMARK

Denmark presented food consumption data expressed by population for cod liver and muscle, for flounder muscle and for mussels. (*Table DK food consumption*)

Food consumption data arises from a consumer-scan. The survey was conducted as a household-purchase study with a total number of 2000 households participating, thus representing approx. 6000 individuals with an even age and sex-distribution. Households were chosen to represent the entire country.

Survey was performed over two years – 1999 to 2000. Participants reported purchased foods on a weekly basis and using fixed questionnaires.

No data exists on the individual consumption of fish and fish-products in the Danish population, and no estimates can therefore be provided as for the high consumers. All data reported are mean levels.

TABLE 57 DK FOOD CONSUMPTION

DENMARK

Food group code	Food name	Year	Data by Population (g/day)	
			Mean	high consumers
9.1.1.30 x1	Cod - liver	2000	0.04	no data
9.1.1.30 x2	Cod- muscle	2000	1.33	no data
9.1.1.30 x4	Flounder- muscle	2000	0.51	no data
9.1.2.1	Blue Mussel	2000	0.03	no data

2.4 FRANCE

France presented food consumption data on 13 food groups. Data expressed by consumers (mean and high consumers - 95th percentile) and by population (mean and high consumers - 95th percentile) were presented for both adults and children. Also consumption data for fish groups and some seafood species were presented in the second submission.. The data are reported in *Table FR Food Consumption*

The food consumption data are based on the INCA survey (Individual and national French food intake survey). This national survey was conducted all over the country from August 1998 to June 1999, so it integrates the seasonal effects. The total sample (3003 persons) is composed of 1985 adults 15 years and over and 1018 children and young teenagers (3-14 years). The food consumption reading was done with a diary record on 7 consecutive days. The identification of the type of food and the portion size consumed were estimated with a validated photographic book. The food nomenclature was based on the nomenclature used in the food composition tables and contains about 1000 codes and 44 food groups.

According to the National Expert:”In this survey, we collected the body weight of almost all the participants. So the calculation of intake of heavy metals or OTC by kg of body weight should be done with the real weight of each person and not with a fixed weight.” (VOLATIER, J.-L. (coordinator), *Enquête INCA individuelle et nationale sur les consommations alimentaires*. Paris: TEC&DOC (Ed.), 2000).

Comment submitted by France on:

Why the data are / are not representative for the consumption of the food item in the member state:

The representativeness of the sample is assured by a geographic stratification (based on region of residence, size of urban area) and by the quota sample method (with the factors age, sex, profession, size of the household). The socio-demographic characteristics of the sub-samples (adults and children) of the survey were compared with the national data from the population census (organised by the INSEE: National Institute of Statistics and Economic Studies) and the difference was very small. So the INCA survey is representative for the consumption of the food in France. Moreover such a survey on individual consumption is the only one in France. A previous similar survey (but with only 1500 persons) was made in 1994. The other food intake surveys cover only on a part of the population (young or elderly people) or a local area.

TABLE 58 FR FOOD CONSUMPTION

FRANCE

ADULTS (>15 Years) average body weight: 66.4						
Food group code	Food name	Year	Data by Population(g/day)		Data by Consumers(g/day)	
			Mean	High consumers (95 perc)	Mean	High consumers (95 perc)
1	Dairy products	1998/99	241.0	526.0	242.2	526.0
2	Fats and oils	1998/99	19.5	43.5	19.5	43.5
3	Edibles ices (sorbet)	1998/99	0.3	0.0	11.7	25.7
4	Fruits and vegetables	1998/99	345.6	690.7	345.8	690.7
5	Confectionery	1998/99	5.0	25.7	12.5	42.9
6	Cereals and cereal products	1998/99	62.9	164.3	68.1	165.7
7	Bakery wares	1998/99	189.6	378.6	190.3	378.6
8	Meat and meat products	1998/99	153.7	291.4	154.3	291.4
9	Fish and fish products	1998/99	34.5	97.7	41.4	103.4
9 (9.1-9.4 + (a))	Fish and fish products	1998/99	29.8	87.1	37.6	94.3
9.1.1+9.2 +9.3+9.4	Fish and fish products	1998/99	26.8	82.9	36.5	90.0
9 (a)	3.3.1.1 of regulation 466/2001	1998/99	3.0	21.4	15.2	42.9
9 (9.1-9.4) only molluscs	Molluscs	1998/99	2.0	13.9	12.0	23.0
9 (9.1-9.4) only cephalopodes	Cephalopodes	1998/99	0.4	0.0	18.2	29.7
9 (9.1-9.4) only crustaceans	Crustaceans and echinoderms	1998/99	2.3	14.3	14.9	33.6
10	Eggs and egg products	1998/99	20.0	62.9	29.0	71.4
11	Sweeteners, incl. honey	1998/99	15.9	49.7	18.7	52.0
12	Salts, spices, soups, sauces	1998/99	95.7	333.7	97.8	333.7
14	Beverages	1998/99	1090.5	1973.9	1091.2	1973.9

TABLE 59

CHILDREN (3-14 Years) average body weight: 31.6						
Food group code	Food name	Year	Data by Population(g/day)		Data by Consumers(g/day)	
			Mean	High consumers (95 perc)	Mean	High consumers (95 perc)
1	Dairy products	1998-1999	327.4	618.1	328.4	618.1
2	Fats and oils	1998-1999	14.2	31.2	14.3	31.2
3	Edible ices	1998-1999	0.3	0.0	13.5	32.1
4	Fruits and vegetables	1998-1999	237.2	473.4	237.2	473.4
5	Confectionery	1998-1999	14.4	47.1	18.2	49.9
6	Cereal and Cereal products	1998-1999	78.5	176.4	79.8	176.4
7	Bakery wares	1998-1999	147.4	335.7	147.8	335.7
8	Meat and meat products	1998-1999	112.9	219.3	113.2	219.3
9	Fish and fish products	1998-1999	22.2	61.7	27.5	64.7
9 (9.1-9.4 + (a))	Fish and fish products	1998/99	20.3	57.1	26.3	60.7
9.1.1+9.2 +9.3+9.4	Fish and fish products	1998/99	18.8	55.7	25.8	60.0
9 (a)	3.3.1.1.of regulation 466/2001	1998/99	1.5	11.4	10.7	28.6
9 (9.1-9.4) only molluscs	Molluscs	1998/99	0.9	7.1	9.4	30.0
9 (9.1-9.4) only cephalopodes	Cephalopodes	1998/99	0.2	0.0	15.6	25.7
9 (9.1-9.4) only crustaceans	Crustaceans and echinoderms	1998/99	0.8	7.1	12.0	34.3
10	Eggs and egg products	1998-1999	12.8	42.9	21.0	51.8
11	Sweeteners including honey	1998-1999	4.8	16.1	5.7	16.8
12	Salts, spices, soups, sauces	1998-1999	48.3	181.4	51.3	189.4
14	Beverages	1998-1999	707.3	1270.0	710.0	1270.0

2.5 GREECE

Table HE food consumption presents the average availability (g/person/day) of selected food items among the Greek population. Estimates are based on data collected in the context of the Greek national household budget survey, conducted in 1998-1999. Household budget surveys are periodically undertaken, using nationally representative samples of households (based on total population). The number of participants were 6258 households, singles included. The surveys aim at collecting, among other, data on food availability taking into consideration the households' purchases, together with contributions from own production and food items offered to members as gifts. The data on food quantities refer to foods available at household level, since no information is recorded on the quantity of foods purchased to be consumed outside the household. Data are collected all-year round to allow for seasonal variability in food consumption. Individual availability was estimated without making allowances for edible proportion and under the assumption of equal distribution of food within the household and during the survey period. Sociodemographic parameters, such as education and profession of household head and synthesis of the household (members, sex and age) were recorded. No records for body weight and geographical level exist.

Also data referred to consumers were presented after the first submission.

Food consumption data presented in (*Table HE food consumption*) report food groups established for calculating the dietary intake. Data expressed by consumer and by population are shown. Both mean and high consumers (95 percentile) are considered. No data on specific food consumption were presented.

Table 60 HE FOOD CONSUMPTION

GREECE

Food group code	Food name	Year	Data by Consumer (g/day)		Data by Population (g/person/day)	
			Mean	high consumers	Mean	high consumers
9.1.2, 9.1.3, 9.1.4 and 9.1.5	Fresh Bivalve molluscs, Cephalopods, Crustaceans and Echinoderm	1998-99	37	95 (95th perc)	2.6	18 (95th perc)
9.4	Canned fish, fish roe, caviar, fish pies	1998-99	12	34 (95th perc)	1.5	10 (95th perc)

2.6 ITALY

Table IT –Food Consumption reports data by consumer and by population as used by the National Expert to calculate intake. Only mean data have been reported.

The food consumption values reported in table 61 IT for food groups 9.1.1, 9.1.2 and 9.1.4 were used for calculation of intake.

Food consumption data have been submitted for both groups of foods and for specific fish species. Two studies were presented, but one of them was deemed not yet validated.

The average availability (g/person/day) of selected food items among the Italian population has been reported. Estimates are based on data collected by the Italian Institute for Food and Nutrition, conducted in 1994-1996 to establish the Italian food consumption patterns in the 90's. The sample size was of 1200 households, corresponding to 2734 individuals. Qualitative aspects of food intake profiles were surveyed by a questionnaire. a mixed 7-days based survey technique was applied in order to survey both individuals and household consumptions. Food intakes were recorded by a self-compiled diary, which contained the following informations: 7-day purchase/wastage diary, 7-day recipe diary, 7-day eating diary. Besides, social-demographic anthropometric cultural and life-style characteristics were recorded.

Table IT –Food Consumption reports the data by consumer and by population that were used by the National Expert to calculate intake. Only mean data have been presented.

TABLE 61 IT – FOOD CONSUMPTION**ITALY**

Food group code	Food name	Year	Data by Consumer (g/day)		Data by Population (g/day)	
			Mean	high consumers (median)	Mean	high consumers (median)
9	fish and fish products, including molluscs, crustaceans, echinoderms (MCE)	1994-1996	48.3	no data	31,8	no data
9.2	processed fish and fish products	1994-1996	15.7	no data	7,4	no data
9.1.1	fresh fish, muscle meat of fish	1994-1996	37.8	no data	15,2	no data
9.2.1	frozen fish, fish fillets and fish products	1994-1996	29.1	no data	3,9	no data
9.1.1.30x1	pelagic fish, fresh	1994-1996	27.9	no data	2,3	no data
9.2.1	pelagic fish, frozen	1994-1996	23.0	no data	0,1	no data
9.1.1.30x2	freshwater fish, fresh	1994-1996	30.3	no data	2,4	no data
9.1.2	molluscs, fresh	1994-1996	36.0	no data	4,2	
9.1.4	crustaceans, fresh	1994-1996	20.2	no data	1,0	no data
9.2.1	freshwater fish, frozen	1994-1996	24.9	no data	0,5	no data
9.2.1	molluscs, frozen	1994-1996	26.0	no data	2,0	no data
9.2.1	crustaceans, frozen	1994-1996	20.1	no data	0,4	no data
9.4	tuna, fully preserved	1994-1996	14.4	no data	5,6	no data
9.4	mackerel, fully preserved	1994-1996	12.9	no data	0,1	no data
9.4	salmon, fully preserved	1994-1996	12.7	no data	0,5	no data
9.4	anchovies, fully preserved	1994-1996	3.6	no data	0,2	no data
9.4	sardines, fully preserved	1994-1996	7.9	no data	0,0	no data
9.3.4	salted cod	1994-1996	28.2	no data	0,7	no data
9.3.4	dried fish	1994-1996	0.0	no data	0,0	no data
9.4	clams, fully preserved	1994-1996	10.2	no data	0,0	no data
9.4	other preserved fish products	1994-1996	15.2	no data	0,2	no data

2.7 THE NETHERLANDS

Food consumption data were presented for 5 species of fish, for shrimps and for mussels. (*Table NL Food Consumption*). The data are referred to general population (mean and high consumers).

No data about food groups were presented.

Consumption data were collected in the Dutch National Food Consumption Survey with dietary records from a stratified probability sample of households in The Netherlands (Kistemaker et al., 1998). The survey comprises a description of the daily consumption over two consecutive days and recording of age, sex and body weight for each individual within the sampled households. Data have been collected from April 1997 until April 1998. Collection of data was evenly spread over the weeks of the year and the days of the week. In total 6250 persons aged 1 to 97 participated, belonging to 2774 households. The mean body weight of the subjects was 65.8 kg.

Table 62 NL – FOOD CONSUMPTION

THE NETHERLANDS

Food group code	Food name	Year	Data by Population (g/day)	
			Mean	high consumers
9.1.1.2	Eel	2000	0.13	0.3
9.1.4.3	Shrimp	2000	0.5	0.57
9.1.1.30X 1	Herring	1999- 2000	1.9	3
9.1.1.30X 2	Cod	2000	3.07	9.9
9.1.1.30X 4	Mackerel	2000	0.33	1
9.1.2.1	Mussel	2000	0.41	0.6
9.1.1.30X	Plaice	2000	0.09	2.1

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2.8 NORWAY

Norway presented food consumption data on the whole diet, described in general groups, and for what concerned with fish and seafood, food consumption data for single species both by population (mean and high consumers) and by consumers (mean and high consumers). Two different studies were presented. (Norkost, 1997 and Fish&Game 1999) Also data on food consumption of coastal municipalities were presented, (Fish &Game 2000) thus representing a particular group of consumers that have available large amount of seafoods. *Table NO –Food Consumption* is therefore splitted in the corresponding three sections.

NORKOST 1997: In the national representative dietary survey 2 672 persons in the age of 16 to 79 years participated (average body weight=73 kg). The method used in NORKOST was a quantitative food frequency questionnaire, which was distributed and collected in four different periods spread through the year. The survey tries to capture information about the usual diet during the prior year among the participants. Reference: Johansson, L, Solvoll K: NORKOST 1997. Landsomfattende kostholdsundersøkelse blant menn og kvinner i alder 16-79 år. Rapport nr.2/1999. Statens råd for ernæring og fysisk aktivitet. Oslo 1999 (In Norwegian)

There is a tendency that surveys using food frequency questionnaire overestimate the food consumption in relation to food records measures. NORKOST was also carried out in 1993/94, using the same kind of food questionnaire as the one used in NORKOST 1997. The average energy intake among men aged 16 to 19 years who participated in NORKOST 1993/94 was above the reference values for boys aged 15 to 18 years. This may indicate that this age group overestimates their consumption in some degree when filling out the questionnaire. However, the average energy intake among the men in the age group 30 to 79 years old was within the reference values. The female participants reported an energy intake below the reference values. This indicates that the women participating in this kind of study may underestimate their consumption.

