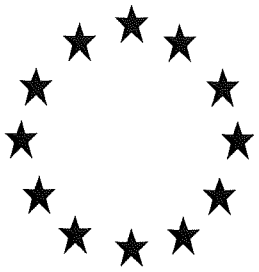
Competent Authority Report

Work Programme for Review of Active Substances in Biocidal Products Pursuant to Council Directive 98/8/EC



IODINE (PT1, PT3, PT 4, PT22)

DOCUMENT III-A 1-4

Applicant, Identity, Physical and chemical data and Analytical methods

Rapporteur Member State: Sweden

Draft Final May 2013

KEMI
Kemikalieinspektionen
Swedish Chemicals Agency

Table of contents

1 APPLICANT

Section A1

1.1 Applicant

Name: Iodine Registration Group (IRG)

Address: c/o Evans Vanodine International PLC

Brierley Road
Walton Summit
Preston
PR5 8AH
United Kingdom

Details of contact person: see Confidential Annex

Evans Vanodine International PLC is the notifier of Iodine according to Art. 4 (1) of regulation (CE) 1869/2000.

Doc. No. 987-004; Section A.1/01

The Iodine Registration Group (IRG) was founded in Manchester on the

2nd February 2006 by the following companies:

- Evans Vanodine International PLC, UK
- Ecolab GmbH & Co. OHG, Germany
- AARDBalm Limited, UK

The IRG currently consists of twelve members.

These companies including contact addresses are as follows:

1.

Name: Safeearth Limited (previously AARDBalm Limited)

Address:
Baltic House
4/5 Baltic Street East
London EC1 0UJ
[redacted]
United Kingdom

Details of contact person: see Confidential Annex

2.

Name: Kilco (International) Ltd.

Address: Broomhouses 2 Industrial Estate
Old Glasgow Road
Lockerbie
DG11 2SD
Scotland

Details of contact person: see Confidential Annex

3.

Name: CID LINES NV

Address: Waterpoortstraat 2
8900 Ieper
Belgium

Details of contact person: see Confidential Annex

4.

Name: DeLaval International AB

Address: Gustaf De Lavals väg 11
147 41 Tumba
Sweden
Mail address for correspondence:

Name: DeLaval NV

Address: Industriepark-Drongen 10
B-9031 Gent
Belgium

Details of contact person: see Confidential Annex

5.

Name: Ecolab Deutschland GmbH

Address: Ecolab-Allee 1
D-40789 Monheim
Germany

Details of contact person: see Confidential Annex

6.

Name: Evans Vanodine International PLC
Address: Brierley Road
Walton Summit
Preston
PR5 8AH
United Kingdom

Details of contact person: see Confidential Annex

7.

Name: HYPRED SA

Address: 57 Boulevard Jules Verger
BP 10180
35 803 DINARD CEDEX
France

Details of contact person: see Confidential Annex

8.

Name: Diversey Operations Europe B.V.

Address: Maarssenbroeksedijk 2
3542 DN Utrecht
Netherlands

Details of contact person: see Confidential Annex

9.

Name: Alcoholes Montplet

Address: Vía Trajana, 53-55
08020 Barcelona

Spain

Details of contact person: see Confidential Annex

10.

Name: GEA Farm Technologies

Address: GEA Farm Tecnologies (UK) Ltd.
Wylye Works, Watery Lane
UK-BA12 9HT Warminster, Wilts
United Kingdom

Details of contact person: see Confidential Annex

11.

Name: ICL Holding Germany beschränkt haftende OHG

Address: ICL Holding Germany beschränkt haftende OHG
Giulinistr. 2
D-67065 Ludwigshafen
Germany

Details of contact person: see Confidential Annex

12.

Name: Ferdinand Eimermacher GmbH Co KG

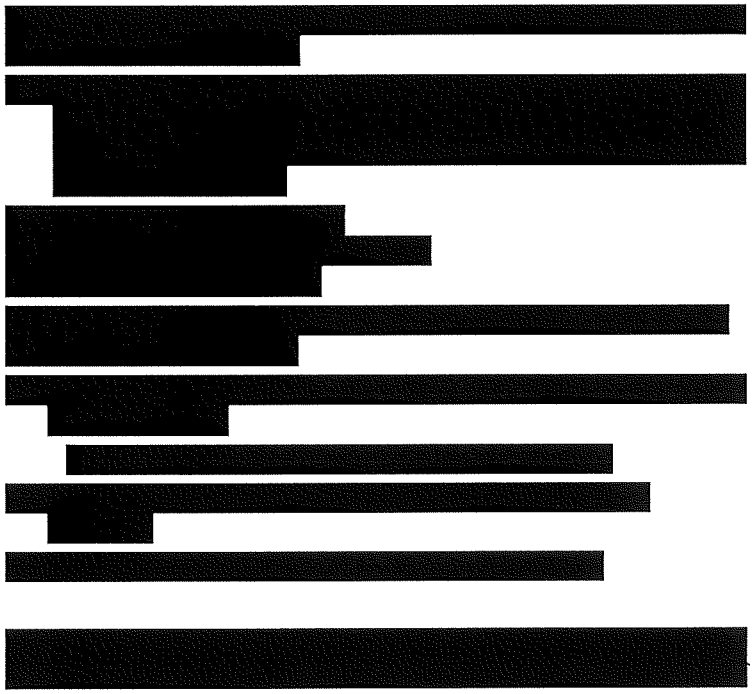
Address: Ferdinand Eimermacher GmbH Co KG
Westring 24
D-48356 Nordwalde
Germany

Details of contact person: see Confidential Annex

1.2	**Manufacturer of Active Substance**	Any Iodine used for the production of biocidal products of the IRG is exclusively manufactured outside the EU. In the Confidential Annex some producers of Iodine are listed (the list is not exhaustive).
1.3	**Manufacturer of Product(s)**	See the Confidential Annex
1.4	**Manufacturer of the pre-mix 'PVP-Iodine'**	Any PVP-iodine used for the production of biocidal products of the IRG is exclusively manufactured outside the EU. See further information in the confidential Annex

2 IDENTITY OF ACTIVE SUBSTANCE

Section A2

2.1	**Common name (IIA2.1)**	Iodine	X1
2.2	**Chemical name (IIA2.2)**	Iodine	X1
2.3	**Manufacturer's development code number(s) (IIA2.3)**	Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU, see section 1. Manufacturer's development code number(s) are not indicated.	
2.4	**CAS No and EC numbers (IIA2.4)**		
2.4.1	**CAS-No**	7553-56-2	X1
	Isomer	No isomers	
2.4.2	**EC-No**	231-442-4	
	Isomer	No isomers	
2.4.3	**Other**	No other identification numbers are available.	
2.5	**Molecular and structural formula, molecular mass (IIA2.5)**		
2.5.1	**Molecular formula**	I_2	X1
2.5.2	**Structural formula**	I-I	X1
2.5.3	**Molecular mass**	253.81 g/mol	X1
2.6	**Method of manufacture of the active substance (IIA2.1)**	Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. 	

2.7	**Specification of the purity of the active substance, as appropriate (IIA2.7)**	[redacted] g/kg g/l % w/w % v/v 99.5% - 100.5% Specification of Iodine is according to *Ph. Eur*, *BP*, and *USP*. Doc. No. 492-010; Section A2.7/01 Doc. No. 131-001; Section A2.7/02 Doc. No. 131-002; Section A2.7/03 Doc. No. 131-003; Section A2.7/04	X2
2.8	**Identity of impurities and additives, as appropriate (IIA2.8)**	See separate standard format.	X3
2.8.1	**Isomeric composition**	No isomers.	
2.9	**The origin of the natural active substance or the precursor(s) of the active substance (IIA2.9)**	• Ores contain Sodium iodate ($NaIO_3$), Sodium periodate ($NaIO_4$), Lautarite ($Ca(IO_3)_2$), and / or other Iodine compounds. • Seaweed (Fucus and Laminaria species)	

Evaluation by Competent Authorities

Evaluation by Rapporteur Member State

Date [redacted]

Materials and methods [redacted]

[redacted]

Conclusion [redacted]

Reliability [redacted]

Acceptability [redacted]

Remarks [redacted]

Section A2	Identity of Active Substance - Exposure data PT 1	
Subsection		Official use only
Section A2.10 Annex Point IIA2.10	Exposure data in conformity with Annex VIIA to Council Directive 92/32/EEC (OJ No L, 05.06.1992, p. 1) amending Council Directive 67/548/EEC	

Subsection		Official use only
2.10.1 Human exposure towards active substance		
2.10.1.1 Production		
i) Description of process	**Active substance** Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on the production process of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, a description of the process is not available. The same applies for the production of the pre-mix PVP-iodine (Polyvinylpyrrolidone iodine), i.e. the pre-mix is exclusively produced outside the EU and no description of the process is available. **Formulation of the biocidal products** Please refer to the "Confidential Data File" for information on the formulation process of • teat dips containing Iodine [redacted] The formulation of PVP-iodine containing products (e.g. [redacted] addressed in this dossier is comparable to that described for [redacted] except that instead of Iodine, PVP-iodine is used for the manufacture of a premix which is incorporated into the finished product. The direct incorporation of the pre-mix PVP-iodine is also common practice for the manufacture of biocidal products addressed in this dossier. If required, more details on the manufacture can be provided. These formulation processes are representative for the formulation of all products considered in this dossier.	

Section A2 Identity of Active Substance - Exposure data PT 1

ii) Workplace description

Active substance

Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Workplaces in non-European countries are not under the scope of European legislation and regulation.

No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on the workplace is the property of the manufacturer of Iodine and the applicant has no access to such data. Thus, a description of the workplace is not available.

Formulation of the biocidal products

Please refer to the "Confidential Data File" for information on the working place referring the formulation of

- teat dips containing Iodine [redacted]

The workplace description is representative for the workplaces in the production of all biocidal products considered in this dossier.

If required, more details on the manufacture can be provided.

iii) Inhalation exposure

Active substance

Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Occupational exposures at workplaces in non-European countries are not under the scope of European legislation and regulation.

No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on occupational exposures at workplaces in the production of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, no information on occupational exposures is available.

Formulation of the biocidal products

An occupational exposure limit value (STEL; MAK; TWA; CEILING; TLV MAK value) of 0.1 ppm (1 mg/m^3) has been established for Iodine at the working place. The occupational exposure at the workplaces is maintained below this limit during production of biocidal products. As the formulation is carried out in closed systems, the only potential exposure to Iodine / PVP-iodine via inhalation is when the raw material is filled into a vessel. For this step the workers have to wear the proper PPE.

Section A2 **Identity of Active Substance - Exposure data PT 1**

iv) Dermal exposure	**Active substance** Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Workplaces in non-European countries are not under the scope of European legislation and regulation. No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on occupational exposures at workplaces in the production of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, no information on occupational exposures is available. **Formulation of the biocidal products** During the manufacture of the Iodine products or precursors there is a possibility of dermal exposure to the worker during the manual addition of Iodine to the vessel, when a sample is taken for quality control purposes, and during the maintenance and cleaning of the vessels. When Iodine / PVP-iodine is added, gloves and coverall / green acid suit must be worn. Thus, the dermal contact to the chemical substances Iodine / PVP-iodine is assumed to be negligible Measurements on dermal deposit of Iodine / PVP-iodine due to these procedures are not available.

2.10.1.2 Intended use(s)

1. Professional Users	
i) Description of application process	Application onto hands, lathering for up to 5 min, rinse-off with water
ii) Workplace description	Health care (hospital, medical practice, nursing home)
iii) Inhalation exposure	3.09×10^{-5} mg/kg/day
iv) Dermal exposure	5.2×10^{-4} mg/kg/day
2. Non-professional Users including the general public	The biocidal use of [redacted] by non-professionals is qualitatively identical to the professional use. However, the daily use rate is going to be lower than 8 per day and also the contact time is less than 5 minutes. Hence, the exposure of professionals constitutes a worst-case scenario that also covers amateurs. No designated calculations for non-professionals have been conducted.
(i) via inhalational contact	see "professional use"
(ii) via skin contact	see "professional use"

Section A2	**Identity of Active Substance - Exposure data PT 1**
(iii) via drinking water	Iodine is an ubiquitarily existing chemical element. Thus, Iodine is naturally found in drinking water. A limit value for Iodine in drinking water is not established[*1)]. Secondary exposure to Iodine due to its use in PT1 is not foreseeable. [*1)] For further information please refer to Doc. 592-032, Section A6.14/13: Iodine in Drinking-water, a background document for development of WHO Guidelines for Drinking-water Quality. A guideline value was not established because the available data were considered as inappropriate and differences between effects on human health of Iodine and Iodide are assumed. Moreover, a lifetime exposure to Iodine from water-disinfection is unlikely.
(iv) via food	Iodine is an ubiquitarily existing chemical element. Iodine is naturally found in food as it is incorporated in cattle and plants or accumulated in fish. Hence, consuming milk and fish is a well-known valuable Iodine source for humans. For secondary exposure, the Iodine in food is due to the use of fertilisers, biocides and/or feed additives. For details on the secondary exposure to Iodine due to biocidal products, please refer to Document IIIA Section A6.15/01-02 (Iodine in cow's milk), Section A6.15/03-08 (Residues of Iodine in Cow's milk following disinfection of teats containing Iodine) and Section A6.15/09-12 (Dietary intake of Iodine, in particular via milk).
(v) indirect via environment	There is no or a negligible exposure to Iodine for humans via the environment. For details on the secondary exposure to Iodine due to biocidal products, please refer to Document IIB, chapter 8.
2.10.2 Environmental exposure towards active substance	
2.10.2.1 Production	Any Iodine used in the biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. The formulation of the biocidal products consists mostly of mixing and packaging procedures (please refer to confidential data: Doc. IIIA, Section 2.10.1.1). There is no information available on releases of the active substance into water and air or on concentrations in wastes. However, due to the fact that closed systems are used, any releases of Iodine into the environment during formulation may be expected to be negligible.
(i) Releases into water	See above
(ii) Releases into air	See above
(iii) Waste disposal	See above
2.10.2.2 Intended use(s)	Please refer to Doc. IIB, chapter 8, providing detailed descriptions of the intended biocidal uses and the related human health and environmental exposure.
Affected compartment(s):	An overview over the distribution of Iodine between the different environmental compartments is provided in Doc IIB, chapter 8.3.1.
water	See above
sediment	See above

Section A2	**Identity of Active Substance - Exposure data PT 1**
air	See above
soil	See above
Predicted concentration in the affected compartment(s)	Predicted concentrations in the different environmental compartments are summarised in Doc IIB, chapter 3.2, table 3.2-26.
water	See above
sediment	See above
air	See above
soil	See above
	Evaluation by Competent Authorities

	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	Not relevant
Materials and methods	The applicant's version is acceptable.
Conclusion	The applicant's version is adopted.
Reliability	1
Acceptability	The information is regarded to be acceptable.
Remarks	

Table A2.10-: PT1: Workplace exposure / Inhalation exposure

Exposure scenario	Workplace operation	PPE	Year(s) of measurement	Number of measurements	Type of measurements	Exposure concentration
Production	Not applicable. Substance is produced outside the EU.					
Formulation	Weighing, filling, mixing and cleaning processes	Gloves, goggles, coverall / acid suit, respirator mask and safety shoes	Measurements are available. Years are not specified.	Measurements are available. Numbers are not specified.	Measurements of ambient air.	0.004 – 0.2 ppm. The higher values are for exposure during addition of iodine itself to premix vessels whilst the lower numbers were recorded during filling of finished products.
Application MG01/PT03	Exclusively professional use	mask, if recommended Gloves for hygiene reasons	No measurements available	Not applicable	Not applicable	Not applicable

Section A2	Identity of Active Substance Exposure data PT 3
Subsection	Official use only
Section A2.10 Annex Point IIA2.10	Exposure data in conformity with Annex VIIA to Council Directive 92/32/EEC (OJ No L, 05.06.1992, p. 1) amending Council Directive 67/548/EEC

Subsection		Official use only
2.10.1	Human exposure towards active substance	
2.10.1.1	Production	
i) Description of process	**Active substance** Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on the production process of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, a description of the process is not available. The same applies for the production of the pre-mix PVP-iodine (Polyvinylpyrrolidone iodine), i.e. the pre-mix is exclusively produced outside the EU and no description of the process is available. **Formulation of the biocidal products** Please refer to the "Confidential Data File" for information on the formulation process of • teat dips containing Iodine [redacted] The formulation of PVP-iodine containing products (e.g. [redacted] addressed in this dossier is comparable to that described for [redacted], except that instead of Iodine, PVP-iodine is used for the manufacture of a premix which is incorporated into the finished product. The direct incorporation of the pre-mix PVP-iodine is also common practice for the manufacture of biocidal products addressed in this dossier. If required, more details on the manufacture can be provided. These formulation processes are representative for the formulation of all products considered in this dossier.	

Section A2 Identity of Active Substance Exposure data PT 3

ii) Workplace description

Active substance

Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Workplaces in non-European countries are not under the scope of European legislation and regulation.

No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on the workplace is the property of the manufacturer of Iodine and the applicant has no access to such data. Thus, a description of the workplace is not available.

Formulation of the biocidal products

Please refer to the "Confidential Data File" for information on the working place referring the formulation of

- teat dips containing Iodine [redacted]

The workplace description is representative for the workplaces in the production of all biocidal products considered in this dossier.

If required, more details on the manufacture can be provided.

iii) Inhalation exposure

Active substance

Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Occupational exposures at workplaces in non-European countries are not under the scope of European legislation and regulation.

No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on occupational exposures at workplaces in the production of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, no information on occupational exposures is available.

Formulation of the biocidal products

An occupational exposure limit value (STEL; MAK; TWA; CEILING; TLV MAK value) of 0.1 ppm (1 mg/m^3) has been established for Iodine at the working place. The occupational exposure at the workplaces is maintained below this limit during production of biocidal products. As the formulation is carried out in closed systems, the only potential exposure to Iodine / PVP-iodine via inhalation is when the raw material is filled into a vessel. For this step the workers have to wear the proper PPE.

Section A2	Identity of Active Substance Exposure data PT 3
iv) Dermal exposure	**Active substance** Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Workplaces in non-European countries are not under the scope of European legislation and regulation. No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on occupational exposures at workplaces in the production of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, no information on occupational exposures is available. **Formulation of the biocidal products** During the manufacture of the Iodine products or precursors there is a possibility of dermal exposure to the worker during the manual addition of Iodine to the vessel, when a sample is taken for quality control purposes, and during the maintenance and cleaning of the vessels. When Iodine / PVP-iodine is added, gloves and coverall / green acid suit must be worn. Thus, the dermal contact to the chemical substances Iodine / PVP-iodine is assumed to be negligible Measurements on dermal deposit of Iodine / PVP-iodine due to these procedures are not available.
2.10.1.2 Intended use(s)	Please refer to Doc. IIB, chapter 8, of this dossier, providing detailed descriptions of the intended biocidal uses and the related human health and environmental exposure.
1. Professional Users	
i) Description of application process	ditto
ii) Workplace description	ditto
iii) Inhalation exposure	ditto
iv) Dermal exposure	ditto
2. Non-professional Users including the general public	
(i) via inhalational contact	There will be no non-professional primary and secondary exposure via inhalation due to the production and/or use of the biocidal products. Neither the Iodine precursor nor Iodine containing biocidal products will be made available to the public.
(ii) via skin contact	There will be no non-professional primary and secondary exposure via skin contact due to the production and/or use of the biocidal products. Neither the Iodine precursor nor Iodine containing biocidal products will be made available to the public.

Section A2	Identity of Active Substance Exposure data PT 3
(iii) via drinking water	Iodine is an ubiquitarily existing chemical element. Thus, Iodine is naturally found in drinking water. A limit value for Iodine in drinking water is not established[*1)]. For details on the potential secondary exposure to Iodine due biocidal products, please refer to Document IIB, chapter 8.
	[*1)] For further information please refer to Doc. 592-032, Section A6.14/13: Iodine in Drinking-water, a background document for development of WHO Guidelines for Drinking-water Quality. A guideline value was not established because the available data were considered as inappropriate and differences between effects on human health of Iodine and Iodide are assumed. Moreover, a lifetime exposure to Iodine from water-disinfection is unlikely.
(iv) via food	Iodine is an ubiquitarily existing chemical element. Iodine is naturally found in food as it is incorporated in cattle and plants or accumulated in fish. Hence, consuming milk and fish is a well-known valuable Iodine source for humans. For secondary exposure, the Iodine in food is due to the use of fertilisers, biocides and/or feed additives. For details on the secondary exposure to Iodine due to biocidal products, please refer to Document IIIA Section A6.15/01-02 (Iodine in cow's milk), Section A6.15/03-08 (Residues of Iodine in Cow's milk following disinfection of teats containing Iodine) and Section A6.15/09-12 (Dietary intake of Iodine, in particular via milk).
(v) indirect via environment	There is no or a negligible exposure to Iodine for humans via the environment. For details on the secondary exposure to Iodine due to biocidal products, please refer to Document IIB, chapter 8.
2.10.2 Environmental exposure towards active substance	
2.10.2.1 Production	Any Iodine used in the biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. The formulation of the biocidal products consists mostly of mixing and packaging procedures (please refer to confidential data: Doc. IIIA, Section 2.10.1.1). There is no information available on releases of the active substance into water and air or on concentrations in wastes. However, due to the fact that closed systems are used, any releases of Iodine into the environment during formulation may be expected to be negligible.
(i) Releases into water	See above
(ii) Releases into air	See above
(iii) Waste disposal	See above
2.10.2.2 Intended use(s)	Please refer to Doc. IIB, chapter 8, providing detailed descriptions of the intended biocidal uses and the related human health and environmental exposure.
Affected compartment(s):	An overview over the distribution of Iodine between the different environmental compartments is provided in Doc IIB, chapter 8.3.1.
water	See above

Section A2	Identity of Active Substance Exposure data PT 3
sediment	See above
air	See above
soil	See above
Predicted concentration in the affected compartment(s)	Predicted concentrations in the different environmental compartments are summarised in Doc IIB, chapter 8.3, table 8.3-11.
water	See above
sediment	See above
air	See above
soil	See above

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	

Table A2.10-: PT 3:Workplace exposure / Inhalation exposure

Exposure scenario	Workplace operation	PPE	Year(s) of measurement	Number of measurements	Type of measurements	Exposure concentration
Production	Not applicable. Substance is produced outside the EU.					
Formulation	Weighing, filling, mixing and cleaning processes	Gloves, goggles, coverall / acid suit, respirator mask and safety shoes	Measurements are available. Years are not specified.	Measurements are available. Numbers are not specified.	Measurements of ambient air.	0.004 – 0.2 ppm. The higher values are for exposure during addition of iodine itself to premix vessels whilst the lower numbers were recorded during filling of finished products.
Application MG01/PT03	Exclusively professional use	mask, if recommended Gloves for hygiene reasons	No measurements available	Not applicable	Not applicable	Not applicable

Section A2	Identity of Active Substance – Exposure data PT 22
Subsection	**Official use only**
Section A2.10 **Annex Point IIA2.10**	**Exposure data in conformity with Annex VIIA to Council Directive 92/32/EEC (OJ No L, 05.06.1992, p. 1) amending Council Directive 67/548/EEC**

Subsection		Official use only
2.10.1	**Human exposure towards active substance**	
2.10.1.1	**Production**	
i) Description of process	**Active substance** Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on the production process of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, a description of the process is not available. The same applies for the production of the pre-mix PVP-iodine (Polyvinylpyrrolidone iodine), i.e. the pre-mix is exclusively produced outside the EU and no description of the process is available. **Formulation of the biocidal product** Please refer to the "Confidential Data File" for information on the formulation process of [redacted] If required, more details on the manufacture can be provided.	
ii) Workplace description	**Active substance** Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Workplaces in non-European countries are not under the scope of European legislation and regulation. No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on the workplace is the property of the manufacturer of Iodine and the applicant has no access to such data. Thus, a description of the workplace is not available. **Formulation of the biocidal product** Please refer to the "Confidential Data File" for information on the working place referring to the formulation of [redacted] If required, more details on the manufacture can be provided.	
iii) Inhalation exposure	**Active substance** Any Iodine used for the production of biocidal products of the Iodine	

Section A2 Identity of Active Substance – Exposure data PT 22

Registration Group (IRG) is exclusively manufactured outside the EU. Occupational exposures at workplaces in non-European countries are not under the scope of European legislation and regulation.

No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on occupational exposures at workplaces in the production of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, no information on occupational exposures is available.

Formulation of the biocidal products

An occupational exposure limit value (STEL; MAK; TWA; CEILING; TLV MAK value) of 0.1 ppm (1 mg/m^3) has been established for Iodine at the working place. The occupational exposure at the workplaces is maintained below this limit during production of biocidal products. As the formulation is carried out in closed systems, the only potential exposure to Iodine / PVP-iodine via inhalation is when the raw material is filled into a vessel. For this step the workers have to wear the proper PPE.

iv) Dermal exposure

Active substance

Any Iodine used for the production of biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. Workplaces in non-European countries are not under the scope of European legislation and regulation.

No member of the IRG Iodine Registration Group is a manufacturer of Iodine. Information on occupational exposures at workplaces in the production of Iodine is the property of the manufacturer and the applicant has no access to such data. Thus, no information on occupational exposures is available.

Formulation of the biocidal products

During the manufacture of the Iodine products or precursors there is a possibility of dermal exposure to the worker during the manual addition of Iodine to the vessel, when a sample is taken for quality control purposes, and during the maintenance and cleaning of the vessels.
When Iodine / PVP-iodine is added, gloves and coverall / green acid suit must be worn. Thus, the dermal contact to the chemical substances Iodine / PVP-iodine is assumed to be negligible Measurements on dermal deposit of Iodine / PVP-iodine due to these procedures are not available.

2.10.1.2 Intended use(s)

Please refer to Doc. IIB, chapter 8, of this dossier, providing detailed descriptions of the intended biocidal uses and the related human health and environmental exposure.

1. Professional Users

i) Description of application process — ditto

ii) Workplace description — ditto

Section A2	Identity of Active Substance – Exposure data PT 22
iii) Inhalation exposure	ditto
iv) Dermal exposure	ditto
2. Non-professional Users including the general public	
(i) via inhalational contact	There will be no non-professional primary and secondary exposure via inhalation due to the production and/or use of the biocidal products. Neither the Iodine precursor nor Iodine containing biocidal products will be made available to the public.
(ii) via skin contact	There will be no non-professional primary and secondary exposure via skin contact due to the production and/or use of the biocidal products. Neither the Iodine precursor nor Iodine containing biocidal products will be made available to the public.
(iii) via drinking water	Iodine is an ubiquitarily existing chemical element. Thus, Iodine is naturally found in drinking water. A limit value for Iodine in drinking water is not established[*1)]. For details on the potential secondary exposure to Iodine due biocidal products, please refer to Document IIB, chapter 8.
	[*1)] For further information please refer to Doc. 592-032, Section A6.14/13: Iodine in Drinking-water, a background document for development of WHO Guidelines for Drinking-water Quality. A guideline value was not established because the available data were considered as inappropriate and differences between effects on human health of Iodine and Iodide are assumed. Moreover, a lifetime exposure to Iodine from water-disinfection is unlikely.
(iv) via food	Iodine is an ubiquitarily existing chemical element. Iodine is naturally found in food as it is incorporated in cattle and plants or accumulated in fish. Hence, consuming milk and fish is a well-known valuable Iodine source for humans. For secondary exposure, the Iodine in food is due to the use of fertilisers, biocides and/or feed additives. Secondary exposure through food from the use of Iodine in embalming fluids is considered negligible.
(v) indirect via environment	There is no or a negligible exposure to Iodine for humans via the environment. For details on the secondary exposure to Iodine due to biocidal products, please refer to Document IIB, chapter 8.
2.10.2 Environmental exposure towards active substance	
2.10.2.1 Production	Any Iodine used in the biocidal products of the Iodine Registration Group (IRG) is exclusively manufactured outside the EU. The formulation of the biocidal products consists mostly of mixing and packaging procedures (please refer to confidential data: Doc. IIIA, Section 2.10.1.1). There is no information available on releases of the active substance into water and air or on concentrations in wastes. However, due to the fact that closed systems are used, any releases of Iodine into the environment during formulation may be expected to

Section A2	Identity of Active Substance – Exposure data PT 22
	be negligible.
(i) Releases into water	See above
(ii) Releases into air	See above
(iii) Waste disposal	See above
2.10.2.2 Intended use(s)	Please refer to Doc. IIB, chapter 8, providing detailed descriptions of the intended biocidal uses and the related human health and environmental exposure.
Affected compartment(s):	An overview over the distribution of Iodine between the different environmental compartments is provided in Doc IIB, chapter 8.4.
water	See above
sediment	See above
air	See above
soil	See above
Predicted concentration in the affected compartment(s)	Predicted concentrations in the different environmental compartments are summarised in Doc IIB, chapter 8.4, table 8.4-07.
water	See above
sediment	See above
air	See above
soil	See above
	Evaluation by Competent Authorities

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	

Table A2.10-: PT 22:Workplace exposure / Inhalation exposure

Exposure scenario	Workplace operation	PPE	Year(s) of measurement	Number of measurements	Type of measurements	Exposure concentration
Production	Not applicable. Substance is produced outside the EU.					
Formulation Note: the formulation procedure of embalming fluid is very similar to that of teat dips. The exposure concentrations provided in the PT3 dossier are considered to be also relevant for PT22.	Weighing, filling, mixing and cleaning processes	Gloves, goggles, coverall / acid suit, respirator mask and safety shoes	Measurements are available. Years are not specified.	Measurements are available. Numbers are not specified.	Measurements of ambient air.	0.004 – 0.2 ppm. The higher values are for exposure during addition of iodine itself to premix vessels whilst the lower numbers were recorded during filling of finished products.
Application MG04/PT22	Exclusively professional use	Gloves, protective clothing and mask for hygiene reasons	No measurements available	Not applicable	Not applicable	Not applicable

Remark: Iodine is a well known element and a lot of data on physical chemical properties is available in the public domain. Therefore, values found in reputable textbooks and data collections are considered to be reliable, irrespective of the fact that they most likely have not been determined according to guidelines or under GLP.