Fish and Game Study 1999 (In the tables “Fish and Game 1” was used): A dietary surveys were conducted, focusing on the consumption patterns of foods, such as saltwater fish, freshwater fish and game, which may contain environmental contaminants, primarily cadmium, mercury, polychlorinated biphenols (PCB) and dioxines. The survey encompassed a nation-wide postal qualitative food frequency questionnaire to 10 000 randomly chosen persons between 18 and 79 years old (average body weight=74 kg). About 60% answered the questionnaire (n=6015). To convert food frequencies into amounts consumed per day standard portion sizes, mainly based on the results from NORKOST 1997, for each of the food items included in the survey were used. The survey tries to capture information about the food consumption during the prior year among the participants. Reference: Meltzer, HM, Bergsten, C, Stigum, H: Fisk- og viltundersøkelsen. Konsum av matvarer som kan ha betydning for inntaket av kvikksølv, kadmium og PCB/dioksin i norsk kosthold. SNT-rapport 6, 2002. (Summary in English)

Fish and Game Study 2000 (In the tables “Fish and Game 2” was used) (Report under process):: The objective with the study was to find out if the consumption of fish, shellfish and game is larger in areas of Norway where the availability of these foods are great. The study encompassed a postal quantitative food frequency questionnaire (similar to the one used in the 1999 study) to 10 000 randomly chosen persons between 18 and 79 years old from 14 coastal and 13 inland municipalities (average body weight=76 kg, which was the same for participants from the two areas). About 55 % answered the questionnaire (n=5502). To convert food frequencies into amounts consumed per day standard portion sizes, mainly based on the results from NORKOST 1997, for each of the food items included in the survey were used. The survey tries to capture information about the food consumption during the prior year among the participants.

Table 63 NO –Food Consumption*Norway*

NORKOST STUDY Average body weight = 73 kg							
Food group code	Food name	Reference	Year	Data by Population(g/day)		Data by Consumers(g/day)	
				Mean	High consumers	Mean	High consumers
1	Milk	NORKOST	1997	438	1063	439	1063
1	Cream	NORKOST	1997	25	78	26	81
1	Cheese	NORKOST	1997	31	80	33	84
2	Fats	NORKOST	1997	34	89	34	89
3	Edible ices	NORKOST	1997	missing	missing	missing	missing
4	Apple	NORKOST	1997	39	98	44	105
4	Banana	NORKOST	1997	31	102	37	102
4	Citrus	NORKOST	1997	28	98	33	98
4	Fruits,used on sandwiches	NORKOST	1997	5	23	15	33
4	Fruits, unspec.	NORKOST	1997	10	45	14	50
4	Strawberry	NORKOST	1997	5	18	8	32
4	Jam, marmelade	NORKOST	1997	24	72	28	74
4	Fruit, canned	NORKOST	1997	6	29	10	35
4	Potato	NORKOST	1997	123	261	123	261
4	Carot	NORKOST	1997	32	98	36	98
4	Swedish turnip	NORKOST	1997	10	50	16	65
4	Tomatoe	NORKOST	1997	10	32	11	34
4	Tomatoe, canned	NORKOST	1997	2	5	2	6
4	Ketchup	NORKOST	1997	3	12	5	17
4	Cucumber	NORKOST	1997	10	32	11	34
4	Cauliflower, broccoli	NORKOST	1997	1	3	4	17
4	Onion,leek	NORKOST	1997	<1	<1	<1	1
4	Cabbage	NORKOST	1997	8	28	10	31
4	Vegetables, frozen	NORKOST	1997	21	68	23	69
4	Vegetables, in dishes	NORKOST	1997	30	92	31	93
4b	Chinease cabbage	NORKOST	1997	4	15	5	15
5	Chocolate	NORKOST	1997	10	38	13	39
6.1	Rice	NORKOST	1997	8	27	9	28
6.1	Oat	NORKOST	1997	4	18	4	18
6.1	Barley	NORKOST	1997	2	12	2	12
6.2	Wheat flour	NORKOST	1997	104	188	104	188
6.2	Wholemeal flour	NORKOST	1997	55	106	55	106
8	Pork	NORKOST	1997	32	71	32	71
8	Beef	NORKOST	1997	38	85	38	85
8	Sheep	NORKOST	1997	8	22	8	22
8	Poultry	NORKOST	1997	9	25	11	35
8	Offal (excl. game)	NORKOST	1997	2	7	3	9

10	Egg	NORKOST	1997	17	42	17	42
11	Sugar	NORKOST	1997	5	24	9	36
11	Honey	NORKOST	1997	1	6	5	16
14	Fruit juice, nectar	NORKOST	1997	74	300	105	302
14	Coffee	NORKOST	1997	449	1140	543	1170
14	Tea	NORKOST	1997	150	700	215	700
14	Soda, lemonade	NORKOST	1997	301	1081	354	1182
14	Water	NORKOST	1997	479	1149	479	1449
14	Beer	NORKOST	1997	94	399	145	540
14	Wine	NORKOST	1997	17	86	31	116
14	Liquer	NORKOST	1997	4	18	9	29
15	Peanuts	NORKOST	1997	2	9	4	13

TABLE 64 *Cont. Norway*

Fish and Game , 1999 Average body weight = 74 kg							
Food group code	Food name	Reference	Year	Data by population (g/day)		Data by consumer (g/day)	
				Mean	High consumers	Mean	High consumers
4	Fungi, not cultivated	Fish & Game 1	1999	1	5	2	5
6.2	Bran, wheat	Fish & Game 1	1999	1	4	1	4
6.2	Bran, oat	Fish & Game 1	1999	1	4	1	4
8	Moose	Fish & Game 1	1999	1	2	10	28
8	Reindeer	Fish & Game 1	1999	1	2	2	7
8	Rabbit	Fish & Game 1	1999	<1	2	2	7
8	Liver, game	Fish & Game 1	1999	<1	2	2	7
8	Kidney, game	Fish & Game 1	1999	<1	0	3	7
8	Heart, game	Fish & Game 1	1999	<1	2	2	2
8	Wild birds	Fish & Game 1	1999	1	2	2	2
8	Offal, wild birds	Fish & Game 1	1999	<1	0	2	7
9	Fish for sandwich	Fish & Game 1	1999	3	8	3	8
9	Fish products	Fish & Game 1	1999	19	47	20	47
9	Cod	Fish & Game 1	1999	10	30	11	30
9	Liver, cod	Fish & Game 1	1999	0.2	0.5	0.7	2.3
9	Roe, cod	Fish & Game 1	1999	2	3	4	12
9	Saithe	Fish & Game 1	1999	7	24	9	24
9	Liver, saithe	Fish & Game 1	1999	0.1	0.5	0.7	2.3
9	Haddock	Fish & Game 1	1999	2	11	4	14

9	Flounder	Fish & Game 1	1999	2	7	3	9
9	Mackerel	Fish & Game 1	1999	2	10	3	10
9	Herring	Fish & Game 1	1999	2	7	3	7
9	Tuna	Fish & Game 1	1999	2	10	5	18
9	Salmon, sea	Fish & Game 1	1999	3	14	5	14
9	Salmon, farmed	Fish & Game 1	1999	6	14	7	14
9	Saltwater fish, other	Fish & Game 1	1999	3	14	6	14
9	Pike	Fish & Game 1	1999	<1	2	3	10
9	Pearch	Fish & Game 1	1999	<1	2	2	8
9	Powan	Fish & Game 1	1999	<1	2	2	8
9	Charr	Fish & Game 1	1999	1	2	3	8
9	Lake trout	Fish & Game 1	1999	3	14	5	14
9	Freshwater fish, other	Fish & Game 1	1999	<1	2	3	10
9a	Eel	Fish & Game 1	1999	<1	1	1	5
9	Shrimp, self-peeled	Fish & Game 1	1999	3	8	4	8
9	Shrimp, preserved	Fish & Game 1	1999	3	8	3	8
9	Crab	Fish & Game 1	1999	2	13	4	13
9	Crab, claws	Fish & Game 1	1999	2	3	4	13
9	Mussel	Fish & Game 1	1999	1	5	1	5

TABLE 65

<i>cont. Norway Fish and Game ,2000 Average body weight: 76 kg</i>					
Food group code	Food name	Reference	Year(s)	Data by consumer coastal municipalities (g/day)	
				Mean	High consumers
4	Potato	Fish & Game 2	2000	122	180
4	Carrot	Fish & Game 2	2000	40	77
4	Swedish turnip	Fish & Game 2	2000	21	67
4	Fungi, not cultivated	Fish & Game 2	2000	3	15
6.2	Bran, wheat	Fish & Game 2	2000	2	4
6.2	Bran, oat	Fish & Game 2	2000	2	4
8	Moose	Fish & Game 2	2000	5	16
8	Reindeer	Fish & Game 2	2000	2	7
8	Rabbit	Fish & Game 2	2000	1	3
8	Liver, game	Fish & Game 2	2000	2	3
8	Kidney, game	Fish & Game 2	2000	1	3
8	Heart, game	Fish & Game 2	2000	2	3
8	Wild birds	Fish & Game 2	2000	2	3
8	Offal, wild birds	Fish & Game 2	2000	2	4
9	Fish for	Fish &	2000	3	8

	sandwiches	Game 2			
9	Fish products	Fish & Game 2	2000	21	35
9	Cod	Fish & Game 2	2000	17	45
9	Liver, cod	Fish & Game 2	2000	0.7	2.9
9	Roe, cod	Fish & Game 2	2000	3	6
9	Saithe	Fish & Game 2	2000	12	45
9	Liver, saithe	Fish & Game 2	2000	0.7	2.9
9	Haddock	Fish & Game 2	2000	3	7
9	Flounder	Fish & Game 2	2000	2	9
9	Mackerel	Fish & Game 2	2000	4	12
9	Herring	Fish & Game 2	2000	3	9
9	Tuna	Fish & Game 2	2000	5	27
9	Salmon, sea	Fish & Game 2	2000	4	18
9	Salmon, farmed	Fish & Game 2	2000	5	18
9	Saltwater fish, other	Fish & Game 2	2000	7	36
9	Pike	Fish & Game 2	2000	4	14
9	Pearch	Fish & Game 2	2000	2	3
9	Powan	Fish & Game 2	2000	2	4
9	Charr	Fish & Game 2	2000	2	3

9	Lake trout	Fish & Game 2	2000	4	18
9	Freshwater fish, other	Fish & Game 2	2000	4	18
9a	Eel	Fish & Game 2	2000	1	2
9	Shrimp, self-peeled	Fish & Game 2	2000	4	10
9	Shrimp, preserved	Fish & Game 2	2000	3	10
9	Crab	Fish & Game 2	2000	6	21
9	Crab, claws	Fish & Game 2	2000	5	21
9	Mussel	Fish & Game 2	2000	1	2
14	Coffee	Fish & Game 2	2000	809	1500
14	Tea	Fish & Game 2	2000	331	1000

3. SUMMARIES OF SUBMITTED INTAKE DATA

3.1 BELGIUM

No calculation of intake was presented

3.2 DENMARK

Intake calculation is based primarily on the very limited consumption of mussels. Intake calculations are therefore only valid as a guideline for the average intake of OTC in the Danish population from that particular foodstuff. 70 kg bodyweight average is assumed. Only calculation for mean values – no other assumptions Table *DK Intake* reports the presented calculations.

From the table it can be observed that four different clusters of data on intake of TBT/DBT/MBT for mussels have been submitted, without a mean value. In fact the National Expert grouped the data according to the year, as reported in *Table DK occurrence*

The intake for mussels are therefore referred to the relevant year.

The complete raw data are reported on technical Annex on CD ROM

Table 66 DK Intake

DENMARK

(calculated with <LOD=LOD/2)

Food group code	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
			Mean	high level	Mean	high level
9.1.1.30x1	Cod - liver	TBT	0.001241	no data	0.00001773	no data
9.1.1.30x1	Cod - liver	DBT	0.000451	no data	0.00000645	no data
9.1.1.30x1	Cod - liver	MBT	0.000009	no data	0.00000013	no data
9.1.1.30x1	Cod - liver	TPT	0.002872	no data	0.00004103	no data
9.1.1.30x1	Cod - liver	DPT	0.000120	no data	0.00000171	no data
9.1.1.30x1	Cod - liver	MPT	0.000043	no data	0.00000061	no data
9.1.1.30x2	Cod-muscle	TBT	0.003856	no data	0.00005509	no data
9.1.1.30x2	Cod-muscle	DBT	0.038489	no data	0.00054984	no data
9.1.1.30x2	Cod-muscle	MBT	0.007433	no data	0.00010619	no data
9.1.1.30x2	Cod-muscle	TPT	0.002947	no data	0.00004210	no data
9.1.1.30x2	Cod-muscle	DPT	0.001529	no data	0.00002184	no data
9.1.1.30x2	Cod-muscle	MPT	0.000439	no data	0.00000627	no data
9.1.1.30x4	Flounder-muscle	TBT	0.062116	no data	0.00088738	no data
9.1.1.30x4	Flounder-muscle	DBT	0.023016	no data	0.00032880	no data
9.1.1.30x4	Flounder-muscle	MBT	0.003703	no data	0.00005289	no data
9.1.1.30x4	Flounder-muscle	TPT	0.006503	no data	0.00009290	no data
9.1.1.30x4	Flounder-muscle	DPT	0.000586	no data	0.00000838	no data
9.1.1.30x4	Flounder-muscle	MPT	0.000168	no data	0.00000240	no data
9.1.2.1	Blue Mussel 2001	TBT	0.000862	no data	0.00001232	no data
9.1.2.1	Blue Mussel 2001	DBT	0.000533	no data	0.00000761	no data
9.1.2.1	Blue Mussel 2001	MBT	0.000058	no data	0.00000083	no data
9.1.2.1	Blue Mussel 2000	TBT	0.001699	no data	0.00002427	no data
9.1.2.1	Blue Mussel 2000	DBT	0.000441	no data	0.00000630	no data
9.1.2.1	Blue Mussel 2000	MBT	0.000459	no data	0.00000656	no data
9.1.2.1	Blue Mussel 1999	TBT	0.000558	no data	0.00000798	no data
9.1.2.1	Blue Mussel 1999	DBT	0.000223	no data	0.00000318	no data
9.1.2.1	Blue Mussel 1999	MBT	0.000342	no data	0.00000488	no data

9.1.2.1	Blue Mussel 1998	TBT	0.001520	no data	0.00002171	no data
9.1.2.1	Blue Mussel 1998	DBT	0.000147	no data	0.00000210	no data
9.1.2.1	Blue Mussel 1998	MBT	0.000952	no data	0.00001359	no data

3.3 GERMANY

On the basis of the mean occurrence data and of the food consumption data, daily intakes have been calculated. Estimated dietary intakes (mean and high consumers = 97.5 Percentile) for the various organotin compounds (OTCs) are presented in several Tables reported extensively in Technical Annex on CD-ROM. The tables there reported are :

- Tab 4a for adults using the consumption data by consumers and $<LOD=0$;
- Tab 4b for adults using the consumption data by consumers and $<LOD=LOD/2$;
- Tab 4c for adults using the consumption data by population and $<LOD=0$;
- Tab 4d for adults using the consumption data by population and $<LOD=LOD/2$;
- Tab 4e for children using the consumption data by consumers and $<LOD=0$;
- Tab 4f for children using the consumption data by consumers and $<LOD=LOD/2$;
- Tab 4g for children using the consumption data by population and $<LOD=0$;
- Tab 4h for children using the consumption data by population and $<LOD=LOD/2$.

Tables DE Intake reports in the next pages splitted data for adults (bodyweight 70 kg) and children (bodyweight 20 kg) both referred by consumers and by population and both calculated when $<LOD$ occurrence data were assumed =0 or when they were assumed = $LOD/2$.