3 PHYSICAL AND CHEMICAL PROPERTIES OF ACTIVE SUBSTANCE

Section A3

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
3.1 Melting point, boiling point, relative density (IIA3.1)								
3.1.1 Melting point								
Melting pt. 1	[redacted]	[redacted]	113.5 °C		[redacted]	[redacted]	Doc. No. 192-001, A3.1.1/01	
Melting pt. 2	[redacted]	[redacted]	113.6 °C		[redacted]	[redacted]	Doc. No. 192-005, A3.1.1/02	
Melting pt. 3	[redacted]	[redacted]	113.5 °C		[redacted]	[redacted]	Doc. No. 192-006, A3.1.1/03	
Melting pt. 4	[redacted]	[redacted]	113.7 °C at 1 atm		[redacted]	[redacted]	Doc. No. 119-001, A3.1.1/04	X2
3.1.2 Boiling point								
Boiling pt. 1	[redacted]	[redacted]	184.35 °C at 1 atm		[redacted]	[redacted]	Doc. No. 192-001, A3.1.1/01	

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
Boiling pt. 2	[redacted]	[redacted]	185.24 °C		[redacted]	[redacted]	Doc. No. 192-005, A3.1.1/02	
Boiling pt. 3	[redacted]	[redacted]	184.5 °C		[redacted]	[redacted]	Doc. No. 192-006, A3.1.1/03	
Boiling pt. 4	[redacted]	[redacted]	184.4 °C		[redacted]	[redacted]	Doc. No. 119-001, A3.1.1/04	X2
3.1.3 Bulk density/ relative density								
Bulk/rel. density 1	[redacted]	[redacted]	$D_4^{20} = 4.93$		[redacted]	[redacted]	Doc. No. 192-001, A3.1.1/01	
Bulk/rel. density 2	[redacted]	[redacted]	$D = 4.943$ g/cm^3		[redacted]	[redacted]	Doc. No. 192-005, A3.1.1/02	
Bulk/rel. density 3	[redacted]	[redacted]	$D = 4.93$		[redacted]	[redacted]	Doc. No. 192-006, A3.1.1/03	
3.2 Vapour pressure (IIA3.2)								
Vapour pressure 1	[redacted]	[redacted]	0.305 mmHg (40.7 Pa) at 25 °C		[redacted]	[redacted]	Doc. No. 581-009 A3.2/01	X2 X3

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
Vapour pressure 2	[redacted]	[redacted]	1 mmHg (133 Pa) at 40 °C 10 mmHg (1.33 kPa) at 72 °C 100 mmHg (13.3 kPa) at 115 °C 400 mmHg (53.3 kPa) at 160 °C 760 mmHg (101.3 kPa) at 185 °C (boiling point)		[redacted]	[redacted]	Doc. No. 192-001, A3.1.1/01	X3
3.2.1 Henry's Law Constant (Pt. I-A3.2)	[redacted]	[redacted]	34.43 Pa m^3 mol^{-1} at 25 °C	[redacted]	[redacted]	[redacted]	Calculation based on data from: Doc. No. 581-009 A3.2/01 Doc. No. 192-001, A3.1.1/01	X2
3.3 Appearance (IIA3.3)								
3.3.1 Physical state	[redacted]	[redacted]	solid		[redacted]	[redacted]	Doc. No. 192-005, A3.1.1/02	
3.3.2 Colour	[redacted]	[redacted]	Grey-black, metallic shine		[redacted]	[redacted]	Doc. No. 192-005, A3.1.1/02	

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
3.3.3 Odour	[redacted]	[redacted]	Characteristic, sharp, irritating		[redacted]	[redacted]	Doc. No. 192-006, A3.1.1/03 Doc. No. 591-004, A3.3.3/01	
3.4 Absorption spectra (IIA3.4)								
UV/VIS	[redacted]	[redacted]	Please refer to Figure 1 at the end of this table for an illustration of the UV spectrum.		[redacted]	[redacted]	Doc. No 192-007, A3.4/01	X4
IR	[redacted]	[redacted]	Not relevant	I_2 is homonuclear diatomic molecule and therefore its only vibrational mode is IR inactive.				

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
NMR	[redacted]	[redacted]	Not relevant	There is no carbon or hydrogen in I_2. Therefore, the recording of a ^{13}C- or ^{1}H-NMR spectrum would give no valuable results.				
MS	[redacted]	[redacted]	The mass spectrum of Iodine can easily be estimated. The natural abundance of ^{127}I is 100%. Therefore, the molecular ion peak of I_2 is expected at m/z = 254.					
3.5 Solubility in water (IIA3.5)								
Water solubility 1	[redacted]	[redacted]	0.29 g/L at 20 °C 0.30 g/L at 25 °C 0.78 g/L at 50 °C		[redacted]	[redacted]	Doc. No. 192-001, A3.1.1/01	
Water solubility 2	[redacted]	[redacted]	0.33 g/L at 25°C		[redacted]	[redacted]	Doc. No. 581-009 A3.2/01	X2 X5
3.6 Dissociation constant (-)			**The determination of a pK_a or pK_b is not relevant for Iodine, as it is neither an acid nor a base. The solubility of elemental Iodine (I_2) in water is extremely low (0.3 g/L at 20 deg C).**				Doc. No. 592-046 A3.6/01 Doc. No.	

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
			[redacted]				792-005 A3.6/02	
3.7 Solubility in organic solvents, including the effect of temperature on solubility (IIIA3.1)	[redacted]	[redacted]	230 g/L in methanol at 25 °C 206 g/L in ether at 17 °C 164.6 g/L in benzene at 25 °C		[redacted]	[redacted]	Doc. No. 192-001, A3.1.1/01	

Subsection (Annex Point)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
	[redacted]	[redacted]	157 g/kg in ethyl acetate at 25 °C 182.5 g/kg in toluene at 25 °C 17.3 g/kg in n-heptane at 25 °C 13.2 g/kg in n-hexane at 25 °C	It can be concluded from the values stated that Iodine is very well soluble in polar organic and aromatic solvents and good soluble in non-polar solvents.	[redacted]	[redacted]	Doc. No. 591-004, A3.3.3/01	
3.8 Stability in organic solvents used in b.p. and identity of relevant breakdown products (IIIA3.2)			According to the specifications of the biocidal products described in this dossier (refer to the respective Doc. IIIB, Sec. 2) the major solvent used in the biocidal products is water. Organic solvents are present at up to ca. 18%. Other organic substances, that have not the function of a solvent, are also present. No tests on the stability of Iodine in the relevant organic substances present in biocidal products have been performed. However, storage stability tests of the two biocidal products in PT 3 are available and are summarised in Doc. IIIB, Sec. 3.7. In these tests, the Iodine concentration has been monitored over a time period. Therefore, the tests also reflect the stability of Iodine against the organic materials present in the biocidal products. **Therefore, it is concluded that no additional tests are necessary to cover this data requirement.** According to the TNsG on data requirements, the stability must "be stated if the active substance as manufactured includes an organic solvent". The					X6

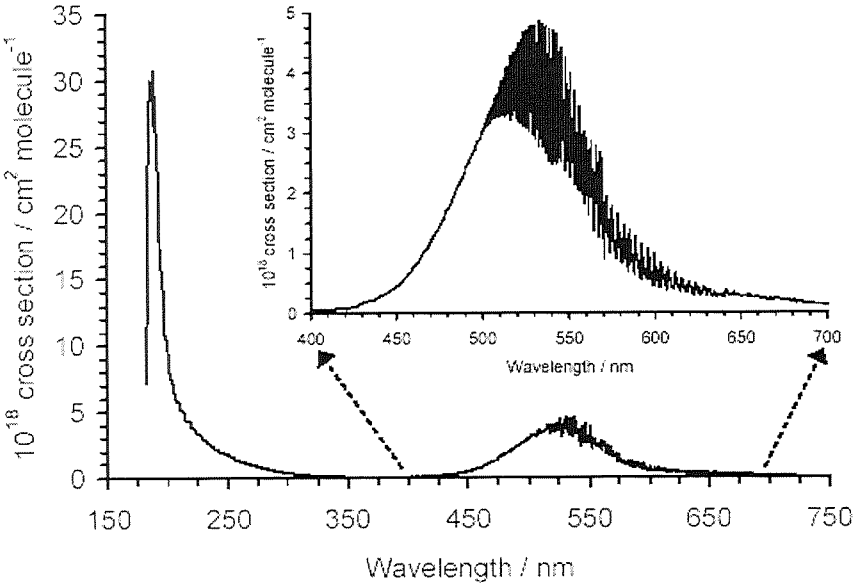
Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
			active substance Iodine as manufactured does not [redacted] an organic solvent.					
3.9 **Partition coefficient n-octanol/water (IIA3.6)**	[redacted]	[redacted]	Log Kow = 2.49		[redacted]	[redacted]	Doc. No. 591-004, A3.3.3/01	
	[redacted]	[redacted]	Log Kow = 1.86		[redacted]	[redacted]	Doc. No. 114-001 A3.9/01	X1
3.10 **Thermal stability, identity of relevant breakdown products (IIA3.7)**	[redacted]	[redacted]	I_2 has a melting point of approx. 114 °C and a boiling point of approx. 185 °C. No decomposition occurs.					
3.11 **Flammability, including auto-flammability and identity of combustion products (IIA3.8)**	[redacted]	[redacted]	Iodine is not flammable.		[redacted]	[redacted]	Doc. No. 191-001, A3.11/01	X2
			[redacted]				Doc. No. 192-008; A3.11/02 Doc. No. 192-005, A3.1.1/02 Doc. No.	X7 X2

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
			[redacted]				191-001, A3.11/01	
3.12 Flash-point (IIA3.9)			Iodine is not flammable. According to the TNsG on data requirements the flash-point must be provided for liquids whose vapours can be ignited. As Iodine is a solid and forms no flammable gases, the determination of the flash point is considered not to be necessary.					

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
3.13 Surface tension (IIA3.10)			It is not necessary to perform a study on the surface tension of an aqueous solution of Iodine, as Iodine is not put on the market as such as a biocidal product. Iodine based biocidal products are solutions of Iodine or PVP-iodine, respectively. These solutions typically also contain surface active surfactants. Therefore, it is considered to be more relevant to provide data on the surface tension of aqueous solutions of these products. Please refer to Doc IIIB, Section B3.10.					X8
3.14 Viscosity (-)			Not relevant. Iodine is a solid up to 114 °C.					
3.15 Explosive properties (IIA3.11)			According to the TNsG on data requirements and the EC Method A.14 " the test can be exempted when available thermodynamic information (heat of formation/decomposition) or absence of certain reactive groups in the structural formula or its "oxygen balance" establishes beyond reasonable doubt that the substance is incapable of decomposing, forming gases or releasing heat very rapidly". As can be seen from the chemical structure of Iodine (I_2) no hazardous groups (like nitro-groups, acetylene groups, 1,2- epoxides) are present in the molecule. I_2 contains no oxygen atoms. Therefore, it can be concluded that I2 is not explosive. However, contact of iodine with e.g. the following substances results in the risk of explosion: acetylene, ammonia, alkali metals.					

Subsection (Annex Point)	Method	Purity/ Specification	Results	Remarks/ Justification	GLP (Y/N)	Reliability	Reference	Official use only
3.16 Oxidizing properties (IIA3.12)			In the group of the halogens, Iodine is the weakest oxidiser. However, the oxidising power of Iodine is sufficient to oxidise the noble metal copper and iodine reacts exothermically under the formation of heat with e.g. iron powder, lithium, phosphorous.					X9
3.17 Reactivity towards container material (IIA3.13)			Iodine is normally packed into HDPE containers. Long commercial experience indicates the stability and suitability of this packaging.				Doc. No. 162-001; A3.17/01	

Figure 1: [redacted]



Evaluation by Competent Authorities

Evaluation by Rapporteur Member State

Date

Materials and methods

Conclusion

Reliability

Acceptability

Remarks

4 ANALYTICAL METHODS FOR DETECTION AND IDENTIFICATION

Section A4

4.1 Analytical methods for Detection and Identification of active substance

4.1.1 Section A4.1/01 Analytical Methods for the assay of active substance

	Reference
Reference	European Pharmacopoeia, Fifth Edition, Supplement 5.2, Council of Europe, Strasbourg 2004; Doc. No. 492-010 (published), Section A4.1/01.
Data protection	No
Data owner	Not applicable: publication
Companies with letter of access	Not applicable: publication
Criteria for data protection	No data protection claimed
	Guidelines and Quality Assurance
Guideline study	European Pharmacopoeia based on directive 2001/83/EC
GLP	Not relevant
Deviations	none
	Materials and Methods
Preliminary treatment	[redacted]
Enrichment	[redacted]
Cleanup	[redacted]
Detection	[redacted]
Separation method	[redacted]
Detector	[redacted]
Standard(s)	[redacted]
Interfering substance(s)	[redacted]
Linearity	[redacted]
Calibration range	[redacted]
Number of measurements	[redacted]
Linearity	[redacted]

Specifity: interfering substances	[redacted]
Recovery rates at different levels	[redacted]
Relative standard deviation	[redacted]
Limit of determination	[redacted]
Precision	[redacted]
Repeatability	[redacted]
Independent laboratory validation	[redacted]
Materials and methods	[redacted]

Applicant's Summary and conclusion

Conclusion	The method is common standard method for the determination of Iodine and is therefore suitable for the determination of the purity of Iodine.
Reliability	

Evaluation by Competent Authorities	
Evaluation by RMS	
Date	
Materials and methods	
Conclusion	
Reliability	

Acceptability	acceptable
Remarks	

4.2 Analytical methods for detection of Iodine residues

4.2.1 Section A4.2a/01-02 Analytical Methods for Detection and Identification of Iodine in soil

References

Reference	01.) J. Popke, J. Fleckenstein, E. Schnug and M. Bahadir (1997): „Spurenanalytik von Iod in Böden und Pflanzen“ (Doc. No. 492-009; Section A4.2a/01) (published). 02.) P. Schramel (1997): “Anwendung der ICP-MS für die Spurenelementbestimmung in biologischen Materialien” (Doc. No. 492-008; Section A4.2a/02) (published). Both published in „Analytiker-Taschenbuch B. 15”, Berlin, Heidelberg, New York: Springer, 1997.
Data protection	No
Data owner	Not applicable: publication
Companies with letter of access	Not applicable: publication
Criteria for data protection	No data protection claimed

GUIDELINES AND QUALITY ASSURANCE

Guideline study	No
GLP	No
Deviations	Not relevant: no guideline study

MATERIALS AND METHODS

Preliminary treatment	[redacted]
Enrichment	[redacted]
Cleanup	[redacted]
Digestion	[redacted]
Detection	[redacted]
Separation method	[redacted]
Detector	[redacted]
	[redacted]
Standard(s)	[redacted]

Interfering substance(s)

Linearity

Calibration range

Number of measurements

Linearity

Specifity: interfering substances

Recovery rates at different levels

Relative standard deviation

Limit of determination

Precision

Repeatability

Independent laboratory validation

Materials and methods

Applicant's Summary and conclusion

Conclusion	Currently ICP-MS can be regarded as the most powerful technique to determine Iodine in biological material, because of the high specificity of Iodine, the sensitivity and low detection limit.
Reliability	
Deficiencies	

	Evaluation by Competent Authorities
	Evaluation by Rapporteur Member State
Date	July 2010
Materials and methods	Applicants version adopted
Conclusion	The described methods are in principle suitable for the determination of iodine in soil, however, no validation data was presented
Reliability	3
Acceptability	Not acceptable due to reporting deficiencies.
Remarks	The submitted document is a text-book compilation of suitable methods without original studies or data.

The LOD quoted must relate to the water extract of the soil.

4.2.2 Section A4.2a/03 Analytical Methods for Detection and Identification of Iodine in soil

	References	**Official use only**
Reference	Knoch, E. (2009): Iodine – Development and Validation of an Analytical Method for the Determination of Iodine in Soil; SGS Institut Fresenius, Taunusstein, Germany; IF-09/01396479, 06.11.2009; Doc. No. 434-001 (unpublished)	
Data protection	Yes	
Data owner	Iodine Registration Group (IRG)	
Companies with letter of access	None	
Criteria for data protection	Data on existing a.s. for first entry to Annex I	
	GUIDELINES AND QUALITY ASSURANCE	
Guideline study	Yes, study performed according to the guidance document on residue analytical methods SANCO/3029/99 rev.4, 11 July 2000.	
GLP	Yes	
Deviations	None	
	MATERIALS AND METHODS	
Preliminary treatment	--	
Enrichment	No enrichment necessary	
Cleanup	Soil samples were heated for 2 hours (190 ± 10 °C) in an acid mixture.	
Digestion	see above 3.1.2	
Detection	--	
Separation method	No separation necessary	
Detector	Spectrometer Model Lambda 2 – Perkin Elmer	
Standard(s)	Potassium iodide (99.5% purity, Sigma-Aldrich) was used as quality control standard.	
Interfering substance(s)	No interferences with other substances reported. Iodine in soil was analysed according to the Sandel-Kolthoff method.	
Linearity	--	
Calibration range	Calibration performed between 0.1 and 0.5 µg Iodine per 5 mL solution.	

Number of measurements	natural soil: three fortification levels, 5 replicates each, 3 replicates for untreated control soils. artificial soil: two fortification levels, 3 replicates each, 3 replicates for untreated control soils.
Linearity	y=a+bx, a= 9.37, b=118.5, r = 0.9992
Specifity: interfering substances	No interferences with other substances are reported.
Recovery rates at different levels	Natural soil: 5 mg/kg moist soil: mean recovery = 94.7% (range 88.0 – 100.0%) 50 mg/kg moist soil: mean recovery = 83.7% (range 78.0 – 92.8%) 1000 mg/kg moist soil: mean recovery = 80.6% (range 72.9 – 92.2%) Artificial soil: 100 mg/kg moist soil: mean recovery = 90.7% (range 87.5 – 93.0%) 1000 mg/kg moist soil: mean recovery = 81.6% (range 74.5 – 85.6%)
Relative standard deviation	Natural soil: 5.9% at 5 mg/kg moist soil 7.3% at 50 mg/kg moist soil 10.0% at 1000 mg/kg moist soil Artificial soil: 3.1% at 100 mg/kg moist soil 7.5% at 1000 mg/kg moist soil
Limit of determination	The limit of detection of the method is 5 mg Iodine/kg dry soil. The background concentrations of Iodine in natural soil were 1.9 – 2.4 mg/kg moist soil, whereas in artificial soil the background concentrations were slightly higher (2.3 – 2.4 mg /kg moist soil).
Precision	--
Repeatability	At a nominal concentration of 49.2 mg Iodine / kg moist soil, on average 44.2 mg Iodine / kg moist soil was found with a relative standard deviation of 0.57% (6 replicates measured).
Independent laboratory validation	Not needed for this kind of analysis.

	Applicant's Summary and conclusion
Materials and methods	Two different soil types were used to develop and validate the analytical method based on the Sandel-Kolthoff method. Iodine ions are a catalyst for the oxidation of arsenic ions with Cer(IV) ions. After a certain reaction time the amount of available Cer(IV) ions is photometrically determined. Natural soil (Canitz soil used for non-target plant tests) and artificial soil (used for earthworm tests) were obtained from BioChem agrar. The soil moisture was determined by heating soil aliquots at 105°C overnight. The dry matter of the soils accounted for 90.04% for the natural soil and 73.63% of the artificial soil. Aliquots of the untreated soils were fortified with Iodine (dissolved in ethanol) and samples were processed according to the Sandel-Kolthoff procedure: Portions of soil were filled into a all-glass reaction tube. Thereafter, an acid mixture (H_2SO_4:HNO_3:$HClO_4$; 130:20:36; v/v/v) was added. The specimen was heated for 2 hours (190 ± 10 °C) using a heat transfer block. After the slurry was allowed to cool, it was transferred into a volumetric flask and brought to volume by the addition of water. An appropriate aliquot of the supernatant was brought to volume using water, to adjust the experimental calibration range. After the addition of sodium arsenite solution and cerium sulphate solution the mixture was allowed to stand before the photometric analysis at 436 nm was started. The validity of the processing procedure was shown by using a quality control standard (i.e. potassium iodide). Potassium iodide solution was filled into an all-glass reaction tube and of an acid mixture (H_2SO_4:HNO_3:$HClO_4$; 130:20:36; v/v/v) were added. After the heating process, the solution was allowed to cool. Thereafter, the solution was transferred into a volumetric flask and was brought to volume by the addition of water. A portion of was withdrawn and brought to volume using water. After the addition of sodium arsenite solution and cerium sulphate solution the mixture was allowed to stand before the photometric analysis (% transmission at 436 nm) was started.
Conclusion	The method was developed and validated according to SANCO/3029/99 rev.4, 11 July 2000. For the purpose of detection of the Iodine concentrations in soil samples used for acute terrestrial tests, the method is considered

applicable and sufficiently robust.

Reliability 1

Deficiencies None

Evaluation by Competent Authorities	
Evaluation by Rapporteur Member State	
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

Section A4.2a/04 **Analytical Methods for Detection and Identification of Iodine in soil**

Annex Point IIA IV.4.2

Official use only

1 REFERENCES

1.1 Reference	Yamada, H. et al. (1996): Determination of total iodine in soils by inductively coupled plasma mass spectrometry; Soil science and plant nutrition; 42:4, 859-866; Doc. No. 492-017 (published)
1.2 Data protection	No
1.2.1 Data owner	Not applicable: publication
1.2.2 Companies with letter of access	Not applicable: publication

Section A4.2a/04 **Analytical Methods for Detection and Identification of Iodine in soil**
Annex Point IIA IV.4.2

1.2.3	Criteria for data protection	No data protection claimed

2 GUIDELINES AND QUALITY ASSURANCE

2.1	**Guideline study**	No
2.2	**GLP**	No
2.3	**Deviations**	Not applicable

3 MATERIALS AND METHODS

3.1	**Preliminary treatment**	[redacted]	
3.1.1	Enrichment	[redacted]	
3.1.2	Cleanup	[redacted]	X1
3.1.3	Digestion	[redacted]	
3.2	**Detection**	[redacted]	
3.2.1	Separation method	[redacted]	
3.2.2	Detector	[redacted]	
3.2.3	Standard(s)	[redacted]	
3.2.4	Interfering substance(s)	[redacted]	
3.3	**Linearity**	[redacted]	
3.3.1	Calibration range	[redacted]	X1
3.3.2	Number of measurements	[redacted]	
3.3.3	Linearity	[redacted]	X2
3.4	**Specifity: interfering substances**	[redacted]	
3.5	**Recovery rates**	[redacted]	X3

Section A4.2a/04 **Analytical Methods for Detection and Identification of Iodine in soil**
Annex Point IIA IV.4.2

at different levels

3.5.1 Relative standard deviation

X4

3.6 Limit of determination

X5

3.7 Precision

3.7.1 Repeatability

3.7.2 Independent laboratory validation

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

X1

4.2 Conclusion

The method can be used to reliably detect iodine present in its various forms at background concentrations in soil.

4.2.1 Reliability

X6

4.2.2 Deficiencies

Section A4.2a/04 Analytical Methods for Detection and Identification of Iodine in soil

Annex Point IIA IV.4.2

Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	[redacted]
Materials and methods	[redacted]

Section A4.2a/04 **Analytical Methods for Detection and Identification of Iodine in soil**

Annex Point IIA IV.4.2

4.2.3 Section A4.2b/01 Analytical Methods for Detection and Identification of Iodine in air

	Reference
Reference	OSHA, Occupational Safety & Health Administration, U.S. Department of Labor (1994): Iodine in Workplace Atmospheres (Impregnated Activated Beaded Carbon); Doc. No. 592-036 (published), Section A4.2b/01.
Data protection	No
Data owner	Not applicable: publication
Companies with letter	Not relevant: publication

of access	
Criteria for data protection	No data protection claimed
	Guidelines and Quality Assurance
Guideline study	No
	However, close to SANCO/825/00 rev. 7
GLP	No
Deviations	Not relevant: no guideline study
	MATERIALS AND METHODS
Preliminary treatment	[redacted]
Enrichment	[redacted]
Cleanup	[redacted]
Detection	[redacted]
Separation method	[redacted]
Detector	[redacted]
Standard(s)	[redacted]
Interfering substance(s)	[redacted]

[redacted]

Linearity

Calibration range

Number of measurements

Linearity

Specifity: interfering substances

Recovery rates at different levels

[redacted]

[redacted]

Relative standard deviation [redacted]

Limit of determination [redacted]

Precision [redacted]

Repeatability [redacted]

Independent laboratory validation [redacted]

Applicant's Summary and conclusion

Materials and methods [redacted]

Conclusion	The validation of results indicates, that the method is accurate and precise. Performance during collection efficiency, breakthrough and storage stability tests is adequate. The described method is suitable for the sampling and determination of I_2 in air.
Reliability	[redacted]
Deficiencies	[redacted]

	Evaluation by Competent Authorities
	Evaluation by Rapporteur Member State
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	

4.2.4 Section A4.2c/01 Analytical Methods for Detection and Identification of Iodide in water

	Reference	**Official use only**
Reference	DIN EN ISO 10304-3: "Determination of dissolved anions in water by liquid chromatography of ions; Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate". Doc. No. 492-004 (published), section A4.2c/01.	
Data protection	No	
Data owner	Not applicable: publication	
Companies with letter of access	Not relevant: publication	
Criteria for data protection	No data protection claimed	
	GUIDELINES AND QUALITY ASSURANCE	
Guideline study	Document outlines a norm.	
GLP	No	
Deviations	Not relevant: no guideline study	
	MATERIALS AND METHODS	

Independent laboratory validation

[redacted]

[redacted]

Applicant's Summary and conclusion

Materials and methods

[redacted]

[redacted]

Conclusion

Iodide is determined via an ion chromatographic separation and CD (conductivity detector) or UV detection.

The method is suitable for the determination of iodide in water. The concentration range covered by the method is 0.1 – 50 µg I/L. Higher concentrated samples should be diluted accordingly.

An inter-laboratory trial was performed. Statistical analysis of the results obtained during this trial proved the validity of the method.

Reliability

1

Deficiencies

No

Evaluation by Competent Authorities

Evaluation by Rapporteur Member State

Date

[redacted]

Materials and methods

[redacted]

Conclusion

[redacted]

	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	

4.2.5 Section A4.2c/02-03 Analytical Methods for Detection and Identification of Iodide in water

	Reference
Reference	Reference is made to the method described under Section A4.2a/01/02 for the determination of iodide in soil. This method is also applicable for the determination of iodide in water. The digestion step of the soil sample can be omitted. Please refer to Section A4.2a/01-02 for a detailed description of: 1.) J. Popke, J. Fleckenstein, E. Schnug and M. Bahadir (1997): „Spurenanalytik von Iod in Böden und Pflanzen“ (Doc. No. 492-009; Section A4.2c/02) 2.) P. Schramel (1997): “Anwendung der ICP-MS für die Spurenelementbestimmung in biologischen Materialien” (Doc. No. 492-008, Section A4.2c/03), both published in „Analytiker-Taschenbuch B. 15”, Berlin, Heidelberg, New York: Springer, 1997. (published).