Some analytical measurements were made for detection of the organotin compounds MOT, DOT and TOT in fish and fish products. But the numbers of the analytical data are low and no concentrations above the LOD were obtained. For these reasons means were not calculated and no dietary intakes for these specific OTCs were estimated by the National Expert.

It should be emphasized that the highest concentrations of OTCs were detected in certain molluscs like clams (TBT/DBT) and fresh fish from inland water ways and harbours (TBT/TPT). In addition in some instances high levels of TBT and TPT were also analysed in fresh fish from lakes (TBT/TPT). The complete raw data are reported on the technical Annex on CD ROM.

Table 67 DE intake

GERMANY

Adults >= 18 years Bodyweight: =70 kg <LOD =0 CONSUMERS							
Food group code	Food Id. (country)	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.027	0.071	0.00039	0.00101
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.004	0.011	0.00006	0.00015
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.018	0.046	0.00025	0.00065
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0	0	0	0
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	0.639	1.649	0.00912	0.02355
9.1.1	DE/1	Fresh Fish farm / Lake	TeBT	0	0	0	0
9.1.1	DE/1	Fresh Fish farm / Lake	TePT	0	0	0	0
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	0.320	0.826	0.00457	0.01180
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	DBT	0.042	0.081	0.00059	0.00115
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	DPT	0.011	0.021	0.00015	0.00030
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	MBT	0.004	0.008	0.00006	0.00011
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	MPT	0.003	0.005	0.00004	0.00008
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TBT	0.431	0.835	0.00616	0.01193
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TeBT	0.003	0.005	0.00004	0.00007
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TePT	0	0	0	0
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TPT	0.256	0.496	0.00366	0.00709
9.1.1	DE/3	Fresh Fish marine	DBT	0.008	0.024	0.00012	0.00034
9.1.1	DE/3	Fresh Fish marine	DPT	0.002	0.004	0.00002	0.00006
9.1.1	DE/3	Fresh Fish marine	MBT	0.003	0.009	0.00004	0.00013
9.1.1	DE/3	Fresh Fish marine	MPT	0	0	0	0
9.1.1	DE/3	Fresh Fish marine	TBT	0.082	0.235	0.00117	0.00336
9.1.1	DE/3	Fresh Fish marine	TeBT	0	0	0	0
9.1.1	DE/3	Fresh Fish marine	TePT	0	0	0	0
9.1.1	DE/3	Fresh Fish marine	TPT	0.133	0.380	0.00190	0.00543

9.1.2	DE/4	Bivalve molluscs	DBT	0.295	2.000	0.00421	0.02857
9.1.2	DE/4	Bivalve molluscs	DPT	0.003	0.018	0.00004	0.00025
9.1.2	DE/4	Bivalve molluscs	MBT	0.063	0.429	0.00090	0.00613
9.1.2	DE/4	Bivalve molluscs	MPT	0	0	0	0
9.1.2	DE/4	Bivalve molluscs	TBT	0.978	6.633	0.01398	0.09476
9.1.2	DE/4	Bivalve molluscs	TeBT	0	0	0	0
9.1.2	DE/4	Bivalve molluscs	TePT	0	0	0	0
9.1.2	DE/4	Bivalve molluscs	TPT	0.090	0.611	0.00129	0.00873
9.1.4	DE/5	Fresh crustaceans	DBT	0.008	0.026	0.00011	0.00037
9.1.4	DE/5	Fresh crustaceans	DPT	0	0	0	0
9.1.4	DE/5	Fresh crustaceans	MBT	0.008	0.026	0.00011	0.00037
9.1.4	DE/5	Fresh crustaceans	MPT	0	0	0	0
9.1.4	DE/5	Fresh crustaceans	TBT	0.046	0.154	0.00066	0.00219
9.1.4	DE/5	Fresh crustaceans	TeBT	0	0	0	0
9.1.4	DE/5	Fresh crustaceans	TPT	0.093	0.307	0.00133	0.00439
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.001	0.003	0.00001	0.00005
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0	0	0	0
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.382	1.390	0.00546	0.01985
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0	0	0	0
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.124	0.450	0.00177	0.00643
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0	0	0	0
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.009	0.033	0.00013	0.00047

(cont.) *Table 68 DE intake GERMANY*

NTAKE ADULTS >18 YEARS <LOD = LOD/2 BODYWEIGHT 70 KG CONSUMERS							
Food group code	Food Id. country	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.166	0.427	0.00236	0.00610
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.086	0.222	0.00123	0.00318
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.154	0.398	0.00220	0.00569
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0.081	0.208	0.00115	0.00298
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	0.721	1.861	0.01030	0.02658
9.1.1	DE/1	Fresh Fish farm / Lake	TeBT	0.081	0.208	0.00115	0.00298
9.1.1	DE/1	Fresh Fish farm / Lake	TePT	0.081	0.208	0.00115	0.00298
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	0.373	0.963	0.00533	0.01376
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	DBT	0.069	0.133	0.00098	0.00190
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	DPT	0.176	0.341	0.00251	0.00487
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	MBT	0.082	0.160	0.00118	0.00228
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	MPT	0.089	0.173	0.00128	0.00247
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TBT	1.118	2.164	0.01597	0.03092
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TeBT	0.148	0.286	0.00211	0.00409
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TePT	0.064	0.124	0.00091	0.00176
9.1.1	DE/2	Fresh Fish Inland water ways / harbour	TPT	0.527	1.021	0.00753	0.01459
9.1.1	DE/3	Fresh Fish marine	DBT	0.043	0.124	0.00062	0.00177
9.1.1	DE/3	Fresh Fish marine	DPT	0.021	0.061	0.00031	0.00088
9.1.1	DE/3	Fresh Fish marine	MBT	0.034	0.096	0.00048	0.00137
9.1.1	DE/3	Fresh Fish marine	MPT	0.037	0.107	0.00053	0.00153
9.1.1	DE/3	Fresh Fish marine	TBT	0.227	0.650	0.00324	0.00928
9.1.1	DE/3	Fresh Fish marine	TeBT	0.021	0.061	0.00030	0.00087
9.1.1	DE/3	Fresh Fish marine	TePT	0.065	0.185	0.00092	0.00264
9.1.1	DE/3	Fresh Fish marine	TPT	0.116	0.332	0.00165	0.00474
9.1.2	DE/4	Bivalve molluscs	DBT	0.304	2.058	0.00434	0.02940

9.1.2	DE/4	Bivalve molluscs	DPT	0.040	0.274	0.00058	0.00391
9.1.2	DE/4	Bivalve molluscs	MBT	0.095	0.644	0.00136	0.00920
9.1.2	DE/4	Bivalve molluscs	MPT	0.037	0.250	0.00053	0.00357
9.1.2	DE/4	Bivalve molluscs	TBT	0.911	6.178	0.01302	0.08826
9.1.2	DE/4	Bivalve molluscs	TeBT	0.039	0.268	0.00056	0.00382
9.1.2	DE/4	Bivalve molluscs	TePt	0.046	0.313	0.00066	0.00446
9.1.2	DE/4	Bivalve molluscs	TPT	0.102	0.693	0.00146	0.00989
9.1.4	DE/5	Fresh crustaceans	DBT	0.010	0.033	0.00014	0.00048
9.1.4	DE/5	Fresh crustaceans	DPT	0.009	0.030	0.00013	0.00042
9.1.4	DE/5	Fresh crustaceans	MBT	0.010	0.033	0.00014	0.00048
9.1.4	DE/5	Fresh crustaceans	MPT	0.006	0.019	0.00008	0.00027
9.1.4	DE/5	Fresh crustaceans	TBT	0.035	0.114	0.00049	0.00163
9.1.4	DE/5	Fresh crustaceans	TeBT	0.009	0.030	0.00013	0.00042
9.1.4	DE/5	Fresh crustaceans	TPT	0.013	0.041	0.00018	0.00059
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.052	0.191	0.00075	0.00273
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0.041	0.150	0.00059	0.00214
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.259	0.941	0.00370	0.01344
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0.048	0.174	0.00068	0.00248
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.142	0.517	0.00203	0.00738
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0.011	0.040	0.00016	0.00057
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.077	0.281	0.00110	0.00401

(cont.) Table 69 DE intake GERMANY

DE intake Adults >= 18 years <LOD =0 Bodyweight: =70 kg POPULATION							
Food group code	Food Id. (country)	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.001	0.019	0.00002	0.00028
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.000	0.003	0.00000	0.00004
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.001	0.013	0.00001	0.00018
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0.000	0.000	0.00000	0.00000
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	0.025	0.453	0.00035	0.00647
9.1.1	DE/1	Fresh Fish farm / Lake	TeBT	0	0	0.00000	0.00000
9.1.1	DE/1	Fresh Fish farm / Lake	TePT	0	0	0.00000	0.00000
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	0.012	0.227	0.00018	0.00325
9.1.1	DE/3	Fresh Fish marine	DBT	0.003	0.018	0.00004	0.00026
9.1.1	DE/3	Fresh Fish marine	DPT	0.001	0.003	0.00001	0.00005
9.1.1	DE/3	Fresh Fish marine	MBT	0.001	0.007	0.00002	0.00010
9.1.1	DE/3	Fresh Fish marine	MPT	0	0	0.00000	0.00000
9.1.1	DE/3	Fresh Fish marine	TBT	0.030	0.179	0.00043	0.00256
9.1.1	DE/3	Fresh Fish marine	TeBT	0	0	0.00000	0.00000
9.1.1	DE/3	Fresh Fish marine	TePT	0	0	0.00000	0.00000
9.1.1	DE/3	Fresh Fish marine	TPT	0.049	0.289	0.00070	0.00413
9.1.4	DE/5	Fresh crustaceans	DBT	0.000	0.004	0.00000	0.00006
9.1.4	DE/5	Fresh crustaceans	DPT	0	0	0.00000	0.00000
9.1.4	DE/5	Fresh crustaceans	MBT	0.000	0.004	0.00000	0.00006
9.1.4	DE/5	Fresh crustaceans	MPT	0	0	0.00000	0.00000
9.1.4	DE/5	Fresh crustaceans	TBT	0.002	0.026	0.00003	0.00038
9.1.4	DE/5	Fresh crustaceans	TeBT	0	0	0.00000	0.00000
9.1.4	DE/5	Fresh crustaceans	TPT	0.004	0.053	0.00005	0.00075
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.000	0.002	0.00000	0.00003
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0	0	0.00000	0.00000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.112	0.879	0.00160	0.01255
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0	0	0.00000	0.00000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.036	0.285	0.00052	0.00406
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0	0	0.00000	0.00000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.003	0.021	0.00004	0.00029

9.4		products					
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(cont.) Table 70 DE intake GERMANY

NTAKE ADULTS >18 YEARS <LOD =LOD/2 BODYWEIGHT 70 KG POPULATION							
Food group code	Food Id.(country)	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.006	0.117	0.00009	0.00168
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.003	0.061	0.00005	0.00087
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.006	0.109	0.00009	0.00156
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0.003	0.057	0.00004	0.00082
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	0.028	0.512	0.00040	0.00731
9.1.1	DE/1	Fresh Fish farm / Lake	TeBT	0.003	0.057	0.00004	0.00082
9.1.1	DE/1	Fresh Fish farm / Lake	TePT	0.003	0.057	0.00004	0.00082
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	0.014	0.265	0.00021	0.00378
9.1.1	DE/3	Fresh Fish marine	DBT	0.016	0.094	0.00023	0.00134
9.1.1	DE/3	Fresh Fish marine	DPT	0.008	0.047	0.00011	0.00067
9.1.1	DE/3	Fresh Fish marine	MBT	0.012	0.073	0.00018	0.00105
9.1.1	DE/3	Fresh Fish marine	MPT	0.014	0.082	0.00020	0.00117
9.1.1	DE/3	Fresh Fish marine	TBT	0.084	0.494	0.00120	0.00706
9.1.1	DE/3	Fresh Fish marine	TeBT	0.008	0.046	0.00011	0.00066
9.1.1	DE/3	Fresh Fish marine	TePT	0.024	0.141	0.00034	0.00201
9.1.1	DE/3	Fresh Fish marine	TPT	0.043	0.252	0.00061	0.00360
9.1.4	DE/5	Fresh crustaceans	DBT	0.000	0.006	0.00001	0.00008
9.1.4	DE/5	Fresh crustaceans	DPT	0.000	0.005	0.00001	0.00007
9.1.4	DE/5	Fresh crustaceans	MBT	0.000	0.006	0.00001	0.00008
9.1.4	DE/5	Fresh crustaceans	MPT	0.000	0.003	0.00000	0.00005
9.1.4	DE/5	Fresh crustaceans	TBT	0.001	0.020	0.00002	0.00028
9.1.4	DE/5	Fresh crustaceans	TeBT	0.000	0.005	0.00001	0.00007
9.1.4	DE/5	Fresh crustaceans	TPT	0.001	0.007	0.00001	0.00010
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.015	0.121	0.00022	0.00173
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0.012	0.095	0.00017	0.00135
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.076	0.595	0.00108	0.00850
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0.014	0.110	0.00020	0.00157
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.042	0.327	0.00060	0.00467
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0.003	0.025	0.00005	0.00036
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.023	0.177	0.00032	0.00253