	Evaluation by Competent Authorities
	Evaluation by Rapporteur Member State
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

4.2.6 Section A4.2c/04 Analytical Methods for Detection and Identification of Iodide in water

	Reference	**Official use only**
Reference	S. Kirchner, A. Stelz and E. Muskat, *Z. Lebensm. Unters. Forsch.* **1996**, *203*, pp. 311-315; Doc. No. 492-006 (published), Section A4.2c/04.	
Data protection	No	
Data owner	Not applicable: publication	
Companies with letter of access	Not relevant: publication	
Criteria for data protection	No data protection claimed	
	GUIDELINES AND QUALITY ASSURANCE	
Guideline study	No	
GLP	No	
Deviations	Not relevant: no guideline study	
	Materials and Methods	
Preliminary treatment	[redacted]	
Enrichment	[redacted]	
Cleanup	[redacted]	
Detection	[redacted]	
Separation method	[redacted]	
Detector	[redacted]	
Standard(s)	[redacted]	
Interfering substance(s)	[redacted]	

[redacted]

Linearity [redacted]

Calibration range [redacted]

Number of measurements [redacted]

Linearity [redacted]

Specifity: interfering substances [redacted]

Recovery rates at different levels [redacted]

Relative standard deviation [redacted]

Limit of determination [redacted]

Precision [redacted]

Repeatability [redacted]

Independent laboratory validation [redacted]

Applicant's Summary and conclusion

Materials and methods [redacted]

[redacted]

Conclusion

A method for the determination of iodide in mineral water has been developed and validated.

The method is based on a derivatisation of iodide with ethylene oxide to 2-iodo-ethanol. 2-iodo-ethanol is determined by a gas chromatographic technique.

Limits of detection and determination, recovery rates and precision data have been generated.

Reliability

[redacted]

Deficiencies

[redacted]

Evaluation by Competent Authorities	
Evaluation by Rapporteur Member State	
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

Section A4.2c/05 Analytical Methods for Detection and Identification of Iodide in water

Annex Point IIA IV.4.2.c

Official use only

1 REFERENCE

1.1 Reference Yoshida, S. et al. (2007): Determination of the chemical forms of iodine with IC-ICP-MS and its application to environmental samples; Journal of Radioanalytical and Nuclear Chemistry, 273:1, 211-214; Doc. No. 492-018 (published)

1.2 Data protection No

1.2.1 Data owner: Not applicable: publication

1.2.2 Companies with letter of access: Not relevant: publication

1.2.3 Criteria for data protection: No data protection claimed

2 GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study No

2.2 GLP No

2.3 Deviations Not relevant: no guideline study

3 MATERIALS AND METHODS

Section A4.2c/05 **Analytical Methods for Detection and Identification of Iodide in water**

Annex Point IIA IV.4.2.c

3.1 Preliminary treatment

3.1.1 Enrichment

3.1.2 Cleanup

3.2 Detection

3.2.1 Separation method

3.2.2 Detector

3.2.3 Standard(s)

3.2.4 Interfering substance(s)

3.3 Linearity

3.3.1 Calibration range

X1

3.3.2 Number of measurements

3.3.3 Linearity

Section A4.2c/05 **Analytical Methods for Detection and Identification of Iodide in water**

Annex Point IIA IV.4.2.c

3.4 Specificity: interfering substances

[redacted]

3.5 Recovery rates at different levels

[redacted] X2

3.5.1 Relative standard deviation

[redacted]

3.6 Limit of determination

[redacted]

3.7 Precision

[redacted]

3.7.1 Repeatability

[redacted]

3.7.2 Independent laboratory validation

[redacted]

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

[redacted]

4.2 Conclusion

The method can be used to determine various iodine species in the environmental samples. As the ICP-MS method is very similar to the method described under A4.2a/04, it can be assumed that validation results are very similar for water samples (representing the less complex matrix). X3

4.2.1 Reliability

[redacted] X4

4.2.2 Deficiencies

[redacted]

Section A4.2c/05 Analytical Methods for Detection and Identification of Iodide in water

Annex Point IIA IV.4.2.c

[redacted]

Evaluation by Competent Authorities	
Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

Section A4.2c/06
Annex Point IIA IV.4.2.c

Analytical Methods for Detection and Identification of Iodide and Iodate in water

Official use only

1 REFERENCES

1.1	**Reference**	Sacher, F. et al. (2005): Analysis of iodinated X-ray contrast agents in water samples by ion chromatography and inductively-coupled plasma mass spectrometry; Doc. No. 492-021 (published)
1.2	**Data protection**	No
1.2.1	Data owner	Not applicable: publication
1.2.2	Companies with letter of access	Not applicable: publication
1.2.3	Criteria for data protection	No data protection claimed

2 GUIDELINES AND QUALITY ASSURANCE

2.1	**Guideline study**	No
2.2	**GLP**	No
2.3	**Deviations**	Not applicable

3 MATERIALS AND METHODS

3.1	**Preliminary treatment**	[redacted]
3.1.1	Enrichment	[redacted]
3.1.2	Cleanup	[redacted]
3.1.3	Digestion	[redacted]
3.2	**Detection**	[redacted]
3.2.1	Separation method	[redacted]
3.2.2	Detector	[redacted]
3.2.3	Standard(s)	[redacted]
3.2.4	Interfering substance(s)	[redacted] X1
3.3	**Linearity**	[redacted]
3.3.1	Calibration range	[redacted]

Section A4.2c/06 **Analytical Methods for Detection and Identification of Iodide and Iodate in water**
Annex Point IIA IV.4.2.c

3.3.2	Number of measurements	[redacted]
3.3.3	Linearity	[redacted] X2
3.4	**Specifity: interfering substances**	[redacted]
3.5	**Recovery rates at different levels**	[redacted]
3.5.1	Relative standard deviation	[redacted] X3
3.6	**Limit of determination**	[redacted] X4
3.7	**Precision**	[redacted]
3.7.1	Repeatability	[redacted]
3.7.2	Independent laboratory validation	[redacted]

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

[redacted]

4.2 Conclusion

The method can be used to reliably detect iodine present in its various forms at background concentrations in water. In this study different water samples (including surface water) were spiked with a known concentration of iodide and iodate for method validation. For the X-ray contrast agents, it could be shown that increasing the sample volume to 1 mL can even enhance the sensitivity of the method.

The method was validated for limit of detection, limit of determination, linearity and repeatability.

4.2.1	Reliability	[redacted] X5
4.2.2	Deficiencies	[redacted]

Section A4.2c/06
Annex Point IIA IV.4.2.c

Analytical Methods for Detection and Identification of Iodide and Iodate in water

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

Section A4.2c/07 **Analytical Methods for Detection and Identification of Iodide and Iodate in water**

Annex Point IIA IV.4.2.c

		Official use only
	1 REFERENCE	
1.1 Reference	Liu, W. et al. (2010): Determination of bromine and iodine speciation in drinking water using high performance liquid chromatography-inductively coupled plasma-mass spectrometry; Geostandards and geoanalytical research, Vol. 35, No. 1, p. 69-74; Doc. No. 492-022 (published)	
1.2 Data protection	No	
1.2.1 Data owner	Not applicable: publication	
1.2.2 Companies with letter of access	Not relevant: publication	
1.2.3 Criteria for data protection	No data protection claimed	
	2 GUIDELINES AND QUALITY ASSURANCE	
2.1 Guideline study	No	
2.2 GLP	No	
2.3 Deviations	Not relevant: no guideline study	
	3 MATERIALS AND METHODS	
3.1 Preliminary treatment	[redacted]	
3.1.1 Enrichment	[redacted]	
3.1.2 Cleanup	[redacted]	
3.2 Detection	[redacted]	
3.2.1 Separation method	[redacted]	X1
3.2.2 Detector	[redacted]	
3.2.3 Standard(s)	[redacted]	X2
3.2.4 Interfering substance(s)	[redacted]	

Section A4.2c/07 **Analytical Methods for Detection and Identification of Iodide and Iodate in water**

Annex Point IIA IV.4.2.c

[redacted]

3.3 Linearity

3.3.1 Calibration range

3.3.2 Number of measurements X3

3.3.3 Linearity

3.4 Specificity: interfering substances

3.5 Recovery rates at different levels X4

3.5.1 Relative standard deviation

3.6 Limit of determination X5

3.7 Precision

3.7.1 Repeatability X6

3.7.2 Independent laboratory validation

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

4.2 Conclusion

The method can be used to determine various iodine species in drinking water samples. The method was validated with respect to linearity, specificity, limit of detection, recovery and repeatability.

4.2.1 Reliability X7

4.2.2 Deficiencies

Section A4.2c/07 Analytical Methods for Detection and Identification of Iodide and Iodate in water

Annex Point IIA IV.4.2.c

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	[redacted]
Materials and methods	[redacted]

Section A4.2c/07 **Analytical Methods for Detection and Identification of Iodide and Iodate in water**

Annex Point IIA IV.4.2.c

Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

4.2.3 Section A4.2d/01 Analytical Methods for Detection and Identification of Iodide in Animal and human body fluids and tissues

	JUSTIFICATION FOR NON-SUBMISSION OF DATA
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**
Limited exposure [ ]	**Other justification [X]**
Detailed justification:	According to the TNsG on data requirements, an analytical method in animal and human body fluids and tissues must be submitted, where an active substance is classified as toxic or highly toxic. It is not necessary to submit an analytical method for the determination of Iodine (Iodide) in animal and human body fluids and tissues, because Iodine (Iodide) is not classified as toxic or highly toxic.

	Evaluation by Competent Authorities
	Evaluation by Rapporteur Member State
Date	[redacted]
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	

4.3 Analytical methods for detection of Iodine residues in/on food or feedstuff

4.3.1 Section A4.3/01 Analytical Methods for Detection and Identification of Iodide in milk and milk powder

[redacted]

Reference — **Official use only**

Reference	1) ISO 14378: "Milk and dried milk – Determination of iodide content – Method using high-performance liquid chromatography". Doc. No. 492-013 (published), Section A4.3/01. 2) Sertl, D. and Malone, W. (1993): Liquid chromatographic method for determination of iodine in milk: collaborative study; Journal of AOAC International Vol 76, No. 4 (published)
Data protection	No
Data owner	Not applicable: publication
Companies with letter of access	Not relevant: publication
Criteria for data protection	No data protection claimed

GUIDELINES AND QUALITY ASSURANCE

Guideline study	Document outlines a norm.
GLP	No
Deviations	Not relevant: no guideline study

Materials and Methods

Preliminary treatment	[redacted]
Enrichment	[redacted]
Cleanup	[redacted]

[redacted]

Detection	[redacted]	
Separation method	[redacted]	
Detector	[redacted]	
Standard(s)	[redacted]	
Interfering substance(s)	[redacted]	
Linearity	[redacted]	
Calibration range	[redacted]	X1
Number of measurements	1) [redacted] 2) [redacted]	
Linearity	[redacted]	
Specifity: interfering substances	[redacted]	
Recovery rates at different levels	1) [redacted] 2) [redacted]	

[redacted]

X2

Relative standard deviation

[redacted]

Limit of determination

[redacted]

Precision

[redacted]

Repeatability

[redacted]

Independent laboratory validation

[redacted]

Applicant's Summary and conclusion

Materials and methods

[redacted]

[redacted]

[redacted]

Conclusion

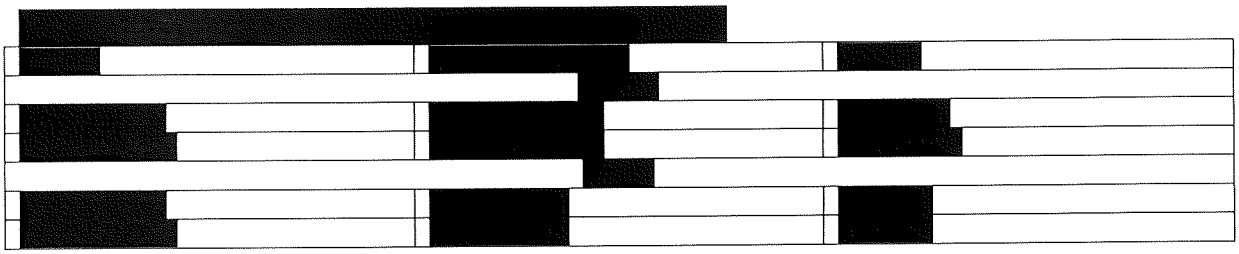
The International Standard summarised herein specifies a high-performance liquid chromatographic (HPLC) method for the determination of the iodide content of pasteurised whole milk and dried skim milk, when present at levels from 0.03 µg/g to 1 µg/g and 0.3 µg/g to 10.0 µg/g, respectively.

Some validation data is not reported in the method. However, an interlaboratory test has been performed to prove the repeatability and reproducibility of the method.

Reliability [redacted]

Deficiencies [redacted]

[redacted]



	Evaluation by Competent Authorities
	Evaluation by Rapporteur Member State
Date	
Materials and methods	
Conclusion	
Reliability	
Acceptability	

[redacted]

Remarks

Section A4.3/02
Annex Point IIIA IV.1

Analytical Method for the determination of Iodine in food samples

Official use only

1 REFERENCE

1.1 Reference

Rädlinger, G. and Heumann K.G. (1998): Iodine determination in food samples using inductively coupled plasma isotope dilution mass spectrometry; Anal. Chem., 1998, 70, 2221-2224; Doc. No. 492-019 (published)

1.2 Data protection

No

1.2.1 Data owner

Not applicable: publication

1.2.2 Companies with letter of access

Not relevant: publication

1.2.3 Criteria for data protection

No data protection claimed

2 GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study

No

2.2 GLP

No

2.3 Deviations

Not relevant: no guideline study

3 MATERIALS AND METHODS

3.1 Preliminary treatment

[redacted]

3.1.1 Enrichment

[redacted]

3.1.2 Cleanup

[redacted]

X1

Section A4.3/02 **Analytical Method for the determination of Iodine in food samples**

Annex Point IIIA IV.1

3.2 Detection	[redacted]	
3.2.1 Separation method	[redacted]	
3.2.2 Detector	[redacted]	
3.2.3 Standard(s)	[redacted]	
3.2.4 Interfering substance(s)	[redacted]	
3.3 Linearity	[redacted]	
3.3.1 Calibration range	[redacted]	X2
3.3.2 Number of measurements	[redacted]	
3.3.3 Linearity	[redacted]	
3.4 Specifity: interfering substances	[redacted]	X3
3.5 Recovery rates at different levels	[redacted]	X4
3.5.1 Relative standard deviation	[redacted]	X4
3.6 Limit of determination	[redacted]	X5
3.7 Precision	[redacted]	
3.7.1 Repeatability	[redacted]	

Section A4.3/02
Annex Point IIIA IV.1

Analytical Method for the determination of Iodine in food samples

3.7.2 Independent laboratory validation

[redacted]

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

[redacted]

4.2 Conclusion

The ICP-MS methods provide fast and reliable results. Because IDMS is a method of proven high precision and accuracy, it is internationally accepted as a definitive method. The $^{127}I/^{129}I$ isotope ratio of the isotope-diluted sample is the only number which must be experimentally determined for each iodine analysis by IDMS. This isotope ratio is not influenced by matrix effects or by the isolated amount of iodine. Whereas ICP-MS requires external calibration, ICP-IDMS is an internal "one-point" calibration.

For either method a digestion of the sample is required. Comparing the performance of TMAH to $HClO_4/HNO_3$ digestion, the latter is considered to perform better since it is less time consuming and a 100% iodine extraction can be guaranteed. Both methods are favoured over the oxygen combustion method.

4.2.1 Reliability

[redacted]

4.2.2 Deficiencies

[redacted]

Evaluation by Competent Authorities
Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
EVALUATION BY RAPPORTEUR MEMBER STATE
Date [redacted]
Materials and methods [redacted]

Section A4.3/02
Annex Point IIIA IV.1

Analytical Method for the determination of Iodine in food samples

[redacted]

[redacted]

Conclusion [redacted]

Reliability [redacted]

Acceptability [redacted]

Section A4.3/02
Annex Point IIIA IV.1

Analytical Method for the determination of Iodine in food samples

Remarks [redacted]

5 REFERENCE LIST OF STUDIES SUBMITTED (BY SECTION NO.)

Section No / Reference No[1]	Author(s)[2]	Year	Title[3] Source (where different from company) Company Report No. GLP (where relevant) (Un)Published	Data Protection Claimed (Yes/No)	Owner
A1/01	Bervoets, A.	2002	ECB EMAIL TO EVANS - PRELIMINARY NOTIFICATION NUMBER - [N266]EVANS VANODINE INTERNATIONAL PLC-[7553-56-2] Source: EC Report No.: Not indicated Not GLP; (unpublished) Doc. No.: 987-004	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group
A2.7/01	Anonymous	2004	EUROPEAN PHARMACOPOEIA - IODINE Source: European Pharmacopoeia,Fifth Edition, Supplement 5.2, ISBN: 92-871-5414-7 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-010	No	N.R.
A2.7/02	Turton, R.G. Wilcox, D.J. Wilkinson, J.F.	N.I.	SPECIFICATION - IODINE PRILLS PH. EUR. Source: Blagden Chemicals Marketing Report No.: I001/0800 : CR2646/ISSUE NO.2 Not GLP; (unpublished) Doc. No.: 131-001	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group

1 ***Section Number/Reference Number*** should refer to the section number in Doc III-A or III-B. If the study is non-key, and hence not summarised in Doc III but mentioned in Doc II, it should be included in the reference list alongside related references and its location in Doc II indicated in brackets. (If there is a need to include a cross-reference to PPP references then an additional column can be inserted).

2 ***Author's Name*** should include the author's surname before initial (s) to enable the column to be sorted alphabetically. If the Human Rights Charter prevents author's surnames on unpublished references being included in non-confidential documents, then it will be necessary to consider including 'Unpublished [number/year & letter] ' in Doc II, and both ' Unpublished [number/year & letter]' and the 'Authors Name' in the reference list'. This may necessitate the need for an additional column to state whether a reference is unpublished which can then be sorted.

3 ***Title, Source (where different from company), Company, Report No., GLP (where relevant), (Un)Published*** should contain information relevant to each item (ideally on separate lines within the table cell for clarity). If useful, the name of the electronic file containing the specific study/reference could be added in brackets.

Section No / Reference No[1]	Author(s)[2]	Year	Title[3] Source (where different from company) Company Report No. GLP (where relevant) (Un)Published	Data Protection Claimed (Yes/No)	Owner
A2.7/03	Anonymous	1992	PRILLED IODINE - TYPICAL SPECIFICATIONS Source: SQM Iodine Europe N.V., Belgium Report No.: 006657, Revision nr 02 Not GLP; (unpublished) Doc. No.: 131-002	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group
A2.7/04	Anonymous	1999	CERTIFICATE OF ANALYSIS - PRILLED IODINE Source: acf minera s.a. Chile Report No.: 01-36 190046 Not GLP; (unpublished) Doc. No.: 131-003	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group
A2.8.9/01	Anonymous	2004	EUROPEAN PHARMACOPOEIA - IODINE Source: European Pharmacopoeia, Fifth Edition, Supplement 5.2, ISBN: 92-871-5414-7 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-010	No	N.R.
A2.8.9/02	Anonymous	2003	IODINE SPECIFICATION - IODINE I-1 Source: Not applicable Report No.: Not indicated Not GLP; (unpublished) Doc. No.: 131-005	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group
A3.1.1/01	Weast, R.C.	1990	CRC HANDBOOK OF CHEMISTRY AND PHYSICS - PHYSICAL CONSTANTS OF INORGANIC COMPOUNDS Source: CRC Handbook of Chemistry and Physics, 70th Edition Report No.: Not applicable Not GLP; (published) Doc. No.: 192-001	No	N.R.
A3.1.1/02	Holleman, A.F. Wiberg, E.	1985	LEHRBUCH DER ANORGANISCHEN CHEMIE - GRUPPE DER HALOGENE Source: Lehrbuch der Anorganischen Chemie, 91-100 Auflage, 1985, 400-401, 434-436, 442-443 Report No.: Not applicable Not GLP; (published) Doc. No.: 192-005	No	N.R.
A3.1.1/03	Anonymous	1995	CD RÖMPP CHEMIE LEXIKON - IOD Source: CE Römpp Chemie Lexikon, Version 1.0, 1995 Report No.: Not applicable Not GLP; (published) Doc. No.: 192-006	No	N.R.
A3.1.1/04	Anonymous	N.I.	DATA BASE REPORT - IODINE - CAS NO. [7553-56-2] Source: Not indicated Report No.: Not indicated Not GLP; (unpublished) Doc. No.: 119-001	NO	N.R.

Section No / Reference No[1]	Author(s)[2]	Year	Title[3] Source (where different from company) Company Report No. GLP (where relevant) (Un)Published	Data Protection Claimed (Yes/No)	Owner
A3.2/01	Anonymous	2004	TOXICOLOGICAL PROFILE FOR IODINE Source: U.S. Department of Health and Human Services Report No.: Not indicated Not GLP; (unpublished) Doc. No.: 581-009	NO	N.R.
A3.3.3/01	Anonymous	2006	HSDB DATA BASE SEARCH - IODINE - CAS NO. [7553-56-2] Source: HSDB Database search - http://toxnet.nlm.nih.gov/ Report No.: Not applicable Not GLP; (published) Doc. No.: 591-004	No	N.R.
A3.4/01	Saiz-Lopez, A. et al.	2004	ABSOLUTE ABSORPTION CROSS-SECTION AND PHOTOLYSIS RATE OF I2 Source: Atmos. Chem. Phys. Discuss., 4, 2379-2403, 2004 Report No.: Not applicable Not GLP; (published) Doc. No.: 192-007	No	N.R.
A3.6/01	Lee, S.K. Zhai, H. Maibach, H.I.	2005	ALLERGIC CONTACT DERMATITIS FROM IODINE PREPARATIONS - A CONUNDRUM Source: Contact Dermatitis, 2005, 52, 184-187 Report No.: Not applicable Not GLP; (published) Doc. No.: 592-046	No	N.R.
A3.6/02	Nagy, K. Körtvélyesi, T. Nagypál, I.	2003	IODINE HYDROLYSIS EQUILIBRIUM Source: Journal of Solution Chemistry, 32, 5, May 2003, 385-393 Report No.: Not applicable Not GLP; (published) Doc. No.: 792-005	No	N.R.
A3.9/01	Anonymous	N.I.	EPIWIN CALCULATION OF THE OCTANOL / WATER PARTITION COEFFICIENT OF IODINE Source: Not indicated Report No.: Not indicated Not GLP; (unpublished) Doc. No.: 114-001	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group
A3.11/01	Anonymous	2007	GESTIS STOFFDATENBANK - IOD Source: Gestis - Stoffdatenbank Report No.: Not applicable Not GLP; (unpublished) Doc. No.: 191-001	NO	N.R.
A3.11/02	Riedel, E.	1990	ANORGANISCHE CHEMIE - OXIDE DER HALOGENE Source: Anorganische Chemie, 2, 1990, 385-388 Report No.: Not indicated Not GLP; (published) Doc. No.: 192-008	No	N.R.
A3.17/01	Dehouck, P.	N.I.	PACKING SPECIFICATIONS IODINE Source: Cid Lines Report No.: Not indicated Not GLP; (unpublished) Doc. No.: 162-001	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Cid Lines

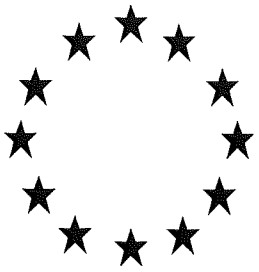
Section No / Reference No[1]	Author(s)[2]	Year	Title[3] Source (where different from company) Company Report No. GLP (where relevant) (Un)Published	Data Protection Claimed (Yes/No)	Owner
A4.1/01	Anonymous	2004	EUROPEAN PHARMACOPOEIA - IODINE Source: European Pharmacopoeia, Fifth Edition, Supplement 5.2, ISBN: 92-871-5414-7 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-010	No	N.R.
A4.2a/01	Günzler, H. et al.	1997	SPURENANALYTIK VON IOD IN BÖDEN UND PFLANZEN Source: Analytiker Taschenbuch 15, 1997, 122-145, Springer Verlag Report No.: Not applicable Not GLP; (published) Doc. No.: 492-009	No	N.R.
A4.2a/02	Günzler, H. et al.	1997	ANWENDUNG DER ICP-MS FÜR DIE SPURENELEMENTBESTIMMUNG IN BIOLOGISCHEN MATERIALIEN Source: Analytiker Taschenbuch, 1997, 15, 90-120 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-008	No	N.R.
A4.2a/03	Knoch, E.	2009	IODINE - DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF IODINE IN SOIL SGS Institut Fresenius GmbH, Taunusstein, Germany Report No.: IF-09/01396479 GLP, unpublished Doc. No.: 434-001	Yes (Data on existing a.s. submitted for the first time for entry into Annex I.)	Iodine Registration Group
A4.2a/04	Yamada, H. et al.	1996	Determination of total iodine in soils by inductively coupled plasma mass spectrometry; Soil science and plant nutrition; 42:4, 859-866 Not GLP; (published) Doc. No. 492-017	No	N.R.
A4.2b/01	Anonymous	2006	IODINE IN WORKPLACE ATMOSPHERES – IMPREGNATED ACTIVATED BEADED CARBON Source: From website: http://www.osha.gov/ Report No.: Not applicable Not GLP; (published) Doc. No.: 592-036	No	N.R.
A4.2c/01	Anonymous	1997	DETERMINATION OF DISSOLVED ANIONS IN WATER BY LIQUID CHROMATOGRAPHY OF IONS – PART 3 – DETERMINATION OF CHROMATE, IODIDE, SULFITE, THIOCYANATE AND THIOSULFATE Source: Deutsche Norm, DIN EN ISO 10304-3, November 1997 Report No.: DIN EN ISO 10304-3 : 1997-11 ICS 13.060.01 Not GLP; (published) Doc. No.: 492-004	No	N.R.

Section No / Reference No[1]	Author(s)[2]	Year	Title[3] Source (where different from company) Company Report No. GLP (where relevant) (Un)Published	Data Protection Claimed (Yes/No)	Owner
A4.2c/02	Günzler, H. et al.	1997	SPURENANALYTIK VON IOD IN BÖDEN UND PFLANZEN Source: Analytiker Taschenbuch 15, 1997, 122-145, Springer Verlag Report No.: Not applicable Not GLP; (published) Doc. No.: 492-009	No	N.R.
A4.2c/03	Günzler, H. et al.	1997	ANWENDUNG DER ICP-MS FÜR DIE SPURENELEMENTBESTIMMUNG IN BIOLOGISCHEN MATERIALIEN Source: Analytiker Taschenbuch, 1997, 15, 90-120 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-008	No	N.R.
A4.2c/04	Kirchner, S. Stelz, A. Muskat, E.	1996	BEITRAG NATÜRLICHER MINERALWÄSSER ZUR IODIDVERSORGUNG DER BEVÖLKERUNG Source: Z Lebensm Unters Forsch, 1996, 203, 311-315 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-006	No	N.R.
A4.2c/05	Yoshida, S. et al.	2007	Determination of the chemical forms of iodine with IC-ICP-MS and its application to environmental samples; Journal of Radioanalytical and Nuclear Chemistry, 273:1, 211-214; Not GLP; (published) Doc. No. 492-018	No	N.R.
A42c/06	Sacher, F. et al.	2005	Analysis of iodinated X-ray contrast agents in water samples by ion chromatography and inductively-coupled plasma mass spectrometry; Doc. No. 492-021 Not GLP; (published) Doc. No. 492-021	No	N.R.
A4.2c/07	Liu, W. et al.	2010	Determination of bromine and iodine speciation in drinking water using high performance liquid chromatography-inductively coupled plasma-mass spectrometry; Geostandards and geoanalytical research, Vol. 35, No. 1, p. 69-74; Not GLP; (published) Doc. No. 492-022	No	N.R.
A4.3/01	Anonymous	2000	MILK AND DRIED MILK - DETERMINATION OF IODIDE CONTENT - METHOD USING HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY Source: ISO 14378, 2000, 1-14 Report No.: Not applicable Not GLP; (published) Doc. No.: 492-013	No	N.R.

Section No / Reference No[1]	Author(s)[2]	Year	Title[3] Source (where different from company) Company Report No. GLP (where relevant) (Un)Published	Data Protection Claimed (Yes/No)	Owner
A4.3/02	Rädlinger, G. Heumann, K.G.	1998	Iodine determination in food samples using inductively coupled plasma isotope dilution mass spectrometry; Anal. Chem., 1998, 70, 2221-2224; Not GLP; (published) Doc. No. 492-019	No	N.R.