9.4		products					
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(cont.) Table 71 DE intake GERMANY

intake (children 4-6 years) < LOD=0 Bodyweight 20 kg CONSUMERS							
Food group code	Food Id.(country)	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.017		0.00086	
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.003		0.00013	
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.011		0.00056	
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0		0	
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	0.402		0.02008	
9.1.1	DE/1	Fresh Fish farm / Lake	TeBT	0		0	
9.1.1	DE/1	Fresh Fish farm / Lake	TePT	0		0	
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	0.201		0.01006	
9.1.1	DE/3	Fresh Fish marine	DBT	0.005	0.014	0.00024	0.00069
9.1.1	DE/3	Fresh Fish marine	DPT	0.001	0.003	0.00004	0.00013
9.1.1	DE/3	Fresh Fish marine	MBT	0.002	0.005	0.00009	0.00026
9.1.1	DE/3	Fresh Fish marine	MPT	0	0	0	0
9.1.1	DE/3	Fresh Fish marine	TBT	0.047	0.138	0.00237	0.00689
9.1.1	DE/3	Fresh Fish marine	TeBT	0	0	0	0
9.1.1	DE/3	Fresh Fish marine	TePT	0	0	0	0
9.1.1	DE/3	Fresh Fish marine	TPT	0.077	0.223	0.00383	0.01114
9.1.4	DE/5	Fresh crustaceans	DBT	0.004		0.00022	
9.1.4	DE/5	Fresh crustaceans	DPT	0		0.00000	
9.1.4	DE/5	Fresh crustaceans	MBT	0.004		0.00022	
9.1.4	DE/5	Fresh crustaceans	MPT	0		0.00000	
9.1.4	DE/5	Fresh crustaceans	TBT	0.026		0.00129	
9.1.4	DE/5	Fresh crustaceans	TeBT	0		0.00000	
9.1.4	DE/5	Fresh crustaceans	TPT	0.052		0.00258	
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.000	0.002	0.00002	0.00012
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0	0	0	0
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.166	0.947	0.00831	0.04736
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0	0	0	0
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.054	0.307	0.00269	0.01534
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0	0	0	0
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.004	0.022	0.00020	0.00111

products

TABLE 72 DE INTAKE GERMANY

INTAKE (CHILDREN 4-6 YEARS) < LOD = LOD/2 BODYWEIGHT 20 KG CONSUMERS

Food group code	Food Id. country	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/1	Fresh Fish farm / Lake	DBT	0.104		0.00520	
9.1.1	DE/1	Fresh Fish farm / Lake	DPT	0.054		0.00271	
9.1.1	DE/1	Fresh Fish farm / Lake	MBT	0.097		0.00485	
9.1.1	DE/1	Fresh Fish farm / Lake	MPT	0.051		0.00254	
9.1.1	DE/1	Fresh Fish farm / Lake	TBT	0.453		0.02266	
9.1.1	DE/1	Fresh Fish farm / Lake	TeBT	0.051		0.00254	
9.1.1	DE/1	Fresh Fish farm / Lake	TePT	0.051		0.00254	
9.1.1	DE/1	Fresh Fish farm / Lake	TPT	0.235		0.01173	
9.1.1	DE/3	Fresh Fish marine	DBT	0.025	0.072	0.00124	0.00362
9.1.1	DE/3	Fresh Fish marine	DPT	0.012	0.036	0.00062	0.00180
9.1.1	DE/3	Fresh Fish marine	MBT	0.019	0.056	0.00097	0.00282
9.1.1	DE/3	Fresh Fish marine	MPT	0.022	0.063	0.00108	0.00314
9.1.1	DE/3	Fresh Fish marine	TBT	0.131	0.381	0.00655	0.01904
9.1.1	DE/3	Fresh Fish marine	TeBT	0.012	0.036	0.00061	0.00178
9.1.1	DE/3	Fresh Fish marine	TePT	0.037	0.108	0.00186	0.00542
9.1.1	DE/3	Fresh Fish marine	TPT	0.067	0.194	0.00334	0.00971
9.1.4	DE/5	Fresh crustaceans	DBT	0.006		0.00028	
9.1.4	DE/5	Fresh crustaceans	DPT	0.005		0.00025	
9.1.4	DE/5	Fresh crustaceans	MBT	0.006		0.00028	
9.1.4	DE/5	Fresh crustaceans	MPT	0.003		0.00016	
9.1.4	DE/5	Fresh crustaceans	TBT	0.019		0.00096	
9.1.4	DE/5	Fresh crustaceans	TeBT	0.005		0.00025	
9.1.4	DE/5	Fresh crustaceans	TPT	0.007		0.00035	
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.023	0.130	0.00114	0.00651
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0.018	0.102	0.00090	0.00511
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.113	0.641	0.00563	0.03207
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0.021	0.118	0.00104	0.00592
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.062	0.352	0.00309	0.01761
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0.005	0.027	0.00024	0.00135
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.034	0.191	0.00168	0.00956

9.4		products					
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(cont.) *Table 73 DE intake GERMANY*

DE intake (children 4-6 years) < LOD=0 Bodyweight: =20 kg POPULATION							
Food group code	Food Id. country	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/3	Fresh Fish marine	DBT	0.002	0.009	0.00010	0.00046
9.1.1	DE/3	Fresh Fish marine	DPT	0.000	0.002	0.00002	0.00009
9.1.1	DE/3	Fresh Fish marine	MBT	0.001	0.003	0.00004	0.00017
9.1.1	DE/3	Fresh Fish marine	MPT	0	0	0.00000	0.00000
9.1.1	DE/3	Fresh Fish marine	TBT	0.019	0.091	0.00097	0.00455
9.1.1	DE/3	Fresh Fish marine	TeBT	0	0	0.00000	0.00000
9.1.1	DE/3	Fresh Fish marine	TePT	0	0	0.00000	0.00000
9.1.1	DE/3	Fresh Fish marine	TPT	0.031	0.147	0.00157	0.00735
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.0001	0.0007	0.0000	0.0000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0.0000	0.0000	0.0000	0.0000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.0250	0.2977	0.0013	0.0149
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0.0000	0.0000	0.0000	0.0000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.0081	0.0964	0.0004	0.0048
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0.0000	0.0000	0.0000	0.0000
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.0006	0.0070	0.0000	0.0003

(cont.) *Table 74 DE intake GERMANY*

DE intake (children 4-6 years) < LOD = LOD/2 Bodyweight: =20 kg POPULATION							
Food group code	Food Id. country	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
				Mean	high level	Mean	high level
9.1.1	DE/3	Fresh Fish marine	DBT	0.010	0.048	0.00051	0.00239
9.1.1	DE/3	Fresh Fish marine	DPT	0.005	0.024	0.00025	0.00119
9.1.1	DE/3	Fresh Fish marine	MBT	0.008	0.037	0.00040	0.00186
9.1.1	DE/3	Fresh Fish marine	MPT	0.009	0.041	0.00044	0.00207
9.1.1	DE/3	Fresh Fish marine	TBT	0.054	0.251	0.00269	0.01256
9.1.1	DE/3	Fresh Fish marine	TeBT	0.005	0.023	0.00025	0.00117
9.1.1	DE/3	Fresh Fish marine	TePT	0.015	0.072	0.00077	0.00358
9.1.1	DE/3	Fresh Fish marine	TPT	0.027	0.128	0.00137	0.00641
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DBT	0.003	0.041	0.00017	0.00205
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	DPT	0.003	0.032	0.00014	0.00161
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MBT	0.017	0.202	0.00085	0.01008
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	MPT	0.003	0.037	0.00016	0.00186
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TBT	0.009	0.111	0.00047	0.00554
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TeBT	0.001	0.008	0.00004	0.00042
9.2 / 9.3 / 9.4	DE/6	Processed fish and fish products	TPT	0.005	0.060	0.00025	0.00301

3.4 FRANCE

CALCULATION OF THE OTC INTAKE

The National Contact Point considered that at the SCOOP deadline the data available were not enough to calculate the intake.

3.5 ITALY

Since consumption data were available only for few fish groups, it was necessary to calculate OTC intake for such groups, only. To this aim, it was decided to group occurrence data from fresh mussels and clams under the *fresh bivalve molluscs* group, data from gilted bream, sea bass, etc., under the *fresh fish* group, and data from crabs under the *fresh crustaceans* group. Then, daily intakes were calculated. This was done in order to highlight the differences existing in the representativity of the samples.

Almost all the references referred OTC concentrations as μg of compound/dry weight of food, while μg of compound/wet weight was required. Therefore, OTC concentrations have been converted to μg of compound/wet weight. To this aim, wet weights were used when available; otherways, the following approximation has been applied: dry weight : wet weight = 1 : 5. Therefore, OTC concentrations – when reported as μg of compound/dry weight – were converted to μg of compound/wet weight dividing by 5 the reported numbers (such ratio was currently applied by authors of reference IT-001 in raw data).

OTC occurrence data available in raw data from samples IT-001, IT-002 and IT-003 for fresh mussels and some fish species were grouped, then daily intakes were calculated. This was done in order to report these data separately from those reported in IT-004.

Furthermore, it should be noted that even if the data available from IT-004 came from 12 different sampling sites, only the data from 5 sampling sites were retained as representative for dietary intake, and therefore used for calculation.

In fact, among the presented occurrence data, only the data from 5 sampling sites were deemed as representative for dietary intake, and therefore used for calculation.

Table IT Intake reports mean data calculated with $<\text{LOD}$ values $=\text{LOD}/2$ and $<\text{LOD} = 0$. The complete raw data are reported on technical Annex on CD ROM

ITALY

Table 75 IT Intake (mean values: <LOD=LOD/2)

Food group code	Food Identification (country Code/Sample Number)	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
			Population	Consumers	Population	Consumers
9.1.1	fresh fish	TBT	0.36480	0.90720	0.00521	0.01296
9.1.1		DBT	0.07752	0.19278	0.00111	0.00275
9.1.1		MBT	0.09120	0.22680	0.00130	0.00324
9.1.1		TPT	0.15200	0.37800	0.00217	0.00540
9.1.1		DPT	0.05472	0.13608	0.00078	0.00194
9.1.1		MPT	0.09576	0.23814	0.00137	0.00340
9.1.2	fresh bivalve molluscs	TBT	0.17220	1.47600	0.00246	0.02109
9.1.2		DBT	0.10500	0.90000	0.00150	0.01286
9.1.2		MBT	0.16926	1.45080	0.00242	0.02073
9.1.2		TPT	0.01092	0.09360	0.00016	0.00134
9.1.2		DPT	0.00546	0.04680	0.00008	0.00067
9.1.2		MPT	0.04956	0.42480	0.00071	0.00607
9.1.4	fresh crustaceans	TBT	0.01560	0.31512	0.00022	0.00450
9.1.4		DBT	0.00420	0.08484	0.00006	0.00121
9.1.4		MBT	0.00600	0.12120	0.00009	0.00173
9.1.4		TPT	0.00240	0.04848	0.00003	0.00069
9.1.4		DPT	0.00240	0.04848	0.00003	0.00069
9.1.4		MPT	0.00330	0.06666	0.00005	0.00095

ITALY

Table 76 IT Intake (mean values: <LOD=0)

Food group code	Food Identification (country Code/Sample Number)	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
			Population	Consumers	Population	Consumers
9.1.1	fresh fish	TBT	0.29640	0.73710	0.00423	0.01053
9.1.1		DBT	0.05928	0.14742	0.00085	0.00211
9.1.1		MBT	0.09120	0.22680	0.00130	0.00324
9.1.1		TPT	0.18848	0.46872	0.00269	0.00670
9.1.1		DPT	0.07448	0.18522	0.00106	0.00265
9.1.1		MPT	0.10184	0.25326	0.00145	0.00362
9.1.2	fresh bivalve molluscs	TBT	0.17220	1.47600	0.00246	0.02109
9.1.2		DBT	0.10500	0.90000	0.00150	0.01286
9.1.2		MBT	0.16926	1.45080	0.00242	0.02073
9.1.2		TPT	0.01554	0.13320	0.00022	0.00190
9.1.2		DPT	0.00252	0.02160	0.00004	0.00031
9.1.2		MPT	0.04746	0.40680	0.00068	0.00581
9.1.4	fresh crustaceans	TBT	0.01560	0.31512	0.00022	0.00450
9.1.4		DBT	0.00420	0.08484	0.00006	0.00121
9.1.4		MBT	0.00600	0.12120	0.00009	0.00173
9.1.4		TPT	0.00270	0.05454	0.00004	0.00078
9.1.4		DPT	0.00300	0.06060	0.00004	0.00087
9.1.4		MPT	0.00330	0.06666	0.00005	0.00095

3.6 The Netherlands

The whole set of the presented occurrence data was indicated by the National Contact Point as representative for intake calculation. However, OTC intakes were calculated according to the availability of food consumption data. Intake data are referred to general population (mean and high consumers). and have been calculated for both for occurrence data $<LOD = 0$ and for $<LOD = LOD/2$, as reported in the *Tables NL Intake* The complete raw data are reported on the technical Annex on CD ROM

Tables 77 NL Intake (mean values: <LOD=0)

The Netherlands POPULATION

Food code	group	Food Id. (country Code /S. N)	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
					Mean	high level	Mean	high level
9.1.1.2		NL/001	Eel	MBT	0.000156	0.00036	2.277E-06	5.25547E-06
9.1.1.2		NL/001	Eel	DBT	0.000273	0.00063	3.985E-06	9.19708E-06
9.1.1.2		NL/001	Eel	TBT	0.00221	0.0051	3.226E-05	7.44526E-05
9.1.1.2		NL/001	Eel	MPT	0.000039	0.00009	5.693E-07	1.31387E-06
9.1.1.2		NL/001	Eel	DPT	0	0	0	0
9.1.1.2		NL/001	Eel	TPT	0.00546	0.0126	7.971E-05	0.000183942
9.1.4.3		NL/002	Shrimp	MBT	0.0008	0.000912	1.168E-05	1.33139E-05
9.1.4.3		NL/002	Shrimp	DBT	0.0008	0.000912	1.168E-05	1.33139E-05
9.1.4.3		NL/002	Shrimp	TBT	0.007	0.00798	0.0001022	0.000116496
9.1.4.3		NL/002	Shrimp	MPT	0	0	0	0
9.1.4.3		NL/002	Shrimp	DPT	0.00015	0.000171	2.19E-06	2.49635E-06
9.1.4.3		NL/002	Shrimp	TPT	0.0015	0.00171	2.19E-05	2.49635E-05
9.1.1.30X1		NL/003	Herring	MBT	0.00038	0.0006	5.547E-06	8.75912E-06
9.1.1.30X1		NL/003	Herring	DBT	0.00475	0.0075	6.934E-05	0.000109489
9.1.1.30X1		NL/003	Herring	TBT	0.0323	0.051	0.0004715	0.000744526
9.1.1.30X1		NL/003	Herring	MPT	0.00152	0.0024	2.219E-05	3.50365E-05
9.1.1.30X1		NL/003	Herring	DPT	0.00076	0.0012	1.109E-05	1.75182E-05
9.1.1.30X1		NL/003	Herring	TPT	0.00931	0.0147	0.0001359	0.000214599
9.1.1.30X2		NL/004	Cod	MBT	0.000307	0.00099	4.482E-06	1.44526E-05
9.1.1.30X2		NL/004	Cod	DBT	0	0	0	0
9.1.1.30X2		NL/004	Cod	TBT	0.00307	0.0099	4.482E-05	0.000144526
9.1.1.30X2		NL/004	Cod	MPT	0	0	0	0
9.1.1.30X2		NL/004	Cod	DPT	0	0	0	0
9.1.1.30X2		NL/004	Cod	TPT	0.006447	0.02079	9.412E-05	0.000303504
9.1.1.30X4		NL/006	Mackerel	MBT	0.00033	0.001	4.818E-06	1.45985E-05
9.1.1.30X4		NL/006	Mackerel	DBT	0.000726	0.0022	1.06E-05	3.21168E-05
9.1.1.30X4		NL/006	Mackerel	TBT	0.00363	0.011	5.299E-05	0.000160584
9.1.1.30X4		NL/006	Mackerel	MPT	0	0	0	0
9.1.1.30X4		NL/006	Mackerel	DPT	0	0	0	0
9.1.1.30X4		NL/006	Mackerel	TPT	0.00165	0.005	2.409E-05	7.29927E-05
9.1.2.1		NL/008	Mussel	MBT	0.000943	0.00138	1.377E-05	2.0146E-05
9.1.2.1		NL/008	Mussel	DBT	0.003485	0.0051	5.088E-05	7.44526E-05
9.1.2.1		NL/008	Mussel	TBT	0.00861	0.0126	0.0001257	0.000183942
9.1.2.1		NL/008	Mussel	MPT	0.000041	0.00006	5.985E-07	8.75912E-07
9.1.2.1		NL/008	Mussel	DPT	0.000287	0.00042	4.19E-06	6.13139E-06
9.1.2.1		NL/008	Mussel	TPT	0.00492	0.0072	7.182E-05	0.000105109
9.1.1.30X6		NL/010	Plaice	MBT	0.000018	0.00042	2.628E-07	6.13139E-06
9.1.1.30X6		NL/010	Plaice	DBT	0.000072	0.00168	1.051E-06	2.45255E-05
9.1.1.30X6		NL/010	Plaice	TBT	0.000162	0.00378	2.365E-06	5.51825E-05
9.1.1.30X6		NL/010	Plaice	MPT	0.000027	0.00063	3.942E-07	9.19708E-06
9.1.1.30X6		NL/010	Plaice	DPT	0.000117	0.00273	1.708E-06	3.9854E-05
9.1.1.30X6		NL/010	Plaice	TPT	0.00198	0.0462	2.891E-05	0.000674453

cont. Table 78 NL intake (mean values: <LOD=LOD/2) POPULATION

Food code	group	Food Id. (country Code/Sample Number)	Food name	OTC	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)	
					Mean	high level	Mean	high level
9.1.1.2		NL/001	Eel	MBT	0.000156	0.00036	2,277E-06	5,25547E-06
9.1.1.2		NL/001	Eel	DBT	0.000273	0.00063	3,985E-06	9,19708E-06
9.1.1.2		NL/001	Eel	TBT	0.00234	0.0054	3,416E-05	7,88321E-05
9.1.1.2		NL/001	Eel	MPT	0.000052	0.00012	7,591E-07	1,75182E-06
9.1.1.2		NL/001	Eel	DPT	0.00039	0.0009	5,693E-06	1,31387E-05
9.1.1.2		NL/001	Eel	TPT	0.00546	0.0126	7,971E-05	0,000183942
9.1.4.3		NL/002	Shrimp	MBT	0.0008	0.000912	1.168E-05	1.33139E-05
9.1.4.3		NL/002	Shrimp	DBT	0.0008	0.000912	1.168E-05	1.33139E-05
9.1.4.3		NL/002	Shrimp	TBT	0.007	0.00798	0.0001022	0.000116496
9.1.4.3		NL/002	Shrimp	MPT	0.00005	0.000057	7.299E-07	8.32117E-07
9.1.4.3		NL/002	Shrimp	DPT	0.00025	0.000285	3.65E-06	4.16058E-06
9.1.4.3		NL/002	Shrimp	TPT	0.0015	0.00171	2.19E-05	2.49635E-05
9.1.1.30X1		NL/003	Herring	MBT	0.00038	0.0006	5.547E-06	8.75912E-06
9.1.1.30X1		NL/003	Herring	DBT	0.00475	0.0075	6.934E-05	0.000109489
9.1.1.30X1		NL/003	Herring	TBT	0.0323	0.051	0.0004715	0.000744526
9.1.1.30X1		NL/003	Herring	MPT	0.00152	0.0024	2.219E-05	3.50365E-05
9.1.1.30X1		NL/003	Herring	DPT	0.00285	0.0045	4.161E-05	6.56934E-05
9.1.1.30X1		NL/003	Herring	TPT	0.00931	0.0147	0.0001359	0.000214599
9.1.1.30X2		NL/004	Cod	MBT	0.000307	0.00099	4.482E-06	1.44526E-05
9.1.1.30X2		NL/004	Cod	DBT	0.000307	0.00099	4.482E-06	1.44526E-05
9.1.1.30X2		NL/004	Cod	TBT	0.00307	0.0099	4.482E-05	0.000144526
9.1.1.30X2		NL/004	Cod	MPT	0.000307	0.00099	4.482E-06	1.44526E-05
9.1.1.30X2		NL/004	Cod	DPT	0.000921	0.00297	1.345E-05	4.33577E-05
9.1.1.30X2		NL/004	Cod	TPT	0.006447	0.02079	9.412E-05	0.000303504
9.1.1.30X4		NL/006	Mackerel	MBT	0.00033	0.001	4.818E-06	1.45985E-05
9.1.1.30X4		NL/006	Mackerel	DBT	0.000726	0.0022	1.06E-05	3.21168E-05
9.1.1.30X4		NL/006	Mackerel	TBT	0.00363	0.011	5.299E-05	0.000160584
9.1.1.30X4		NL/006	Mackerel	MPT	0.000165	0.0005	2.409E-06	7.29927E-06
9.1.1.30X4		NL/006	Mackerel	DPT	0.000561	0.0017	8.19E-06	2.48175E-05
9.1.1.30X4		NL/006	Mackerel	TPT	0.00165	0.005	2.409E-05	7.29927E-05
9.1.2.1		NL/008	Mussel	MBT	0.000943	0.00138	1.377E-05	2.0146E-05
9.1.2.1		NL/008	Mussel	DBT	0.003485	0.0051	5.088E-05	7.44526E-05
9.1.2.1		NL/008	Mussel	TBT	0.00861	0.0126	0.0001257	0.000183942
9.1.2.1		NL/008	Mussel	MPT	0.000041	0.00006	5.985E-07	8.75912E-07
9.1.2.1		NL/008	Mussel	DPT	0.000287	0.00042	4.19E-06	6.13139E-06
9.1.2.1		NL/008	Mussel	TPT	0.00492	0.0072	7.182E-05	0.000105109
9.1.1.30X6		NL/010	Plaice	MBT	0.000018	0.00042	2.628E-07	6.13139E-06
9.1.1.30X6		NL/010	Plaice	DBT	0.000081	0.00189	1.182E-06	2.75912E-05
9.1.1.30X6		NL/010	Plaice	TBT	0.000171	0.00399	2.496E-06	5.82482E-05
9.1.1.30X6		NL/010	Plaice	MPT	0.000045	0.00105	6.569E-07	1.53285E-05
9.1.1.30X6		NL/010	Plaice	DPT	0.000135	0.00315	1.971E-06	4.59854E-05
9.1.1.30X6		NL/010	Plaice	TPT	0.00198	0.0462	2.891E-05	0.000674453

3.7 GREECE

Since consumption data is available for the fresh bivalve molluscs, cephalopodes, crustaceans and echinoderm, as a group, the mean concentration of each specific organotin compound in the samples HE001-HE016(the whole set of data for fresh seafood) was calculated and used for the estimation of the mean level of daily intake. The mean level of daily intake was calculated by multiplying the mean concentration of each specific organotin compound with the mean consumption.

The high level of daily intake was calculated by multiplying the highest concentration of the specific organotin compound with the 95th perc. consumption value.

Both the data , by consumers and by population were calculated, both by assuming < LOD occurrence values =0 and <LOD occurrence values=LOD/2.

The intake data are reported in *Table HE INTAKE*. The complete raw data are reported on technical Annex on CD ROM

Table 79 HE Intake data by population (calculated with <math><LOD=LOD/2</math>)

Food group code	Food Id. (country Code/Sample Number)	Food name	OTC	Daily intake ($\mu\text{g}/\text{day}$)		Daily intake / body weight ($\mu\text{g}/\text{day}/\text{kg bw}$)	
				Mean	high level	Mean	high level
9.1.2, 9.1.3, 9.1.4 and 9.1.5	HE 001-016	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	TBT	0.057	1.1	0.00081	0.01571
9.1.2, 9.1.3, 9.1.4 and 9.1.5	HE 001-016	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	DBT	0.07	2.29	0.00100	0.03271
9.1.2, 9.1.3, 9.1.4 and 9.1.5	HE 001-016	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	MBT	0.065	2.72	0.00093	0.03886
9,4	HE017	Canned fish, fish roe, caviar, fish pies	TBT	0.003	0.02	0.00004	0.00029
9,4	HE017	Canned fish, fish roe, caviar, fish pies	DBT	0.0075	0.05	0.00011	0.00071
9,4	HE017	Canned fish, fish roe, caviar, fish pies	MBT	0.0045	0.03	0.00006	0.00043

Table 80 HE Intake data By consumers (calculated with <math><LOD=LOD/2</math>)

Food group code	Food Id. (country Code/Sample Number)	Food name	OTC	Daily intake ($\mu\text{g}/\text{day}$)		Daily intake / body weight ($\mu\text{g}/\text{day}/\text{kg bw}$)	
				Mean	high level	Mean	high level
9.1.2, 9.1.3, 9.1.4 and 9.1.5	HE 001-016	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	TBT	0.81	5.79	0.0116	0.0828
9.1.2, 9.1.3, 9.1.4 and 9.1.5	HE 001-016	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	DBT	1.00	12.06	0.0143	0.1723
9.1.2, 9.1.3, 9.1.4 and 9.1.5	HE 001-016	Fresh Bivalve molluscs, Cephalopodes, Crustaceans and Echinoderm	MBT	0.92	14.34	0.0131	0.2049
9,4	HE017	Canned fish, fish roe, caviar, fish pies	TBT	0.024	0.068	0.00034	0.00097
9,4	HE017	Canned fish, fish roe, caviar, fish pies	DBT	0.060	0.170	0.00086	0.0024
9,4	HE017	Canned fish, fish roe, caviar, fish pies	MBT	0.036	0.102	0.00051	0.0014

3.8 Norway

Estimated intake in the Norwegian population:

Data for the consumption of fish, shellfish and game were from the Fish and Game Study 1999-2000. The Fish and Game study was a representative study, making use of a food frequency questionnaire. A number of 6015 individuals participated in the survey carried out in 1999, whereas 5502 individuals participated in the survey carried out in 2000. The participants were asked to give information about how many times during the last year they had consumed specific fish and game and offal of such. Based on standard portion of the foods in question the food frequencies were converted into amount eaten per day (g/day). Three intake calculations were made for TBT and TPT and their derivatives:

The first one (TBT and TPT and their derivatives intake 1) is based on consumption data from Fish and Game Study 1999, all participants.

The second one (TBT and TPT and their derivatives intake 2) is based on consumption data from Fish and Game Study 1999, consumers only.

Estimated intake in sub-groups:

The third one (TBT and TPT and their derivatives intake 3) is based on consumption data from Fish and Game Study 2000, consumers only. Consumption of fish are based on participants who live in coastal municipalities. It is found that the consumption of saltwater fish is significant higher in the population who live in coastal areas and therefore they may be a group at risk to have a high intake of TBT and TPT and their derivatives.

Assumptions being made:

Fish

It was assumed that fish used on sandwiches would be herring.

The concentration of TBT and TPT and their derivatives in saithe, haddock and flounder, was assumed to be the same as in cod, whereas the concentration of TBT in mackerel and salmon was assumed to be the same as in herring.

The TBT and TPT and their derivatives concentration in liver of saithe was assumed to be the same as in cod liver.

The food group "Saltwater fish, other" was assumed to consist of equal parts of "skrubbe" and brosmé.

Shellfish

Crab consists of so-called dark and white meat. The two types of meat contain different amounts of the contaminants in question. A study based on ten crabs showed that the crabs had an average content of 41% white meat (found in the claws), whereas 59% of the crabs

consisted of brown meat (unpublished data). The result was used when estimating the content of heavy metals in whole crabs.

Proposed ratio:

Major approximations performed on the total number of foods:

TBT: 7 fish / 16 fish

RAW data: the complete raw data an reported on the Technical Annex on CD-ROM

TABLE 81 NORWAY Estimated daily intake by population, TBT and derivatives (Fish & Game, 1)

Food group code	Food name	Daily intake (µg/day/kg bw)					
		TBT		DBT		MBT	
		Mean	high level	Mean	high level	Mean	high level
9	Fish,- products (general group)	0.0406686	0.1432029	0.00803143	0.02445429	0.00210571	0.00728
9	Fish for sandwich	0.003343	0.008914	0.00034286	0.00091429	8.5714E-05	0.00022857
9	Fish products	0.0057	0.0141	0.00135714	0.00335714	0.00027143	0.00067143
9	Cod	0.005	0.015	0.00114286	0.00342857	0.00028571	0.00085714
9	Liver, cod	0.00097	0.003187	0.00048	0.00157714	0.00006	0.00019714
9	Saithe	0.0035	0.012	0.0008	0.00274286	0.0002	0.00068571
9	Liver, saithe	0.00097	0.003187	0.00048	0.00157714	0.00006	0.00019714
9	Haddock	0.001	0.0055	0.00022857	0.00125714	5.7143E-05	0.00031429
9	Flounder	0.000657	0.0023	0.00042857	0.0015	5.7143E-05	0.0002
9	Mackerel	0.002229	0.011143	0.00022857	0.00114286	5.7143E-05	0.00028571
9	Herring	0.002229	0.0078	0.00022857	0.0008	5.7143E-05	0.0002
9	Salmon, sea	0.003343	0.0156	0.00034286	0.0016	8.5714E-05	0.0004
9	Salmon, farmed	0.006686	0.0156	0.00068571	0.0016	0.00017143	0.0004
9	Saltwater fish, other	0.001414	0.0066	8.5714E-05	0.0004	8.5714E-05	0.0004
9a	Eel	0	0.002829	0	0.00055714	0	0.00024286
9	Crab	0.0028	0.0182	0.00068571	0.00445714	0.00022857	0.00148571
9	Crab, claws	0.000829	0.001243	0.00051429	0.00077143	0.00034286	0.00051429
9	Mussel	0.001557	0.007786	0.00047143	0.00235714	0.00012857	0.00064286

TABLE 82 NORWAY Estimated daily intake by population, TPT and derivatives (Fish & Game, 1)

Food group code	Food name	Daily intake (µg/day/kg bw)					
		TPT		DPT		MPT	
		Mean	high level	Mean	high level	Mean	high level
9	Fish,- products (general group)	0.07978	0.27924857	0.02438	0.08470571	0.01112857	0.03814286
9	Fish for sandwich	0.00115714	0.00308571	0.00017143	0.00045714	4.2857E-05	0.00011429
9	Fish products	0.019	0.047	0.00624286	0.01544286	0.00298571	0.00738571
9	Cod	0.01657143	0.04971429	0.00542857	0.01628571	0.00257143	0.00771429
9	Liver, cod	0.00439	0.01442429	0.00024	0.00078857	0.0002	0.00065714
9	Saithe	0.0116	0.03977143	0.0038	0.01302857	0.0018	0.00617143
9	Liver, saithe	0.00439	0.01442429	0.00024	0.00078857	0.0002	0.00065714
9	Haddock	0.00331429	0.01822857	0.00108571	0.00597143	0.00051429	0.00282857
9	Flounder	0.00345714	0.0121	0.00091429	0.0032	0.0004	0.0014
9	Mackerel	0.00077143	0.00385714	0.00011429	0.00057143	2.8571E-05	0.00014286
9	Herring	0.00077143	0.0027	0.00011429	0.0004	2.8571E-05	0.0001
9	Salmon, sea	0.00115714	0.0054	0.00017143	0.0008	4.2857E-05	0.0002
9	Salmon, farmed	0.00231429	0.0054	0.00034286	0.0008	8.5714E-05	0.0002
9	Saltwater fish, other	0.00951429	0.0444	0.0054	0.0252	0.00214286	0.01
9a	Eel	0	0.0124	0	0.00037143	0	0.00015714
9	Crab	0.00085714	0.00557143	8.5714E-05	0.00055714	5.7143E-05	0.00037143
9	Crab, claws	0.00051429	0.00077143	2.8571E-05	4.2857E-05	2.8571E-05	4.2857E-05
9	Mussel	0.00028571	0.00142857	0.000008	0.00004	5.7143E-06	2.8571E-05

Table 83 NORWAY Estimated daily intake by consumers, TBT and derivatives (Fish & Game, 1)

Food group code	Food name	Daily intake (µg/day/kg bw)					
		TBT		DBT		MBT	
		Mean	high level	Mean	high level	Mean	high level
9	Fish,- products (general group)	0.05724	0.160817	0.01130286	0.03325429	0.00333429	0.01010857
9	Fish for sandwich	0.003343	0.008914	0.00034286	0.00091429	8.5714E-05	0.00022857
9	Fish products	0.006	0.0141	0.00142857	0.00335714	0.00028571	0.00067143
9	Cod	0.0055	0.015	0.00125714	0.00342857	0.00031429	0.00085714
9	Liver, cod	0.00097	0.003187	0.00048	0.00157714	0.00006	0.00019714
9	Saithe	0.0045	0.012	0.00102857	0.00274286	0.00025714	0.00068571
9	Liver, saithe	0.00097	0.003187	0.00048	0.00157714	0.00006	0.00019714
9	Haddock	0.002	0.007	0.00045714	0.0016	0.00011429	0.0004
9	Flounder	0.000986	0.002957	0.00064286	0.00192857	8.5714E-05	0.00025714
9	Mackerel	0.003343	0.011143	0.00034286	0.00114286	8.5714E-05	0.00028571
9	Herring	0.003343	0.0078	0.00034286	0.0008	8.5714E-05	0.0002
9	Salmon, sea	0.005571	0.0156	0.00057143	0.0016	0.00014286	0.0004
9	Salmon, farmed	0.0078	0.0156	0.0008	0.0016	0.0002	0.0004
9	Saltwater fish, other	0.002829	0.0066	0.00017143	0.0004	0.00017143	0.0004
9a	Eel	0.002829	0.014143	0.00055714	0.00278571	0.00024286	0.00121429
9	Crab	0.0056	0.0182	0.00137143	0.00445714	0.00045714	0.00148571
9	Crab, claws	0.001657	0.005386	0.00102857	0.00334286	0.00068571	0.00222857
9	Mussel	0.001557	0.007786	0.00047143	0.00235714	0.00012857	0.00064286

Table 84 NORWAY Estimated daily intake by consumers, TPT and derivatives (Fish & Game, 1)

Food group code	Food name	Daily intake (µg/day/kg bw)					
		TPT		DPT		MPT	
		Mean	high level	Mean	high level	Mean	high level
9	Fish,- products (general group)	0.11600857	0.33984857	0.03405143	0.08887714	0.01522857	0.04008571
9	Fish for sandwich	0.00115714	0.00308571	0.00017143	0.00045714	4.2857E-05	0.00011429
9	Fish products	0.02	0.047	0.00657143	0.01544286	0.00314286	0.00738571
9	Cod	0.01822857	0.04971429	0.00597143	0.01628571	0.00282857	0.00771429
9	Liver, cod	0.00439	0.01442429	0.00024	0.00078857	0.0002	0.00065714
9	Saithe	0.01491429	0.03977143	0.00488571	0.01302857	0.00231429	0.00617143
9	Liver, saithe	0.00439	0.01442429	0.00024	0.00078857	0.0002	0.00065714
9	Haddock	0.00662857	0.0232	0.00217143	0.0076	0.00102857	0.0036
9	Flounder	0.00518571	0.01555714	0.00137143	0.00411429	0.0006	0.0018
9	Mackerel	0.00115714	0.00385714	0.00017143	0.00057143	4.2857E-05	0.00014286
9	Herring	0.00115714	0.0027	0.00017143	0.0004	4.2857E-05	0.0001
9	Salmon, sea	0.00192857	0.0054	0.00028571	0.0008	7.1429E-05	0.0002
9	Salmon, farmed	0.0027	0.0054	0.0004	0.0008	0.0001	0.0002
9	Saltwater fish, other	0.01902857	0.0444	0.0108	0.0252	0.00428571	0.01
9a	Eel	0.0124	0.062	0.00037143	0.00185714	0.00015714	0.00078571
9	Crab	0.00171429	0.00557143	0.00017143	0.00055714	0.00011429	0.00037143
9	Crab, claws	0.00102857	0.00334286	5.7143E-05	0.00018571	5.7143E-05	0.00018571
9	Mussel	0.00028571	0.00142857	0.000008	0.00004	5.7143E-06	2.8571E-05

Table 85 NORWAY Estimated daily intake by coastal municipalities consumers, TBT and derivatives (Fish & Game, 2)

Food group code	Food name	Daily intake (µg/day/kg bw)					
		TBT		DBT		MBT	
		Mean	high level	Mean	high level	Mean	high level
9	Fish,- products (general group)	0.062669	0.203151	0.01281714	0.04166286	0.00392	0.01339714
9	Fish for sandwich	0.003343	0.008914	0.00034286	0.00091429	8.5714E-05	0.00022857
9	Fish products	0.0063	0.0105	0.0015	0.0025	0.0003	0.0005
9	Cod	0.0085	0.0225	0.00194286	0.00514286	0.00048571	0.00128571
9	Liver, cod	0.00097	0.004019	0.00048	0.00198857	0.00006	0.00024857
9	Saithe	0.006	0.0225	0.00137143	0.00514286	0.00034286	0.00128571
9	Liver, saithe	0.00097	0.004019	0.00048	0.00198857	0.00006	0.00024857
9	Haddock	0.0015	0.0035	0.00034286	0.0008	8.5714E-05	0.0002
9	Flounder	0.000657	0.002957	0.00042857	0.00192857	5.7143E-05	0.00025714
9	Mackerel	0.004457	0.013371	0.00045714	0.00137143	0.00011429	0.00034286
9	Herring	0.003343	0.010029	0.00034286	0.00102857	8.5714E-05	0.00025714
9	Salmon, sea	0.004457	0.020057	0.00045714	0.00205714	0.00011429	0.00051429
9	Salmon, farmed	0.005571	0.020057	0.00057143	0.00205714	0.00014286	0.00051429
9	Saltwater fish, other	0.0033	0.016971	0.0002	0.00102857	0.0002	0.00102857
9a	Eel	0.002829	0.005657	0.00055714	0.00111429	0.00024286	0.00048571
9	Crab	0.0084	0.0294	0.00205714	0.0072	0.00068571	0.0024
9	Crab, claws	0.002071	0.0087	0.00128571	0.0054	0.00085714	0.0036
9	Mussel	0.001557	0.003114	0.00047143	0.00094286	0.00012857	0.00025714

Table 86 NORWAY Estimated daily intake by coastal municipalities consumers, TPT and derivatives (Fish & Game, 2)

Food group code	Food name	Daily intake (µg/day/kg b.w.)					
		TPT		DPT		MPT	
		Mean	high level	Mean	high level	Mean	high level
9	Fish,- products (general group)	0.13205143	0.42611714	0.04005143	0.14071714	0.018	0.06175714
9	Fish for sandwich	0.00115714	0.00308571	0.00017143	0.00045714	4.2857E-05	0.00011429
9	Fish products	0.021	0.035	0.0069	0.0115	0.0033	0.0055
9	Cod	0.02817143	0.07457143	0.00922857	0.02442857	0.00437143	0.01157143
9	Liver, cod	0.00439	0.01818714	0.00024	0.00099429	0.0002	0.00082857
9	Saithe	0.01988571	0.07457143	0.00651429	0.02442857	0.00308571	0.01157143
9	Liver, saithe	0.00439	0.01818714	0.00024	0.00099429	0.0002	0.00082857
9	Haddock	0.00497143	0.0116	0.00162857	0.0038	0.00077143	0.0018
9	Flounder	0.00345714	0.01555714	0.00091429	0.00411429	0.0004	0.0018
9	Mackerel	0.00154286	0.00462857	0.00022857	0.00068571	5.7143E-05	0.00017143
9	Herring	0.00115714	0.00347143	0.00017143	0.00051429	4.2857E-05	0.00012857
9	Salmon, sea	0.00154286	0.00694286	0.00022857	0.00102857	5.7143E-05	0.00025714
9	Salmon, farmed	0.00192857	0.00694286	0.00028571	0.00102857	7.1429E-05	0.00025714
9	Saltwater fish, other	0.0222	0.11417143	0.0126	0.0648	0.005	0.02571429
9a	Eel	0.0124	0.0248	0.00037143	0.00074286	0.00015714	0.00031429
9	Crab	0.00257143	0.009	0.00025714	0.0009	0.00017143	0.0006
9	Crab, claws	0.00128571	0.0054	7.1429E-05	0.0003	7.1429E-05	0.0003
9	Mussel	0.00028571	0.00057143	0.000008	0.000016	5.7143E-06	1.1429E-05

4. ANNEX 2: Questionnaire

4.1 Questionnaire for data submission

4.1.1 INSTRUCTIONS FOR COMPLETION OF FORMS

Form 1: FOOD

OCCURRENCE DATA FOR INDIVIDUAL FOOD SAMPLES

Information about Organotin compounds (OTCs) in individual foodstuffs should be provided in Table 1 ([infosheet 01](#)) as shown in the examples reported in ANNEX 4., The concentration found (in µg/kg) should be provided for each individual food analysed, with the results given as fresh weight. Please refer the calculations to the cationic form, in the case of salts. The mean (median if not available) minimum and maximum values could be provided, too. Information is required for each specific organotin compound, but, if available, information on total OTC can be supplied in free sheets or in any other way.

Food group code

In order to assist in the collation of data, enter the food code for the sample (see ANNEX 1)

Food identification (country code/sample no)

Enter the country code (see ANNEX 2) and then assign a sample number, e.g. for data supplied by Belgium on a processed cheese sample which was the twentieth sample submitted by them a sample code of BE/020 would be assigned.

Food name

Indicate the specific food item for which you submit data, with a brief description, if it is necessary . (see Example in ANNEX 4)

Reference

Details of where the information contained in the table has been published/can be obtained. In the column, each reference should be indicated by the country code and a progressive number (e.g., the first reference submitted by UK in a chronological order will be UK-001). Full references should be provided in a separate reference list (use *infosheet 02 Reference*), following the instruction reported in ANNEX 3. References to papers to be published can also be supplied in the reference list as “unpublished results” (see ANNEX 3).

Year of sampling

If the sampling of the individual food analysed covered more than one year, please indicate the whole time period, e.g. 1998-2000.

Date of sampling, Date of Analysis, Interval between sampling and analysis (if dates are not available)

These information are concerned with the eventual delay between sampling and analysis. It is a warning that successive information are required about the situation of the sample during the above interval. The dates, if available, should be reported. If not available the month and the year, also the interval could be reported (e.g. 6 months). A proper separate sheet (infosheet 02 *Sample collection and Storage*) is provided to report information relevant to trace the history of the sample from the sampling (e.g. fishing) to the analysis. Therefore the procedure used, from the "in situ" collection to the analytical testing, should be described. No predefined form is provided to let the Expert to report information as it is available. The following steps should be briefly reported:

Collection: (in situ conditions)

Sample handling after collection: Give details about containers in direct contact with samples (.materials), storage time, temperature and dark/light exposure, eventual delay between collection and storage (e.g. 30 minutes under sunlight, immediate freezing etc)

Transport conditions: The same type of information as above described

Storage in the Laboratory: If information is available, please indicate the eventual operations on sample e.g. freezing (give temperature), dark or light and, most important of all, indicate the storage time (e.g. 1 month, 90 days, etc).

COMPOSITE/INDIVIDUAL SAMPLE

Specify whether individual samples were analysed separately or pooled to make up a composite sample.

TYPE OF WATER (ONLY FOR FISH PRODUCTS)

Report F for Fresh water, M for Marine water and B for Brackish

Analytical method

It is suggested to use the following abbreviations for the description of sample treatment and analytical technique, respectively:

- EXTRACTION TECHNIQUE OR PRETREATMENT:** LE: Liquid Extraction; US: Ultrasonically shaken; MS: Mechanically shaken; R: Reflux; SE: Soxhlet Extraction; ME: Microwave extraction; SPME: Solid Phase Micro extraction; SPE: Solid Phase Extraction; WG: Wet digestion; PG: pressure digestion (includes microwave digestion); DA: dry ashing; NP: no pre-treatment;
- INSTRUMENTAL DETERMINATION:** GC-MS Gas-Chromatography-Mass-Spectrometry (specify if quadrupole, ion trap, etc); GC-FPD: Gas chromatography-Flame Photometric Detection; HPLC: High Performance Liquid Chromatography; ICP-AES: Inductively Coupled Plasma - Atomic Emission Spectrometry; ICP-MS: Inductively Coupled Plasma - Mass Spectroscopy (specify high resolution or quadrupole, i.e. HR-ICP-MS or Q-ICP-MS); VM:

Voltammetric Methods; CV-AAS: Cold Vapour - Atomic Absorption Spectrometry; FAAS: Flame - Atomic Absorption Spectrometry; GC-QFAAS: Gas Chromatography-Quartz furnace - Atomic Absorption Spectrometry; GF-AAS: Graphite furnace - Atomic Absorption Spectrometry; HG-AAS: Hydride Generation – Atomic Absorption Spectrometry. Other, eventually not included abbreviations can be proposed by the National Expert in the compilation of the Table

Please reference the method used to analyse the sample. Details of the validation of method, reproducibility, repeatability, normal recovery range, correction for recovery, interferences, etc., should be supplied as an additional paper for each method (use infosheet 02 *Analytical Method description*). Label such papers using the country code (ANNEX 2) and a method number, e.g. if Italy supplies data that have been obtained using three different methods of analysis these documents should be labeled MIT/01, MIT/02 and MIT/03 and the code included in the table.

LOD

The Limit of Detection for each method of analysis in the food matrix analysed should be given in the table and in the paper detailing the analytical method. The definition of LOD in the Commission Decision 90/515, i.e. $LOD = 3 \times SD$ for the mean of a large number of blanks, should be used. The quantity $6 \times SD$ should be set as Limit of Quantification ($LOQ = 2 \times LOD$), without reporting it in the tables.

Specific Organotin Compound

Specify the compound. Do not use class name in this field. If abbreviation is used, a separate list for abbreviation must be send.

CAS NUMBER

If available, CAS number can help with identification in the case of different chemical names from different Countries. A list of CAS numbers for some common OTC is reported in ANNEX 5. Obviously, the annexed list is not exhaustive and data about other OTC could be found and should be reported, too. If CAS numbers for other eventual OTC are not available, or in the case of doubt about chemical name (e.g other nomenclature system) please remark it in a separate free sheet or contact the Coordinator. (read *NB note* at the top of Annex 5)

Level of the contaminant

Report in the relevant columns for each individual food the concentration and if available , mean (or median), minimum and maximum values.

Country of origin

Country in which the foodstuff has been produced (or from which has been imported).

Representative for intake calculation

Indicate if the sample is representative of the food that consumers would eat and therefore for intake calculations (Y for yes and N for not) and whether samples were taken on a random (R) or targeted (T) basis

Place of sampling

Choose one of the followings: origin (i.e., farm, fishing ground, forest, etc.), producer (e.g. for transformed products), retail.

Water area (only for fish products)

It should be reported whether fish were caught in the open sea (O), in a harbour area (H) or in an inland waterway (I) or in a lake (L). Other eventual details, if deemed relevant, could be reported in the infosheet 02 *Sample collection and storage*.

AIM OF THE SURVEY

Indicate if samples are derived from control action (C) or monitoring plan (M)

Form 2: EVIDENCE OF ANALYTICAL QUALITY ASSURANCE

Evidence of quality assurance of the analytical laboratory should be given in the relevant template (table 2 infosheet 01) for each item included in the occurrence template.

Accreditation

If the laboratory is accredited, the relevant columns should be filled by indicating general accreditation or specific analysis/analyses accreditation relevant for the Scoop activity; please indicate the international norms to which the laboratory complies and the year of accreditation.

Method validated

Indicate whether the analytical method used is validated (Y=yes, N=no). Validation can be anything from an in-house to a full collaborative study. Details on method validation should be specified in the additional paper provided for each method used (use infosheet 02 Analytical method description).

PROFICIENCY TESTING

If the laboratory participated in national or international proficiency test schemes during the period when samples were analysed, this should be indicated (Y= yes, N= no) If the answer is Y, please report in the separate sheet (infosheet 02 Additional Information about Quality Assurance) information about the proficiency test performed (provider, matrix, concentration, Z-score,). Any other relevant information about quality assurance of the laboratory can be freely reported in this infosheet 02 Additional Information about Quality Assurance , after the table, without a predefined format.

CERTIFIED REFERENCE MATERIALS

The use of certified reference materials , if any, should be indicated in the columns under this heading (Y= yes, N= no); if the answer is Y, please report in the separate sheet (infosheet 02 Additional Information about Quality Assurance) information about the use of Certified Reference Materials. (identity of the CRM, the certified concentration and the found concentration).Any other relevant information about quality assurance of the laboratory can be freely reported in this infosheet 02 Additional Information about Quality Assurance, after the table, without a predefined format.

CLEAN ROOM FACILITIES

If clean room facilities are available in the laboratory, the clean room class should be given.

Other

Other QA measures adopted by the laboratory (e.g. in-house RMs, recovery corrections, etc.) should be specified in this column or reported in Infosheet 02 Additional Information about Quality Assurance.

Form 3: FOOD CONSUMPTION DATA

Where available, experts should provide estimates of the food consumption for the food items for which occurrence data are available (use infosheet 01 Table 3). The difficulties in obtaining food consumption data which are exactly relevant to the particular food are well known. Therefore, it is suggested that the experts provide any information that they have available to them on consumption of relevant foods and beverages together with sufficient information to allow the limitations of the data to be assessed. To this aim, a separate sheet (infosheet 02 Food consumption data – Description of survey methods) without a predefined format is provided to be filled with relevant information. For example, sampling unit information on the individual units (specify A=age, S=sex), household (specify scope e.g. “all”, “single persons excluded”), Specify also sample size (N°=number of participants). Survey method information should be reported, too e.g if total diet study, dietary survey (dietary records/diary), duplicate diet, etc. Specify all relevant information

(e.g. period and frequency, weighted intake, interview, purchase records, etc.). The representativity of these data with respect to geographical level: e.g national, regional, urban, rural (specify geographical region covered) could be indicated, too.

If you have other variables to report, please provide also these supplementary data (e.g. subject weight, other characteristics of the individuals sampled, socio-economic data) on infosheet 02 Food consumption data – Description of survey methods where you report all the relevant details about the consumption data provided and the survey method utilised.

With this data, it is hoped that comparisons can be drawn between countries particularly to identify the main dietary sources of organotin compounds in each country. For each of the food items or groups of foods identified in ANNEX 1 the expert should give:

- the best estimate of the mean consumption (expressed as g/person/day) for the whole population;
- the best estimate of high consumption (95th percentile as a rule, but also 90th or 97.5th percentile can be reported);
- a reference to the source of the consumption data (each reference should be indicated by the country code and a progressive number). Full references should be provided in a separate reference list (in infosheet 02 References), following the instructions reported in ANNEX 3.

Data for specific population sub-groups and especially high-risk groups (e.g. children, etc.) are particularly useful and are welcome if available. For each source of consumption data used in the subsequent intake calculations, the following information should be provided to the extent available using table 3 in infosheet 01:

Year

Period data collected over.

Data by consumer' and 'Data by population: 'Mean, high consumers

Mean and 95th percentile should be used for the subsequent intake calculations. However, also the median should be reported if available., but, in this case mark this information with the term “median” written directly into the cell, near the reported value. The same for 97th or 90th percentiles data, if available instead of 95th percentile.

Form 4: DIETARY INTAKES

Occurrence data and consumption data should be properly combined to give the estimated dietary intake for each compound For occurrence data below the LOD a values of LOD/2 should be used. The procedure used to estimate mean and high level intake should be clearly described in a separate sheet, where all the relevant details not included in the template 4 , should be reported (use infosheet 02 Dietary intakes – Description of assumptions and calculation criteria). If intake data refer to already published investigations, the results of these works should be also summarised in table 4 and reference should be given in the reference list (infosheet 02 References) following the instructions reported in ANNEX 3. All other relevant information about estimated intakes (procedure and assumptions made, e.g. in estimating upper level of total intake by individuals, or correction for

body weight, whether based on total populations or on consumers only, etc) as well as considerations on the limitations of the estimates should be reported on infosheet 02 Dietary intakes – Description of assumptions and calculation criteria.

It will be particularly helpful if the intake data allow to identify the major food sources of the organotin compounds in the diet. Where possible, experts should also provide estimates of intakes for specific population groups and especially high-risk groups. The following information should be provided in table 4 (infosheet 01):

Concentration in food

The concentration in food should be reported as $\mu\text{g}/\text{kg}$. For calculating the mean, where organotin levels were less than the LOD, the level should be taken as ‘zero’ in the first column and as half the LOD (LOD/2) in the second column.

Range of detected values

Please indicate the range of detected values (min-max levels).

Daily intakes, Mean, high level

These are reported on a “adult weight basis” (70 kg) and on a “per kg body weight basis”. Report the mean and 95th percentile to define mean and high-level consumption respectively. A different percentile can be used, but this should be clearly stated.

% of total dietary intake

Please calculate the % of total dietary intake, so that the relative contributions from different food groups/ fish groups can be estimated.

4.2.

Food Categorisation System

Code	Description
0	<i>Food in general, unless otherwise specified</i>
1	Dairy products, excluding products of category 2
1.1	Milk and dairy-based drinks
1.1.1	Milk and buttermilk
1.1.2	Milk, incl, sterilised and UHT goats milk
1.1.3	Buttermilk (Plain)
1.1.4	Dairy-based drinks, flavoured and/or fermented (e.g. chocolate, milk, cocoa, eggnog)
1.2	Fermented and renneted milk products (plain) excluding drinks
1.2.1	Fermented milks (plain)
1.2.2	Non heat-treated after fermentation
1.2.3	Heat-treated after fermentation
1.2.4	Renneted milk
1.3	Condensed milk (plain) and analogues
1.3.1	condensed milk (plain)
1.3.2	Beverage whiteners
1.4	Cream (plain) and the like
1.4.1	Pasteurised cream
1.4.2	Sterilised, UHT, whipping or whipped cream and reduced fat creams
1.4.3	Clotted cream
1.4.4	Cream analogues
1.5	Milk powder and cream powder (plain)
1.5.1	Milk and cream powder
1.5.2	Powder analogues
1.6	Cheese
1.6.1	Unripened cheese
1.6.2	Ripened cheese
1.6.3	Total ripened cheese, includes rind
1.6.4	Rind of ripened cheese
1.6.5	Cheese powder (for reconstitution; e.g., for cheese sauces).
1.6.6	Whey cheese
1.6.7	Processed cheese
1.6.8	Cheese analogues
1.7	Dairy-based desserts (e.g. ice cream, ice milk, pudding, fruit or flavoured yoghurt)
1.8	Whey and whey products, excl, whey cheese
2	Fats and oils, and fat emulsions (type water-in-oil)
2.1	Fats and oils essentially free from water
2.1.1	Butter oil, anhydrous milk fat, ghee
2.1.2	Vegetable oils and fats
2.1.3	Lard, tallow and fish oil, and other animal fats

- 2.2 Fat emulsions mainly of type water in oil
 - 2.2.1 Emulsions containing at least 80% fat
 - 2.2.2 Butter and concentrated butter
 - 2.2.3 Margarine and similar products (e.g. butter-margarine blends)
 - 2.2.4 Emulsions containing less than 80% fat (e.g. minarine)
- 2.3 Fat emulsions other than 2.2, incl. mixed and/or flavoured products based on fat emulsions.
- 2.4 Fat based desserts (excl., dairy based desserts)

3 Edible ices, including sherbet and sorbet

4 Fruits and vegetables (incl. mushrooms & fungi, roots and tubers, pulses and legumes), and nuts & seeds

- 4.1 Fruit**
 - 4.1.1 Fresh fruit
 - Untreated fruit
 - Surface-treated fruit
 - Peeled or cut fruit
 - 4.1.2 Processed fruit
 - 4.1.2.1 Frozen fruit
 - 4.1.2.2 Dried fruit
 - 4.1.2.3 Fruit in vinegar, oil or brine
 - 4.1.2.4 Canned or bottled (pasteurised) fruit
 - 4.1.2.5 Jams, jellies, marmalades
 - 4.1.2.6 Fruit-based spreads other than 4.1.2.5 (e.g. chutney)
 - 4.1.2.7 Candied fruit
 - 4.1.2.8 Fruit preparations, incl. pulp and fruit toppings
 - 4.1.2.9 Fruit-based desserts, incl. fruit-flavoured water-based desserts
 - 4.1.2.10 Fermented fruit products
 - 4.1.2.11 Fruit fillings for pastries
 - 4.1.2.12 Cooked or fried fruit
- 4.2 Vegetables incl. mushrooms & fungi, roots & tubers, pulses and legumes), and nuts & seeds**
 - 4.2.1 Fresh vegetables
 - Untreated vegetables
 - Surface-treated vegetables
 - Peeled or cut vegetables
 - 4.2.2 Processed vegetables, and nuts and seeds
 - 4.2.2.1 Frozen vegetables
 - 4.2.2.2 Dried vegetables
 - 4.2.2.3 Vegetables in vinegar, oil or brine
 - 4.2.2.4 Canned or bottled (pasteurised) vegetables
 - 4.2.2.5 Vegetable, and nut & seed purees and spreads (e.g. peanut butter)
 - 4.2.2.6 Vegetable, and nut & seed pulps and preparations other than 4.2.2.5
 - 4.2.2.7 Fermented vegetable products

4.2.2.8 Cooked or fried vegetables

5 Confectionery

- 5.1 Cocoa products and chocolate products incl. limitations and chocolate substitutes
 - Cocoa mixes (powders and syrups)
 - Cocoa based spread, incl. fillings
 - Imitation chocolate, chocolate substitute products
- 5.2 Sugar based confectionery other than 5.1, 5.3 and 5.4, incl. hard and soft candy, nougats, etc.
- 5.3 Chewing gum
- 5.4 Decorations (e.g. for fine bakery wares), toppings (non-fruit) and sweet sauces.

6 Cereals and cereal products, incl. flours & starches from roots & tubers, pulses & legumes, excluding bakery.

- 6.1 Whole, broken or flaked grain, incl. rice
- 6.2 Flours and starch
- 6.3 Breakfast cereals, incl. rolled oats
- 6.4 Pastas and noodles
- 6.5 Cereal and starch-based desserts (e.g. rice pudding, tapioca pudding)
- 6.6 Batters (e.g. for breading or batters for fish or poultry)

7 Bakery wares

- 7.1 Bread and ordinary bakery wares
 - 7.1.1 Breads and rolls
 - 7.1.2 Crackers, excluding sweet crackers
 - 7.1.3 Other ordinary bakery products (e.g. bagels, pita, English muffins)
 - 7.1.4 Bread-type products, incl. bread stuffing & bread crumbs
- 7.2 Fine bakery wares
 - 7.2.1 Cakes, cookies and pies (e.g. fruit-filled or custard types)
 - 7.2.2 Other fine bakery products (e.g. doughnuts, sweet rolls, scones and muffins)
 - 7.2.3 Mixes for fine bakery wares (e.g. cakes, pancakes)

8 Meat and meat products, including poultry and game

- 8.1 Fresh meat, poultry and game
 - 8.1.1 Whole pieces or cuts
 - 8.1.2 Comminuted
- 8.2 Processed meat, poultry and game products in whole pieces or cuts
 - 8.2.1 Non-heat treated
 - 8.2.1.1 Cured (incl. salted)
 - 8.2.1.2 Cured (incl. salted) and dried.
 - 8.2.1.3 Fermented
 - 8.2.2 Heat-treated
 - 8.2.3 Frozen
- 8.3 Processed comminuted meat, poultry and game products
 - 8.3.1 Non-heat treated
 - 8.3.1.1 Cured (incl. salted)
 - 8.3.1.2 Cured (incl. salted) and dried
 - 8.3.1.3 Fermented

- 8.3.2 Heat-treated
- 8.3.3 Frozen
- 8.4 Edible offal
- 8.5 Edible casings (e.g. sausage casings)

9 Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)

9.1 Fresh fish and fish products, incl. MCE

- 9.1.1** Fresh fish Muscle meat of fish
 - 9.1.1.1 Muscle meat of wedge sole (*Dicoglossa cuneata*),
 - 9.1.1.2 eel (*Anguilla anguilla*)
 - 9.1.1.3 spotted seabass (*Dicentrarchus punctatus*)
 - 9.1.1.4 horse mackerel or scad (*Trachurus trachurus*)
 - 9.1.1.5 grey mullet (*Mugil labrosus labrosus*)
 - 9.1.1.6 common two-banded seabream (*Diplodus vulgaris*)
 - 9.1.1.7 grunt (*Pomadasyus benneti*)
 - 9.1.1.8 european pilchard or sardine (*Sardina pilchardus*),
 - 9.1.1.9 european anchovy (*Eneraulis encrasicholus*)
 - 9.1.1.10 luvar or louvar (*Luvarus imperialis*)
 - 9.1.1.11 Anglerfish (*Lophius spp.*)
 - 9.1.1.12 atlantic catfish (*Anarhichas lupus*)
 - 9.1.1.13 bass (*Dicentratus labrax*)
 - 9.1.1.14 blue line (*Molva dipterygia*),
 - 9.1.1.15 halibut (*Hippoglossus hippoglossus*),
 - 9.1.1.16 little tuna (*Eutynnus spp.*),
 - 9.1.1.17 marlin (*Makaira*),
 - 9.1.1.18 pike (*Esox lucius*),
 - 9.1.1.19 plain bonito (*Orgynopsis unicolor*),
 - 9.1.1.20 portuguese dogfish (*Centroscymnes coelolepis*),
 - 9.1.1.21 rays (*raja spp.*),
 - 9.1.1.22 redfish (*Sebastes marinus*, *S. mentella* *S. viviparus*),
 - 9.1.1.23 sail fish (*Istiophorus platypterus*),
 - 9.1.1.24 scabbard fish (*Lepidopus caudatus*, *Aphanopus carbo*),
 - 9.1.1.25 shark (all species),
 - 9.1.1.26 snake mackerel (*Lepidocybium flavobrunneum*, *Ruvettus pretiosus*, *gempylus serpens*)
 - 9.1.1.27 sturgeon (*Acipenser spp.*),
 - 9.1.1.28 swordfish (*Xiphias gladius*)
 - 9.1.1.29 tuna (*Thunnus spp.*).
 - 9.1.1.30 Other (specify species and add lines; please mark with X code, e.g. 9.1.1.30X1, 9.1.1.30X2 etc)
- 9.1.2** Fresh bivalve molluscs
 - 9.1.2.1 Mussels
 - 9.1.2.2 Oysters
 - 9.1.2.3 Clams
 - 9.1.2.4 Other (specify species and add lines; please mark with X code e.g. 9.1.2.4X1, 9.1.2.4X2 etc)
- 9.1.3** Fresh cephalopodes (with or without viscera)

- 9.1.3.1 Squid
- 9.1.3.2 Octopus
- 9.1.3.3 Cattle-fish
- 9.1.3.4 Other(specify species and add lines; please mark with X code e.g. 9.1.3.4X1, 9.1.3.4X2 etc)
- 9.1.4** Fresh crustaceans,
 - 9.1.4.1 Crab (tested whole, white and brown meat, or just white meat)
 - 9.1.4.2 Lobsters (tested whole, white and brown meat, or just white meat)
 - 9.1.4.3 Shrimp
 - 9.1.4.4 Other(specify species and add lines; please mark with X code e.g. 9.1.4.4X1, 9.1.4.4X2 etc)
- 9.1.5** Echinoderm
- 9.2 Processed fish and fish products, incl. MCE
 - 9.2.1 Frozen fish, fish fillets and fish products, incl. MCE
 - 9.2.2 Frozen battered fish, fish fillets and fish products, incl. MCE
 - 9.2.3 Frozen minced and creamed fish products, incl. MCE
 - 9.2.4 Cooked and/or fried fish and fish products, incl. MCE
 - 9.2.4.1 Cooked fish
 - 9.2.4.2 Cooked molluscs, crustaceans and echinoderms
 - 9.2.4.3 Fried fish and fish products, incl. MCE
- 9.3 Semi-preserved fish and fish products, incl. MCE
 - 9.3.1 Fish and fish products, incl. MCE, marinated and/or in jelly
 - 9.3.2 Fish and fish products, incl. MCE, pickled and/or in brine
 - 9.3.3 Salmon substitutes, caviar and other fish roe products.
 - 9.3.4 Semi-preserved fish and fish products, incl. MCE other than 9.3.1 - 9.3.3
- 9.4 Fully preserved, Canned or fermented fish and fish products incl. MCE.
 - 9.4.1 Fish canned in oil
 - 9.4.2 Fish canned in brine
 - 9.4.3 Fermented fish

Eggs and egg products

- 10**
- 10.1 Fresh eggs
 - 10.1.1 Eggs from indoor reared hens
 - 10.1.2 Eggs from outdoor reared hens
- 10.2 Egg products
 - 10.2.1 Liquid egg products
 - 10.2.2 Frozen egg products
 - 10.2.3 Dried and/or heat coagulated egg products
- 10.3 Preserved eggs, incl. alkaline, salted, and canned eggs
- 10.4 Egg-based desserts (e.g. custard)

11 Sweeteners, including honey

- 11.1 White & semi-white sugar (sucrose or saccharose), fructose, glucose (dextrose), xylose; sugar solutions and syrups, also (partially) inverted sugars, incl. molasses, treacle, and sugar toppings.
- 11.2 Other sugars and syrups (e.g. , brown sugars, maple syrup)
- 11.3 Honey

- 11.4 Table-top sweeteners, incl. those containing high-intensity sweeteners, other than 11.1 - 11.3

12 Salts, spices, soups, sauces, salads, protein products, etc.

- 12.1 Salt
- 12.2 Herbs, spices, seasonings (incl. salt substitutes), and condiments
- 12.3 Vinegars
- 12.4 Mustards
- 12.5 Soups and broths
 - 12.5.1 Ready-to-eat soups and broths, incl. canned, bottled and frozen
 - 12.5.2 Mixes for soups and broths
- 12.6 Sauces and like products
 - 12.6.1 Emulsified sauces (e.g. mayonnaise, salad dressing)
 - 12.6.2 Non-emulsified sauces (e.g. ketchup, cheese sauce, cream sauce, brown gravy)
 - 12.6.3 Mixes for sauces and gravies
- 12.7 Salads (e.g. macaroni salad, potato salad) and sandwich spreads (excl. cocoa- and nut-based spreads)
- 12.8 Yeast
- 12.9 Protein products

13 Foodstuffs intended for particular nutritional uses

- 13.1 Infant formulae and follow-on formulae
- 13.2 Foods for young children (weaning foods)
- 13.3 Dietetic foods intended for special medical purposes
- 13.4 Dietetic formulae for slimming purposes and weight reduction
- 13.5 Dietetic foods other than 13.1-13.4
- 13.6 Food supplements

14 Beverages, excluding dairy products

14.1 Non-alcoholic ("soft") beverages

- 14.1.1 Waters
 - Natural mineral waters and source waters
 - Table waters and soda waters
- 14.1.2 Fruit and vegetable juices
 - Canned or bottles (pasteurised) fruit juice
 - Canned or bottles (pasteurised) vegetable juice
 - Concentrates (liquid or solid) for fruit juice
 - Concentrates (liquid or solid) for vegetable juice
- 14.1.3 Fruit and vegetable nectars
 - Canned or bottled (pasteurised) fruit nectar
 - Canned or bottles (pasteurised) vegetable nectar
 - Concentrates (liquid or solids) for fruit nectar
 - Concentrates (liquid or solids) for vegetable nectar
- 14.1.4 Water-based flavoured drinks, incl. "sport" or "electrolyte" drinks
 - 14.1.4.1 Carbonated drinks
 - 14.1.4.2 Non-carbonated, incl. punches and ades

- 14.1.4.3 Concentrates (liquid or solid) for drinks
 - 14.1.5 Coffee, coffee substitutes, tea, herbal infusions, and other hot cereal beverages, excl cocoa.

 - 14.2 Alcoholic beverages, incl. alcohol-free and low-alcoholic counterparts**
 - 14.2.1 Beer and malt beverages
 - 14.2.2 Cider and perry
 - 14.2.3 Wines
 - 14.2.3.1 Still wine
 - 14.2.3.2 Sparkling and semi-sparkling wines
 - 14.2.3.3 Fortified wine and liqueur wine
 - 14.2.3.4 Aromatized wine
 - 14.2.4 Fruit wine
 - 14.2.5 Mead
 - 14.2.6 Spirituous beverages
 - 14.3 Other alcoholic beverages (e.g. beer, wine, or spirit coolers. etc.)

 - 15 Ready-to-eat savouries**
 - 15.1 Snacks - potato, cereal, flour or starch based (from roots & tubes, pulses & legumes)
 - 15.2 Processed nuts, incl. coated nuts and nut mixtures (with e.g., dried fruit)

 - 16 Composite foods (e.g. casseroles, meat pies) - foods that could not be placed in categories 1-15.**
-

4.3. REFERENCE INSTRUCTIONS

References should be reported using the provided template and numbered chronologically (start from 001). Citations should conform to the “Uniform Requirements for Manuscripts Submitted to Biomedical Journals” (“*Vancouver style*”, see www.icmje.org) with two variations: 1) The titles of journals and monographs should be written in italic; 2) Journal titles can be either written in full or shortened (please use the same criteria). If titles are shortened, please refer to the *Index Medicus* for abbreviations.

Journal papers

Ysart G, Miller P, Croasdale M, Crews H, Robb P, Baxter M, de L’Argy C, Harrison N. 1997 UK total diet study – dietary exposures to aluminium, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, tin and zinc. *Food Additives and Contaminants* 2000;17(9):775-86.

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Ray S. Cadmium. In: Kiceniuk JW, Ray S (Ed.). *Analysis of contaminants in edible aquatic resources*. Weinheim: VCH; 1994. p. 91-113.

Technical Reports

Cubadda F, Stacchini P, Baldini M. *Organic and inorganic micro-pollutants in Adriatic seafood: contamination levels and evaluation of human potential intake* [In Italian]. Rome: Istituto Superiore di Sanità; 1998. (Rapporti ISTISAN 98/11).

Documents available on Internet

Available from: <http://www/...>; last visited 20/12/2001.

ANNEX 5

List of some common organotin compounds with their CAS numbers.

NB: this list is not necessarily exhaustive for the OTC. Data about other OTC could be found and should be reported, too. If CAS numbers for other eventual OTC are not available, if inconsistencies are noted in this list or in the case of doubt about chemical name (e.g other nomenclature system, difficulties with language etc.) please 1) list the chemical name without CAS number, add in a free sheet the explanation for that and , if any, the chemical synonyms or 2) contact the Coordinator to find an agreed solution. To get other useful information about CAS and synonyms please visit:

<http://www.inchem.org/documents/ehc/ehc/ehc015.htm>

[http://ntp-](http://ntp-server.niehs.nih.gov/htdocs/Chem_Background/ExSumPdf/Organotins.pdf)

[server.niehs.nih.gov/htdocs/Chem_Background/ExSumPdf/Organotins.pdf](http://ntp-server.niehs.nih.gov/htdocs/Chem_Background/ExSumPdf/Organotins.pdf)

OTC	CAS
monobutyl tin	78763-54-9
mono butyl tin trichloride (or butyltin trichloride)	1118-46-3
di butyl tin	1002-53-5
dibutyl tin oxide	818-08-6
tri butyl tin	688-73-3
tributyl tin chloride	1461-22-9
tributyl tin oxide	56-35-9
trimethyl tin chloride	1066-45-1
mono butyl ethyl tin	32547-24-3
metyl tin	16408-15-4
monomethyl tin trichloride	
dimethyl tin	23120-99-2
dimethyl tin dichloride	753-73-1
mono methyl tin chloride	993-16-8
di butyl ethyl tin	50334-27-5
tri butyl ethyl tin	19411-60-0
mono phenyl tin	2406-68-0
di phenyl tin	1011-95-6

tri phenyl tin	892-20-6
tri phenyl tin acetate	900-95-8
tri phenyl tin chloride	639-58-7
tri phenyl ethyl tin	5424-25-9
mono butyl tin hydride	2406-65-7
tri propyl tin	761-44-4
tetrabutyl tin	1461-25-2
tetra propyl tin	
dioctyltin	
dioctyltin oxide	780-08-6
dioctyltin dichloride	3542-36-7
trioctyltin	
Monomethyltin tris(isooctyl mercaptoacetate)	54849-38-6
Mono-n-octyltin tris(2-ethylhexylmercaptoacetate)	27107-89-7
Mono-n-octyltin tris(isooctyl mercaptoacetate)	26401-86-5
Bis(2-carbobutoxyethyl)tin-bis(isooctylmercaptoacetate)	63397-60-4
(2-Carbobutoxyethyl)tin-tris(isooctylmercaptoacetate)	63438-80-2
Dibutylthiostannoic acid polymer [=thiobis(butyl-tin sulphide), polymer]	26427-07-6
Di-n-dodecyltin bis(isooctyl mercaptoacetate)	84030-61-5
Di-n-octyltin bis(2-ethylhexyl maleate)	10039-33-5
Di-n-octyltin bis(2-ethylhexyl mercaptoacetate)	15571-58-1
Di-n-octyltin bis(isooctyl maleate)	33568-99-9
Di-n-octyltin bis(isooctyl mercaptoacetate)	26401-97-8 A6
Di-n-octyltin dilaurate	3648-18-8
Di-n-octyltin dimaleate	15571-60-5
Di-n-octyltin ethyleneglycolbis(mercaptoacetate)	69226-44-4
Di-n-octyltin mercaptoacetate	15535-79-2
Dimethyltin bis(isooctyl mercaptoacetate)	26636-01-1

Mono-n-dodecyltin tris(isooctylmercaptoacetate) 67649-65-4
Dibutyl tin, S,S' bis (2-ethylhexylmercaptoacetate) 10584-98-2
Dioctyl tin, S,S' bis (2-ethylhexylmercaptoacetate) 15571-58-1

Table 1. Occurrence data for individual food samples TABLE 87

OTC Country: Units: microgram/kg													
Required information													
Food group code	Food Identification (country Code/Sample Number)	Food name	Reference	Year of sampling	Date of Sampling (month/year)	Date of Analysis (month/year)	Interval between sampling and analysis (if the dates are not available)	Composite/individual sample	Type of water (only for fish products) F= fresh; M=marine; B=Brackish	Analytical method	LOD	Specific Organotin Compound	CAS Number for Specific Compound

Concentration of specific Organotin compounds	Mean /Median level of specific Organotin compounds (M=mean; Me=median)	Min	Max	Country of origin	Place of sampling	Water area (only for fish products) (H= harbour; O= Open sea; I= Inland waterway ; L=lake; OT= other, specify)	Representative for intake calculation (Y/N) Random or Targeted (R/T)	Aim of the survey (C=control) (M=monitoring)

TABLE 88 Table 2. Evidence of quality assurance of analytical occurrence data for individual food samples

OTC		Country:			
Required information					
Food group code	Food Identification (country Code/Sample Number)	Food name	Accreditation of the Lab		Specific Organotin Compound
			General	Specific for OTC	

Method validated	Proficiency testing (Y/N)	Certified Reference Materials (Y/N)	Clean room facilities	Other (specify)

TABLE 89 TABLE 3. ESTIMATED FOOD CONSUMPTION

Country:								
Required information								
Food group code	Food Identification (country Code/Sample Number)	Food name	Reference	Year	Data by Consumer (g/day)		Data by Population (g/day)	
					Mean	high consumers	Mean	high consumers

TABLE 90

Table 4. Estimated intake

OTC		Country:						
Required information								
Food group code	Food Identification (country Code/Sample Number)	Food name	Consumption (g/day)		Specific Organotin Compound	CAS Number	Concentration in food (µg/kg)	
			Mean	high consumers			calculated with <LOD=0	calculated with <LOD =LOD/2

Range of detected values (µg/kg)	Daily intake (µg/day)		Daily intake / body weight (µg/day/kg bw)		% of total dietary intake	Reference
	Mean	high level	Mean	high level		

References

Country N° Reference
Code

ADDITIONAL INFORMATION ON QUALITY ASSURANCE

TABLE 91

<i>PROFICIENCY TESTING</i>				CERTIFIED REFERENCE MATERIALS		
Provider	Matrix	Concentration	Z-score From -2 to +2 (Y/N)	Identity	Certified concentration	Found concentration

Other:

Sample collection and storage: for each set of samples, link this information with food identification(Country code/sample number) reported in the Table 1, 2nd column and the Reference reported in the 4th column of Table 1 (see instruction sheets)

Analytical method description (**add lines if necessary**)

M/Country code/01

M/Country code/02

M/Country code/03

Food consumption data – Description of survey methods

Dietary intakes – Description of assumptions and calculation criteria

5. ANNEX 3

5.1 REFERENCES FOR QUESTIONNAIRE

DENMARK

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