Competent Authority Report

Work Programme for Review of Active Substances in Biocidal Products
Pursuant to Council Directive 98/8/EC



IODINE (PT1)

DOCUMENT III-A5

Efficacy

Rapporteur Member State: Sweden

Draft Final May 2013

KEMI
Kemikalieinspektionen
Swedish Chemicals Agency

Section A5 Effectiveness against target organisms and intended uses

Subsection Annex Point IIA V.5.1 – V.5.8			Official use only
5.1	**Function (IIA5.1)**	Bactericide, virucide and fungicide.	
5.2	**Organism(s) to be controlled and products, organisms or objects to be protected (IIA5.2)**		
5.2.1	**Organism(s) to be controlled (IIA5.2)**	Iodine is used for control of various pathogenic organisms such as bacteria (including spores and mycobacteria), viruses and fungi. Examples of organisms against which Iodine was successfully tested are listed in the Tables A5.3.1-1, A5.3.1-2 and A5.3.1-3 that were already included in the dossier submitted in July 2007. Please note the available data summarised in these tables is not exhaustive due to the large number of available publications. Only the most relevant literature is described. In addition to literature data, also laboratory reports on tests performed with Iodine-based products have been included, examples of which are listed below for the relevant uses. On request of the applicant this information is provided in the Confidential part of the dossier. The above-mentioned information was submitted for PT3 but is regarded to be also relevant for the dossier for PT1. However, the cited documents are not again included in the dossier for PT1.	
5.2.2	**Products, organisms or objects to be protected (IIA5.2)**	Humans (formulation for skin disinfection)	
5.3	**Effects on target organisms, and likely concentration at which the active substance will be used (IIA5.3)**		

Section A5 Effectiveness against target organisms and intended uses

5.3.1	**Effects on target organisms (IIA5.3)**	Iodine in aqueous or alcoholic solutions or solubilised with surfactants (iodophors) is used in a variety of applications to kill harmful microorganisms and viruses. These preparations are used as skin disinfectants pre-operatively, with wound dressings, for teat dipping in dairy cows, sheep and goats and for surface disinfection in a number of industries. In addition, these preparations are antiseptics used for surgical disinfection and general hygiene disinfection of healthy skin by humans. Iodine is suitable for all of these applications because it is a broad spectrum biocide, its efficacy has been demonstrated over 170 years of use. Iodine and iodophors are well established and accepted as having microbicidal activity. There is a huge number of papers demonstrating the microbicidal activity of iodophor products in laboratory and field tests but only a few of these are referenced here as most of them relate to specific formulations and not just to Iodine. The following information was already submitted with the dossier for PT3 in July 2007. Since the cited reports are already available to KEMI, they have not been included again in the present dossier: Table A5.3.1-1 summarises the available information in published text and reference books and in scientific reviews. Table A5.3.1-2 summarises exemplary studies from publicly available sources showing the efficacy of Iodine-based products for biocidal uses. In the present dossier an additional table is included summarising the available data on the efficacy of Iodine from PVP-Iodine based disinfection product. Detailed study summaries on these studies have been included in the product dossier. Please refer to Table B5-1_PT1 provided in the confidential part of the dossier.	X4
5.3.2	**Likely concentrations at which the A.S. will be used (IIA5.3)**		
	PT1	Liquid disinfection product: 10% PVP-I corresponding to approx 1 % Iodine (w/w).	
5.4	**Mode of action (including time delay) (IIA5.4)**		
5.4.1	**Mode of action**	The following mechanisms of action contribute to the high reactivity and non-selective action of Iodine against different micoorganisms: • Iodine rapidly penetrates into micoorganisms showing a high affinity pattern of adsorption. • Iodine combines with protein substances in the bacterial cell; these can be peptidoglycans in the cell walls or enzymes in the cytoplasm. This results in irreversible coagulation of the protein and consequent loss of function.	

Section A5 Effectiveness against target organisms and intended uses

- Iodine is known to act on thiol groups in the cell; if a thiol enzyme is part of a metabolic chain, metabolic inhibition will result.
- Iodine reacts with key groups of proteins, in particular the free-sulfur amino acids cysteine and methionine, nucleotides and fatty acids.
- Iodine interferes at the level of the respiratory chain of the aerobic microorganisms by blocking the transport of electrons through electrophilic reactions with the enzymes of the respiratory chain.

For further details, please refer to the expert statement on resistance attached to this document (Attachment 1_381-017).

5.4.2 Time delay

The rapid penetration of Iodine into microorganisms and its mode of action indicate that the time-delay i.e. contact time required for sufficient efficacy depends on the tolerance of the organism to Iodine and the concentration of Iodine used for treatment. Iodine is more effective at higher temperatures.

The germicidal activity of Iodine-containing solutions is characterised by their colour. Amber solutions are active whilst pale yellow or colourless solutions are less effective and must be replaced by new solutions.

5.5 Field of use envisaged (IIA5.5)

MG01: Disinfectants, general biocidal products	PT 1: Human hygiene biocidal products (disinfectant)	X1
MG01: Disinfectants, general biocidal products	PT 3: Veterinary hygiene biocidal products covered in the dossier submitted in 2007.	X2
MG04: Disinfectants, general biocidal products	PT 22: Embalming and taxidermist fluids covered in the dossier submitted in 2008.	X3

5.6 User (IIA5.6)

Industrial	No industrial use
Professional	Product is intended to be used by professionals. For details about use conditions see Documents II-B and II-C of the biocidal dossier.
General public	Product is also intended to be used by general public. For details about use conditions see Documents II-B and II-C of the biocidal dossier.

Section A5 Effectiveness against target organisms and intended uses

5.7	**Information on the occurrence or possible occurrence of the development of resistance and appropriate management strategies (IIA5.7)**		
5.7.1	**Development of resistance**	As described in the dossier submitted in 2007, Iodine / Iodophors have been used in teat dips since the 1960's and are still the predominant type of product used for the prevention of mastitis. No reduction in efficacy was reported to the producers indicating that no development of resistant microorganisms or viruses has occurred. An overview on the efforts made to find reports on the development of resistance to Iodine is provided in the expert statement attached to this document (Attachment 1_381-017). No resistance of target organisms to [redacted] has been reported.	X5
5.7.2	**Management strategies**	No management strategies have been developed since no occurrence of resistance has been observed. Nevertheless, it should be noted that Iodine-based products are exclusively applied by professional users, in most cases as part of professional hygiene programs, which also involve other biocidal substances of different chemical structure and different mode of action (alternating applications).	
5.8	**Likely tonnage to be placed on the market per year (IIA5.8)**	Based on an estimate provided by one supplier of Iodine, the Iodine world demand in the year 2006 for the production of disinfectants was 14% of the total Iodine world demand of 25,000 – 26,000 t/year. Thus, about 3640 t Iodine/year were used for the production of disinfectants throughout the world. Doc. No. 031-013; Section A5.8/01 For information on the likely tonnage to be placed on the market per year for biocidal products per member of the Iodine Registration Group (IRG), please refer to the confidential part of the dossier.	

Section A5 Effectiveness against target organisms and intended uses

Evaluation by Competent Authorities

EVALUATION BY RAPPORTEUR MEMBER STATE

Date

General

Conclusion

Reliability

Acceptability

Remarks

Section A5 Effectiveness against target organisms and intended uses

Please note, that Tables 5.3.1-1 and 5.3.1-2 were already included in the dossier for PT3 submitted in July 2007. Since the cited documents are already available to KEMI, they have not been included again in the present dossier although they are regarded relevant or supportive for PT1.

Table 5.3.1-1: Summary table of reviews available in public literature on the efficacy of Iodine

Title/Author(s)	Reference	Year	Conclusion	Section point
Review Article The Role of Iodine in Antisepsis and Wound Management: A Reappraisal G. Selvaggi, S. Monstrey, K. Van Landuyt, M. Hamdi and P. Blondeel	*Acta.chir belg*, 103 (3), 241-247	2003	[redacted]	Doc. No. 392-055, Section A5.3.1/01
Topical Antimicrobial Agents in Dermatology Candace Thornton Spann, Susan C Taylor and Jeffrey M Weinberg	*Clinics in Dermatology* 21, 70-77	2003	[redacted]	Doc. No. 392-049, Section A5.3.1/02
Review of disinfectant susceptibility of bacteria isolated in hospital to commonly used disinfectants Tadashi Shiraishi and Yoshito Nakagawa	*Postgrad Med J* 69 (Suppl.3), S70-S77	1993	[redacted]	Doc. No. 392-057, Section A5.3.1/03
Virucidal Activity of Biocides A. Activity against human viruses A.S.Sattar and S.Springthorpe	In: *Principles and Practice of Disinfection, Preservation and Sterilization* 3nd Edition p178 Edited by A.D.Russell, W.B.Hugo and G.A.J.Ayliffe Published by Blackwell Scientific Publications	1999	[redacted]	Doc. No. 392-048, Section A5.3.1/04
Virucidal Activity of Biocides A. Activity against veterinary viruses P.J.Quinn and B.K.Markey	Page 193		[redacted]	

Title/Author(s)	Reference	Year	Conclusion	Section point
Halogens - Free Iodine W.B.Hugo and A.D.Russell	Page 45-46		[redacted]	
Halogens - Iodophors W.B.Hugo and A.D.Russell	Page 45-46		[redacted]	
Iodine	In: *Martindale The Complete Drug Reference* 32nd Edition p1494	1999	[redacted]	Doc. No. 392-047, Section A53.1/05
Chemical disinfectants, antiseptics and preservatives E.M.Scott and S.P.Gorman	In: *Pharmaceutical Microbiology* 6th Edition p219	1998	[redacted]	Doc. No. 392-046, Section A5.3.1/06
Chemicals used as disinfectants: active ingredients and enhancing additives D.J. Jeffrey	*Rev.sci.tech.Off.int.Epiz.* 14 (1) 68	1995	[redacted]	Doc. No. 392-045, Section A5.3.1/07
Iodine	*The Pharmaceutical Codex* 12 Edition *Principles and Practice of Pharmaceutics* p582	1994	[redacted]	Doc. No. 392-050, Section A5.3.1/08
Iodophores		1994	[redacted]	
Bacterial Spores and Chemical Sporicidal Agents A.D.Russell	*Clinical Microbiology Reviews* Vol. 3, No. 2, p99-119	1990	[redacted]	Doc. No. 392-058, Section A5.3.1/09

Title/Author(s)	Reference	Year	Conclusion	Section point
The Bacterial Flora of 'In-Use' Teat Dips J.Bruce	In: *Disinfectants Their use and Evaluation of Effectiveness* p177-182 Edited by C.H.Collins, M.C.Allwood, Sally F. Bloomfield and A.Fox Published by Academic Press, London	1981	[redacted]	Doc. No. 392-051, Section A5.3.1/10
The inactivation of vegetative micro-organisms by chemicals in the dairying industry Christina M Cousins	In: *Inhibition and Inactivation of Vegetative Microbes* p13-30 Edited by F.A.Skinner and W.B.Hugo Published by Academic Press, London	1976	[redacted]	Doc. No. 392-052, Section A5.3.1/11
Iodophors, their physical, chemical and bactericidal properties and use in the dairy industry - A Review A Twomey	*Australian Journal of Dairy Technology*, Part II, 24, 29-32	1969	[redacted]	Doc. No. 392-053, Section A5.3.1/12
Iodine compounds	In: *A Review of Sterilization and Disinfection* p143-144 S.D. Rubbo and Joan F Gardner Published by Lloyd-Luke (Medical Books) Ltd, London	1965	[redacted]	Doc. No. 392-054, Section A5.3.1/13
Elemental Iodine as a Disinfectant for Drinking Water Shih Lu Chang and J. Carrell Morris	*Industrial and Engineering Chemistry* 45(5); 1009-1012.	1953	[redacted]	Doc. No. 392-056, Section A53.1/14

Table 5.3.1-2: Summary table of available publications describing the efficacy of Iodine and Iodine-based products to provide evidence for the intrinsic efficacy of Iodine.

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
bactericide	PT3	Iodophor teat dips	Clostridium spores Coliform counts Anaerobe spores	[redacted]	[redacted]	Iodophor premilking teat dipping followed by subsequent drying with a paper towel reduced bacterial counts in milk as well as the use of teat preparation combined with wet and dry paper towel, but it was superior in reducing new infections. By replacing the paper towel with a cotton towel, iodophor premilking teat dipping followed by drying and scrubbing of teat ends will not raise Iodine residue in milk.	Doc. No. 392-028; Section A5.3.1/15

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
bactericide	PT5	Iodine	*Escherichia coli*	[redacted]		2-5 ppm: reduction to < 5 viable colonies after treatment of 10^8 cells within 10 minutes	Doc. No. 392-056; Section A5.3.1/14
bactericide	PT5	Iodine	Water-borne pathogenic organisms such as enteric bacteria amebic cysts, cercariae, leptospira and viruses	[redacted]	[redacted]	7-8 ppm Iodine in 10 minutes at room temperature: reduction to < 5 viable colonies after treatment of 10^8 cells obtained for *E.coli, Sal. typhosa, Sh. dysenteriae*, Vibrio cholera and mixed coli aerogenes flora of sewage. Sal. Schöttmuelleri: 20 minutes treatment required	Doc. No. 392-056; Section A5.3.1/14
bactericide	PT2-4	[redacted] (1350 ppm Iodine)	*Staphylococcus aureus* *Escherichia coli* *Pseudomonas aeuginosa* *Enterobacter aerogenes* *Klebsiella pneumoniae* *Streptococcus*	[redacted]	[redacted]	Percentage reduction achieved: > 99.999 for all test organisms after 30 seconds contact time. Suspensions of micro-organisms tested at concentrations of 10^7 to 10^8 in contact with disinfectant.	Doc. No 381-015; Section A5.3.1/16

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
			dysgalactiae *Streptococcus agalactiae* *Streptococcus uberus*	[redacted]			
bactericide	PT3	[redacted] (1350 ppm Iodine)	*Staphylococcus aureus* *Escherichia coli*	[redacted]	[redacted]	5.62 and 5.49 log reduction for S. aureus and E. coli, respectively. Pass level for this kind of test is a 3 log reduction in the initial populations. Conclusion: [redacted] shows a significant and effective disinfecting action.	
Bactericide /fungicide	PT3	[redacted] (1350 ppm Iodine)	*P. aeruginosa* CIP 82.118 *S. aureus* CIP 4.83 *C. albicans* IP 48.72 *A. niger* IP 1431.83	[redacted]	[redacted]	The number of colonies per mL of product tested following contact with the product was analysed after 24 hours, 7, 14, 21 and 28 days. Less than 10 colonies per mL were counted indicating that the preserving action of [redacted] is guaranteed. Pass level: at least 4 log reduction after 24 hours.	
virucide	PT2	[redacted]	Enterovirus	[redacted]	[redacted]	% disinfectant to achieve	Doc. No. 392-019; Section

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
		[redacted] (28,000 ppm Iodine) 7 other disinfectants (not containing Iodine)	(Talfan) Reovirus Type 1 WBR 26 Coronavirus: Transmissible gastroenteritis (TGE) Togavirus: Bovine virus diarrhoea (BVD) NADL Myxovirus: Parainfluenza Type 3 T1 Adenovirus type 3 WBR1 Herpesvirus: Infectious bovine rhinotracheitis (IBR) Oxford Poxvirus: Contagious pustular dermatitis (CPD) WVRS	[redacted]	[redacted]	4 log reduction in titer Talfan: 4% [redacted] Reovirus-1: Partial reduction only TGE: 4% [redacted] 3% [redacted] BVD: Partial reduction only Parainfluenza Type 3T1: 2% [redacted] or [redacted] Adenovirus type 3: 3% [redacted] or [redacted] IBR: 1% [redacted] 0.5% [redacted] CPD: 3% [redacted] 2% [redacted]	A5.3.1/17
virucide	PT2 and PT5	Iodine	Poliomyelitis virus, strain Lansing (mouse adapted)	[redacted]	[redacted]	Results were variable but at the concentrations needed for killing amebic cysts, it is also effective against Poliomyelitis virus.	Doc. No. 392-056; Section A5..3.1/14

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
				[redacted]			
Bactericide /fungicide/ virucide	PT3	[redacted] (28,000 ppm Iodine)	Lots of organisms/Pig stables	[redacted]	[redacted]	Bacteria: effective dilutions range from 1:30 for Mycobacterium spp. up to 1:150 for *Bordetella bronchiseptica.* Fungi: effective dilutions are 1:100 for all four relevant fungi. Viruses: effective dilutions range from 1:40 for the virus causing Transmissible Gastroenteritis to 1:600 for the virus causing Swine Vesicular Disease. [redacted] is not effective against Procine parvovirus.	Doc. No. 392-005; Section A5.3.1/18
bactericide	PT3	Iodine	*Staphylococcus aureus* *Staphylococcus agalactiae* *Corynebacterium bovis* Or grouped as Staphylococci and Streptococci	[redacted]	[redacted]	Concentrations of Iodine in products showing significant efficacy for postmilking treatment against: *S. aureus*: 0.05% to 1% Iodine *S. agalactiae*: 0.1% to 1% Iodine *C. bovis*: 0.25% to 1%	Doc. No. 392-030, Section A5..3.1/19

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
						Iodine Staph. species. 0.25% to 1% Iodine Streptococci: 1% Iodine	
bactericide	PT3	[redacted] (Iodophor: 0.1% Iodine) [redacted] (Iodophor: 0.25%) [redacted] (Iodine: 0.25%) [redacted] (Iodophor: 0.55% Iodine [redacted]	No details provided. Test organisms are grouped as "Environmental pathogens", "major pathogens" and "Gram-negative bacteria".	[redacted]	[redacted]	Significant efficacy of product for premilking treatment against: [redacted] environmental pathogens (P>.10) and major pathogens (P<.05) [redacted] environmental pathogens (P>.05) and major pathogens (P<.025) [redacted] Gram-negative bacteria (P<.025) and major pathogens (P<.001) [redacted] environmental pathogens (P>.10) and major pathogens (P<.10)	
amoebicide	PT5	Iodine	Entamoeba histolytica cysts	[redacted]	[redacted]	A suitable dose for emergency disinfection was calculated to be about 8 ppm for a 10 minute treatment at 23 °C. In water with high organic color or Iodine demand > 3 ppm, an increase in dosage was needed. 16	Doc. No. 392-056; Section A5..3.1/14

Function	Field of use envisaged	Test substance	Test organism(s)	Test method	Test conditions	Test results: effects, mode of action, resistance	Reference*)
				[redacted]		ppm was effective for all waters tested. At low temperatures (0-5 °C) the required contact time was 20 minutes.	

*) References:

Section A5.3.1/15: Rasmussen, M.D. et al. (1991): Effects of premilking teat preparation on spores of anaerobes, bacteria and Iodine residues in milk; J. Dairy Sci., Vol. 74, pp. 2472-2478; Doc. No. 392-028. (published)

Section A5..3.1/16: Anonymous (n.i.): Technical file-[redacted] Doc. No. 381-015 (published).

Section A5..3.1/17: Evans, D.H. (19779: Disinfection of animal viruses; Fr. Vet. J., pages 133 and 356; Doc. No. 392-019 (published).

Section A5.3.1/18: Anonymous (n.i.): Pig disinfection programme; Evans brochure; Doc. No. 392-005 (published).

Section A5..3.1/19: Anonymous (1996): 35th annual meeting-national mastitis council, Inc.: Summary of peer-reviewed publications on efficacy of premilking and postmilking teat disinfectants published since 1980; National Mastitis Council Annual Meeting Proceedings, pages 245-256; Doc. No. 392-030 (published).

Please refer also to Table 5.3.1_I-3 and Table 5.3.1_PVP-I-3 in the corresponding confidential parts of the dossier submitted in July 2007 (not included again in the present dossier) for a summary of available data provided by the applicant which is considered confidential.

In addition to the information submitted in 2007 in the dossier for PT3, please refer to Table 5.3.1-4 in the confidential part of the present dossier for a summary of available data provided by the applicant which is considered confidential.

Section A5/01 **Efficacy Data**
Annex Point IIB V.5.10 *Suspension tests with bacteria and viruses*

			Official use only
		1 REFERENCE	
1.1	**Reference**	Chang, S.L.and Morris, J.C.(1953): ELEMENTAL IODINE AS A DISINFECTANT FOR DRINKING WATER; Industrial and Engineering Chemistry, 45, 5, May 1953, 1009-1012; Doc. No.: 392-056 (published). This document was first cited under section point A5.3.1/14.	
1.2	**Data protection**	[redacted]	
1.2.1	Data owner	[redacted]	
1.2.2	Companies with letter of access	[redacted]	
1.2.3	Criteria for data protection	[redacted]	
1.3	**Guideline study**	No but the studies described in the publication were conducted as suspension tests resembling the EN1040 method.	
1.4	**Deviations**	Not applicable	
		2 METHOD	
2.1	**Test Substance (Biocidal Product)**	Elemental iodine	
2.1.1	Trade name/ proposed trade name	[redacted]	
2.1.2	Composition of Product tested	[redacted]	
2.1.3	Physical state and nature	[redacted]	
2.1.4	Monitoring of active substance concentration	[redacted]	
2.1.5	Method of analysis	[redacted]	
2.2	**Reference substance**	[redacted]	
2.2.1	Method of analysis for reference substance	[redacted]	
2.3	**Testing procedure**	[redacted]	
2.3.1	Test population / inoculum / test organism	[redacted]	
2.3.2	Test system	[redacted]	
2.3.3	Application of TS	[redacted]	

Section A5/01 **Efficacy Data**
Annex Point IIB V.5.10 *Suspension tests with bacteria and viruses*

2.3.4 Test conditions

2.3.5 Duration of the test / Exposure time

2.3.6 Number of replicates performed

2.3.7 Controls

2.4 Examination

2.4.1 Effect investigated

2.4.2 Method for recording / scoring of the effect

2.4.3 Intervals of examination

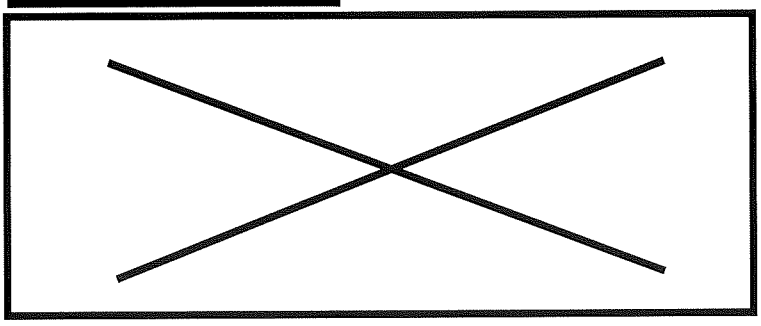
2.4.4 Statistics

2.4.5 Post monitoring of the test organism

3 RESULTS

3.1 Efficacy

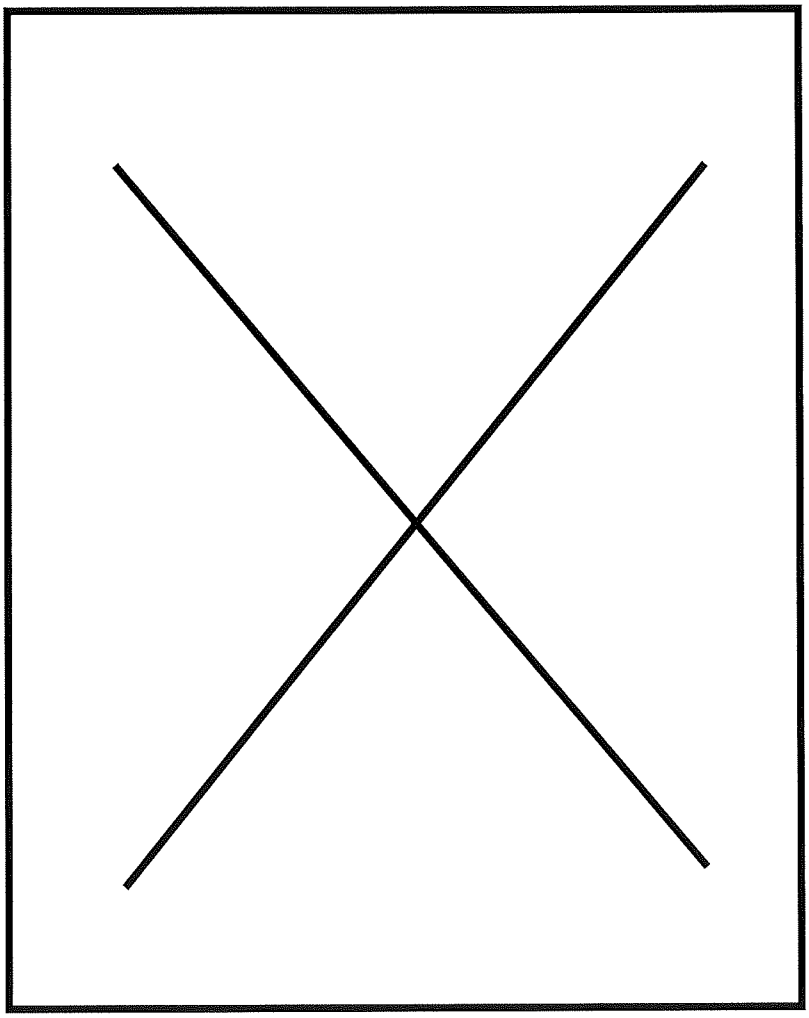
3.1.1 Dose/Efficacy curve



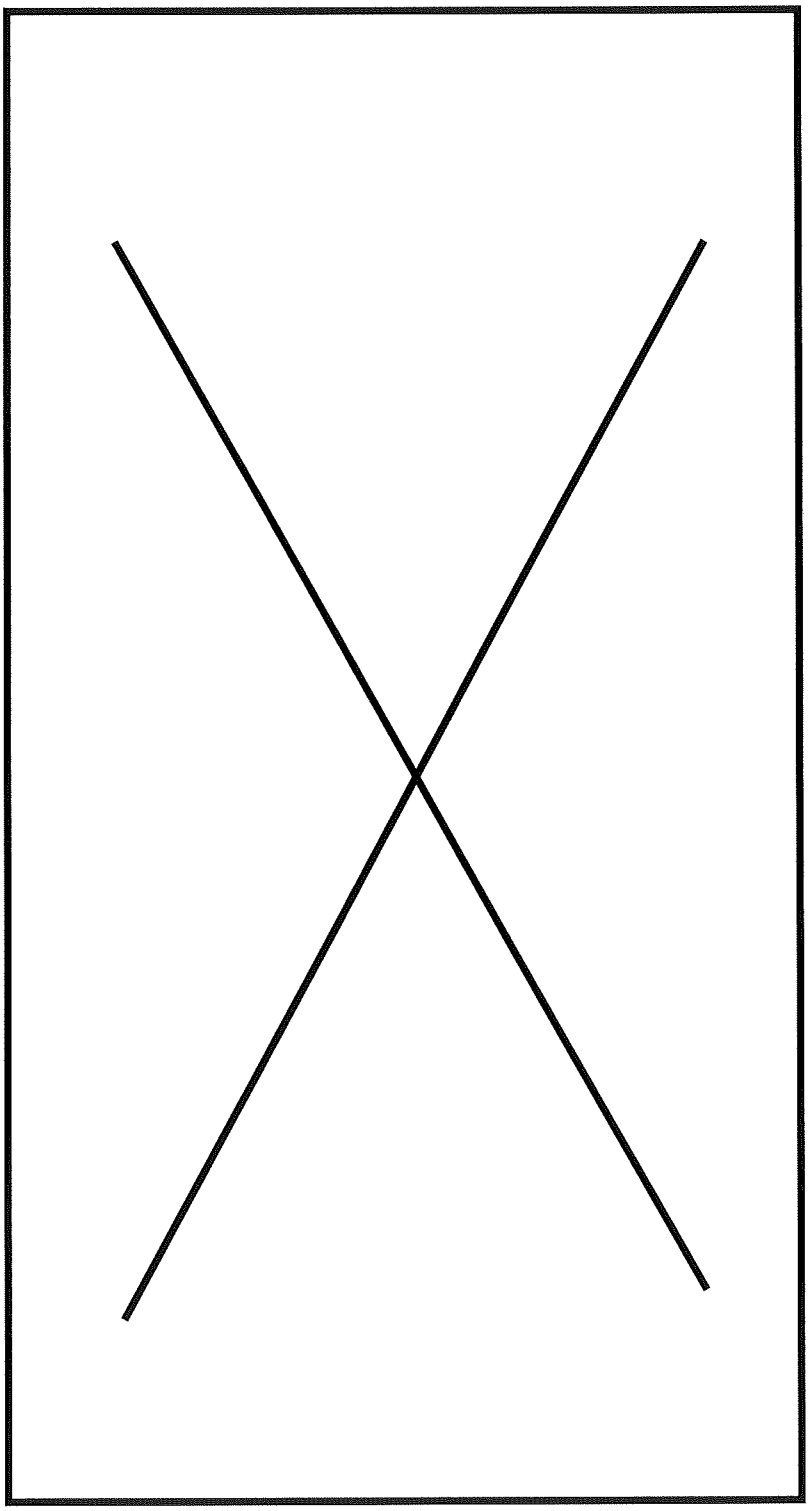
3.1.2 Begin and duration of effects

3.1.3 Observed effects in the post monitoring phase

3.2 Effects against

	organisms or objects to be protected	
3.3	**Other effects**	[redacted]
3.4	**Efficacy of the reference substance**	[redacted]
3.5	**Tabular and/or graphical presentation of the summarised results**	

Section A5/01 **Efficacy Data**
Annex Point IIB V.5.10 *Suspension tests with bacteria and viruses*



3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances