Thiamethoxam

NOTIFICATION OF AN ACTIVE SUBSTANCE UNDER COMMISSION REGULATION (EU) 844/2012

DOCUMENT M-CA, Section 9

Fate and Behaviour in the Environment

LITERATURE DATA

Version history[1]

Date	Data points containing amendments or additions and brief description	Document identifier and version number

[1] It is suggested that applicants adopt a similar approach to showing revisions and version history as outlined in SANCO/10180/2013 Chapter 4 How to revise an Assessment Report

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CA 9 LITERATURE DATA

CA 9.1 Title

This document is a Literature Review Report for thiamethoxam, metabolites and EU representative formulations A9584C (Actara 25WG®) and A9567R (Cruiser 600FS®).

CA 9.2 Author(s) of the review

Syngenta
Jealott's Hill International Research Centre
Bracknell
Berkshire
RG42 6EY
UK

CA 9.3 Summary: A brief summary indicating the purpose of the report, the methodology employed and the results obtained

This report summarises the search for "scientific peer-reviewed open literature on thiamethoxam and its metabolites dealing with fate and behaviour data which may impact health, the environment and non-target species and published within the last ten years before the date of submission of the dossier" in accordance with Article 8(5) of Regulation (EC) No. 1107/2009.

The exact search strategy is detailed in the Tables 9.5-1 to -5 but a summary of the methodology employed is given below.

1. A very broad search was conducted in 16 scientific source databases (detailed in Table 9.5-2) for thiamethoxam and its relevant metabolites using the search terms listed in CA 9.5.1.
2. Duplicates titles from between the data bases were automatically removed from the output.
3. A rapid assessment of the titles was conducted to remove any additional duplicates and any obviously irrelevant titles (where enough information was available from the title alone).
4. A further rapid assessment was conducted using summary abstracts and any clearly irrelevant titles were removed.
5. A detailed assessment of the full-text documents for the remaining titles was conducted using the criteria developed for study relevance (see Table 9.4.2-1).
6. Any relevant papers were highlighted and assessed for reliability.

During the review of the original search, it was noted that the search term 'clothianidin' was not included. As this is a relevant metabolite of thiamethoxam, a separate search was conducted with this search term to ensure all potentially relevant open literature was reviewed.

An overview of the results is summarised in the table below and further details are provided in Section 9.5.

Data requirement(s) captured in the search	Substance	Number (Initial Search)	Number (Top-Up Search)
Total number of *summary records* retrieved after *all* [A] searches of peer-reviewed literature (excluding duplicates)	Thiamethoxam	1644	87 [D]
	Clothianidin [C]	329 [D]	
Number of *summary records* excluded from the search results after rapid assessment for relevance [B]	Thiamethoxam	1621	85
	Clothianidin	326	
Total number of *full-text* documents assessed in detail [A]	Thiamethoxam	23	2
	Clothianidin	3	
Number of *studies* excluded from further consideration after detailed assessment for relevance	Thiamethoxam	22	2
	Clothianidin	3	
Number of *studies* not excluded for relevance after detailed assessment (i.e. relevant studies and studies of unclear relevance)	Thiamethoxam	1	0
	Clothianidin	0	

[A] Both from bibliographic databases and other sources of peer-reviewed literature
[B] aligned with EFSA Journal 2011; 9(2):2092: rapid assessment means exclusion of "obviously irrelevant records" based on titles.
[C] The search for clothianidin was done shortly before submission. Therefore, there is no distinction between initial and top-up search.
[D] Hits which were already included in a previous search step (i.e. both thiamethoxam searches for clothianidin, initial thiamethoxam search for the thiamethoxam top-up search) were treated as duplicates and excluded.

CA 9.4 Protocol

CA 9.4.1 Statement of the objective of the review

The review has the objective of identifying "scientific peer-reviewed open literature on thiamethoxam and its metabolites dealing with fate and behaviour data which may impact health, the environment and non-target species and published within the last ten years before the date of submission of the dossier" in accordance with Article 8(5) of Regulation (EC) No. 1107/2009.

CA 9.4.2 Criteria for relevance with which decisions to select studies in the dossier were made

Table 9.4.2-1: List of Criteria for relevance for each data requirement

Data requirements(s) (indicated by the correspondent CA data point (s))	Criteria for relevance
Route and rate of degradation in soil – Laboratory Studies – aerobic and anaerobic, parent and metabolites CA 7.1.1 CA 7.1.1.1 CA 7.1.1.2	1. Well defined test material (including purity/content) 2. Soil(s) must be agricultural and relevant for the EU e.g. from temperate zone, no extreme characteristics (e.g. meets the criteria in OECD 307) 3. Soil collection, preparation and storage did not differ significantly from recommended protocols 4. Test soils had not previously been exposed to the test material or structural analogues. 5. Experimental conditions did not differ significantly from recommended protocols e.g. temperature and moisture 6. Application rate is within the range of the proposed use and can be verified from the data (time zero samples) 7. Sufficient number of samples taken to determine kinetics (minimum 5) 8. Extraction system was appropriate e.g. avoidance of excessive or inadequate methods 9. Analytical method well described, LOD/LOQ at appropriate level 10. Mass balance or recovery for radiolabelled and unlabelled studies respectively is adequate to support the conclusions, e.g. >90%.

	11. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. for unlabelled studies are suitable blank controls included 12. Identification of 'new' metabolites is robust with appropriate details of method used 13. Anaerobic conditions are verified by measurement
Route and rate of degradation in soil – Field Studies CA 7.1.2.2	1. In addition to criteria under laboratory route and rate: 2. Field site(s) must be geoclimatically relevant for the EU 3. Adequate weather data available to verify relevance of study 4. Application technique relevant to proposed use (foliar, ST granule etc) 5. Sufficient sampling detail and description of sample handling prior to analysis 6. Initial and procedural recoveries are adequate to support the conclusions, e.g. 70-120%.
Soil photolysis CA 7.1.1.3	In addition to criteria under laboratory route and rate: 1. Light source was suitable with details of spectrum and intensity available 2. Dark control included and reported
Mobility studies Adsorption, desorption – parent and metabolites CA 7.1.3 Column or TLC leaching CA 7.1.4.1.1, CA 7.1.4.1.2	1. Well defined test material (including purity/content) 2. Soil(s) must be agricultural and relevant for EU e.g. from temperate zone, no extreme characteristics (e.g. meets the criteria in OECD 106) 3. Soil collection, preparation and storage did not differ significantly from recommended protocols 4. Test soils had not previously been exposed to the test material or structural analogues. 5. Experimental conditions did not differ significantly from recommended protocols 6. Application rate is appropriate to the proposed use and can be verified from the data 7. Sufficient number of samples taken to determine isotherm (if done) 8. Stability of the test item in the system was demonstrated 9. Extraction system was appropriate e.g. avoidance of excessive or inadequate methods 10. Mass balance or recovery for radiolabelled and unlabelled studies respectively is adequate to support the conclusions, e.g. >90% 11. Analytical method well described, LOD/LOQ at appropriate level 12. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. for unlabelled studies are suitable blank controls included
Lysimeter studies CA 7.1.4.2	In addition to criteria under laboratory route and rate: 1. Field site(s) must be geoclimatically relevant for the EU 2. Adequate weather data available to verify relevance of study. Combined rainfall/irrigation sufficient to meet guideline requirements 3. Minimum 1 m depth soil monolith 4. Study continued for sufficient years to support the conclusions
Field leaching CA 7.1.4.3.	In addition to criteria under laboratory route and rate: 1. Field site(s) must be geoclimatically relevant for the EU 2. Adequate weather data and groundwater data (depth, direction) available to verify the validity of study 3. Installation and operation of lysimeters and/or wells and samplers follows recommended protocols 4. Study continued for sufficient years to support the conclusions

Hydrolysis CA 7.2.1	1. Well defined test material (including purity/content) 2. Experimental conditions should not differ significantly from recommended protocols 3. Application rate is within an acceptable the range (e.g. consider solubility) and can be verified from the data (time zero samples) 4. Sufficient number of samples taken to determine kinetics (minimum 5) 5. Analytical method well described, LOD/LOQ at appropriate level 6. Mass balance or recovery for radiolabelled and unlabelled studies respectively is adequate to support the conclusions, e.g. >90%. 7. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. for unlabelled studies are suitable blank controls included 8. Identification of 'new' metabolites is robust with appropriate details of method used
Aqueous photolysis CA 7.2.1.2	In addition to criteria under hydrolysis: 1. Light source was suitable with details of spectrum and intensity available 2. Dark control included and reported
Degradation in aquatic systems CA 7.2.2	1. Well defined test material (including purity/content) 2. Water(s) and sediment(s) must be from an agricultural area and relevant for the EU e.g. from temperate zone, no extreme characteristics (e.g. meets the criteria in OECD 308) 3. Water/sediment collection, preparation and storage do not differ significantly from recommended protocols 4. Experimental conditions do not differ significantly from recommended protocols e.g. temperature and aeration 5. Application rate is within the range of the proposed use and can be verified from the data (time zero samples) 6. Sufficient number of samples taken to determine kinetics (minimum 5) 7. Extraction system was appropriate e.g. avoidance of excessive or inadequate methods 8. Analytical method well described, LOD/LOQ at appropriate level 9. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. for unlabelled studies are suitable blank controls included 10. Mass balance or recovery for radiolabelled and unlabelled studies respectively is adequate to support the conclusions, e.g. >90% 11. Identification of 'new' metabolites is robust with appropriate details of method used 12. Anaerobic conditions are verified by measurement
Degradation in the saturated zone CA 7.2.3	1. For laboratory studies refer to criteria under laboratory route and rate 2. Field site(s) must be geoclimatically relevant for the EU 3. Adequate site characterisation data available e.g. soils, geology, hydrology 4. Installation of samplers e.g. wells, lysimeters follows recommended protocols 5. Analytical method well described, LOD/LOQ at appropriate level 6. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. for unlabelled studies are suitable blank controls included
Route and rate of degradation in air CA 7.3.1	1. Experimental conditions or calculations differ significantly from recommended protocols 2. Analytical method well described, LOD/LOQ at appropriate level 3. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. for unlabelled studies are suitable blank controls included

Monitoring CA 7.5	1. Site(s) or areas must be geoclimatically relevant for the EU 2. Adequate site characterisation data available e.g. soils, geology, hydrology 3. Installation of samplers e.g. wells, lysimeters follows recommended protocols OR adequate description of wells is available (depth of well, length of screen, depth of screen opening, depth of groundwater) 4. Appropriate sampling methodology. 5. Analytical method well described, LOD/LOQ at appropriate level 6. Analytical method appears robust with suitable reproducibility and supports the conclusions made e.g. suitable blank controls included 7. For surface water: description of sampling methodology and handling of detects (peaks, interpolated time-step?), linked to rainfall intensity and volume). Discharge volumes, catchment drained area.

* Recommended protocols under each data point include but are not limited to those listed in the Commission Communications 2013/C 95/01 and 2013/C 95/02

CA 9.5 Search methods

Date of initial search	19 January 2015
Date of most recent update to search	27 April 2015
Date of 'clothianidin' term search	27 April 2015
Date span of the search	10 years

Table 9.5-1: Detailed Search Parameters for Fate and behaviour in the environment (CA 7.1 to 7.12)

Search Strategy
L1 QUE (153719-23-4 OR (A(W)97565N) OR A97565N OR A9765N)
L2 QUE (ACTARA(W)(25WG OR (25(W)WG) OR 2GR OR (2(W)GR)))
L3 QUE ((A(W)9765N) OR (ADAGE(W)(5FS OR (5(W)FS))) OR TIAMETHOXAM?)
L4 QUE (THIAMETHOXAM? OR CGA293343 OR (CGA(W)293343) OR DIACLODEN?)
L5 QUE ((CRUISER(W)(350FS OR (350(W)FS) OR 5FS OR (5(W)FS))))
L6 QUE ((CRUISER(W)(A9765 OR (A(W)9765))) OR THIAMETOXAM?)
L7 QUE ((ACTARA OR CRUISER OR FLAGSHIP OR ADAGE)(10A)INSECTICID?)
L8 QUE L1-7 THIAMETHOXAM
L9 QUE (135018-15-4 OR 153719-38-1 OR 120740-08-1 OR 131748-59-9)
L10 QUE (915125-06-3 OR 634192-72-6 OR 902493-06-5 OR 902493-08-7)
L11 QUE (4245-76-5 OR 868542-26-1 OR 635283-91-9 OR 939773-18-9)
L12 QUE (CGA265307 OR CGA282149 OR CGA309335 OR CGA322704)
L13 QUE (CGA(W)(265307 OR 282149 OR 309335 OR 322704))
L14 QUE (CGA353042 OR CGA353968 OR CGA355190 OR NOA404617)
L15 QUE ((CGA(W)(353042 OR 353968 OR 355190)) OR (NOA(W)404617))
L16 QUE (NOA405217 OR NOA407475 OR NOA421275 OR NOA459602)
L17 QUE (NOA(W)(405217 OR 407475 OR 421275 OR 459602))
L18 QUE (SYN501406 OR (SYN(W)501406))
L19 QUE (N(2W)2(W)CHLOROTHIAZOL(W)5(W)YL(W)METHYL(2W)N(2W) METHYLGUANIDINE?)
L20 QUE (3(W)METHYL(W)4(W)NITROIMINO(W)TETRAHYDRO(W)1(W)3(W)5(W) OXADIAZINE)
L21 QUE (2(W)CHLORO(W)5(W)THIAZOLYL(2W)METHYLAMINE)
L22 QUE (2(W)CHLORO(W)5(2W)AMINOMETHYL(W)THIAZOLE)
L23 QUE (2(W)CHLORO(W)5(W)THIAZOLEMETHANAMINE)
L24 QUE (2(W)CHLORO(W)5(W)THIAZOLEMETHYLAMINE)
L25 QUE (5(2W)AMINOMETHYL(2W)2(W)CHLOROTHIAZOLE)
L26 QUE (150221-74-2 OR (1(W)METHYL(W)3(W)NITROGUANIDINE))
L27 QUE (N(W)METHYL(W)N(2W)NITROGUANIDINE)

Search Strategy

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L28     QUE  ((N(W)METHYL(W)N(2W)NITRO)(2A)GUANIDINE)
L29     QUE  (5(2W)5(W)METHYL(W)4(W)NITROIMINO(2W)1(W)3(W)5(W)OXADIAZINAN)
L30     QUE  (L29(W)3(W)YLMETHYL(W)THIAZOLE(W)2(W)SULFONATE)
L31     QUE  (5(2W)N(2W)METHYL(W)N(3W)NITRO(W)GUANIDINOMETHYL)
L32     QUE  (L31(2W)THIAZOLE(W)2(W)SULFONATE)
L33     QUE  (L9-L28 OR L30 OR L32)  THIAMETHOXAM METABOLITES
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Plus

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L1      QUE  (210880-92-5 OR CLOTHIANIDIN? OR 205510-53-8 OR (TITAN(W)ST))
L2      QUE  (CLUTCH OR DANTOP OR DANTOTSU OR PONCHO OR ARENA)
L3      QUE  (L2(10A)(INSECTICID? OR NEONICOTIN?))
L4      QUE  (PONCHO(W)(250 OR 600)) OR (TAKELOC(W)(CLMN OR MC OR MC50#))
L5      QUE  (DANTOTSU(W)(16WSG OR (16(W)WSG)))
L6      QUE  (L1 OR L3-5)
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Plus

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L1      QUE  (FATE# OR DEGRAD? OR PERSIST? OR DECOMP? OR DECAY?)
L2      QUE  (TRANSFORM? OR DETERIORAT? OR METAB? OR DEGENERAT?)
L3      QUE  (BIODEGRAD? OR BIOTRANSFORM? OR BIODETERIORAT?)
L4      QUE  (BIODEGENERAT? OR BREAKDOWN? OR BREAKSDOWN?)
L5      QUE  (((BROKEN? OR BREAK?)(W)(UP OR DOWN)) OR HALFLIFE#)
L6      QUE  (HALFLIVES OR HALF(W)(LIFE OR LIVES) OR DEGRDN# OR DECOMPN#)
L7      QUE  (BIODEGRDN# OR DEGN# OR BIODEGN# OR DISSIP? OR RESIDUE?)
L8      QUE  (LEACH? OR TRANSPORT? OR MOBIL? OR MOVEMENT? OR HYDROLY?)
L9      QUE  (ADSORP? OR ADSORB? OR SORP? OR SORB? OR DESORP?)
L10     QUE  (DESORB? OR RUNOFF OR (RUN#(W)OFF) OR DRAIN? OR PERCOLAT?)
L11     QUE  (WASHOFF? OR WASHOUT? OR (WASH?(W)(OUT OR OFF)))
L12     QUE  ((((OFF(W)TARGET) OR LATERAL OR HORIZONTAL)(3W)MOVE?))
L13     QUE  (PHOTOLY? OR PHOTODEGRAD? OR PHOTODECOMP?)
L14     QUE  (PHOTOTRANSFORM? OR PHOTOSTAB? OR PHOTODEGRDN# OR PHOTODEGN#)
L15     QUE  ((PHOTO(W)(DECOMP? OR DEGRAD? OR TRANSFORM? OR STAB? OR
             CHEM?)))
L16     QUE  (PHOTOCHEM? OR VOLATIL? OR VAPOUR? OR VAPOR? OR DT50 OR DT90)
L17     QUE  ((DT(W)50) OR (DT(W)90) OR KDOC OR (K(W)DOC) OR KD OR KOC)
L18     QUE  ((K(W)OC) OR (PARTITION?(3W)COEFF?) OR FREUNDLICH)
L19     QUE  (SEDIMENT? OR SOIL OR SOILS OR PODZOL? OR CLAY? OR SAND?)
L20     QUE  (SILT? OR CHERNOZEM? OR PODSOL? OR LOAM? OR PEAT?)
L21     QUE  ((ORGANIC(2W)MATTER?) OR MONTMORIL? OR LATOSOL? OR HUMIC?)
L22     QUE  (HUMUS? OR SUBSOIL? OR AIR OR WATER? OR ATMOSPHER?)
L23     QUE  (RAIN### OR RAINWATER? OR RAINFALL? OR LEACH?)
L24     QUE  (GROUNDWATER? OR ENVIRONMENT? OR PRECIPITAT? OR POND#)
L25     QUE  (STREAM# OR RIVER# OR DELTA# OR ESTUAR? OR SEDIMENT?)
L26     QUE  (AQUATIC? OR MARINE? OR TIDAL? OR BENTHIC? OR LAKE#)
L27     QUE  (BENTHOS? OR LIMNO? OR FRESHWATER? OR SEAWATER?)
L28     QUE  (SALTWATER? OR ((GROUND? OR FRESH OR SEA OR SALT)(W)WATER?))
L29     QUE  (LACUSTRINE? OR MIRE OR MIRES OR RESERVOIR# OR CANAL#)
L30     QUE  (LOCH# OR SEA OR OCEAN OR OCEANS OR LAGOON? OR SEAS)
L31     QUE  (SEABED OR SEAFLOOR OR INTERTIDAL? OR SHORE? OR COAST?)
L32     QUE  (BRACKISH OR LITTORAL? OR SEASHORE? OR MEIOBENTH?)
L33     QUE  (MICROBENTH? OR MACROBENTH? OR HARBOUR# OR FLUVIAL?)
L34     QUE  (MARSH? OR BOG OR BOGS OR SWAMP? OR FEN OR FENS OR ALLUVI?)
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Search Strategy	
L35	QUE (MUDFLAT? OR (MUD(W)FLAT?) OR BAY OR BAYS OR CREEK#)
L36	QUE (HYDROSOIL# OR (HYDRO(W)SOIL#) OR MESOCOSM? OR MICROCOSM?)
L37	QUE (WETLAND? OR FENLAND? OR ((WET OR FEN)(W)LAND?))
L38	QUE (WATERWAY? OR WATERSHED? OR (WATER(W)(WAY? OR SHED?)))
L39	QUE (CATCHMENT? OR DITCH? OR DRAIN# OR DRAINAG?)
L40	QUE (((FOLIAGE OR FOLIAR OR LEAF OR LEAVES)(5A)EVAPORAT?))
L41	QUE ((SPRAY? OR DUST?)(3A)DRIFT)
L42	QUE (L1 OR L2 OR L3 OR L4 OR L5 OR L6 OR L7 OR L8 OR L9 OR L10 OR L11 OR L12 OR L13 OR L14 OR L15 OR L16 OR L17 OR L18 OR L19 OR L20 OR L21 OR L22 OR L23 OR L24 OR L25 OR L26 OR L27 OR L28 OR L29 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41)

Table 9.5-2: Details of databases searched and justification for selection as well as number of hits per database

Pro-vider	Database	Justification	Limits applied	Number*			
				Thiamethoxam initial search	Thiamethoxam top-up search	Clothianidin search	Total
Host STN	MEDLINE	Contains information on every area of medicine providing comprehensive coverage from 1948 to present. Sources include journals and chapters in books or symposia. The database is updated 5 times each week with an annual reload and therefore stays very current in its cover.	10 years	249	9	133	391
	EMBASE	The database, covers worldwide literature in the biomedical and pharmaceutical fields, including biological science, biochemistry, human medicine, forensic science, pediatrics, pharmacy, pharmacology and drug therapy, pharmacoeconomics, psychiatry, public health, biomedical engineering and instrumentation, and environmental science. Sources include more than 4,000 journals from approximately 70 countries, monographs, conference proceedings, dissertations, and reports. The databases covers data from 1974-present and is updated daily.		56	4	30	90
	EMBAL	The database provides early access to bibliographic data and the abstracts for references that will appear in EMBASE. Bibliographic information for references is available in EMBAL for the latest 8 weeks of EMBASE data. The database covers the worldwide literature on the biomedical and pharmaceutical fields. Bibliographic information, abstracts, and author keywords are searchable. Sources include over 4,000 journals. The database covers current data and is updated daily.		1	0	1	2
	ESBIOBASE	A database providing comprehensive coverage of the entire spectrum of biological research worldwide. Coverage includes the following areas: applied microbiology, biotechnology, cancer research, cell & developmental biology, clinical chemistry, ecological & environmental sciences, endocrinology, genetics, immunology, infectious diseases, metabolism, molecular biology, neuroscience, plant and crop science, protein biochemistry, and toxicology. Records are selected from over 1,700 international scientific journals, books, and conference proceedings. The database covers the period 1994 - present and is updated weekly.		29	1	12	42
	AGRICOLA	A bibliographic database containing selected worldwide literature of agriculture and related fields. Coverage of the database includes agricultural economics and rural sociology, agricultural production, animal sciences, chemistry, entomology, food and human nutrition, forestry, natural resources, pesticides, plant science, soils and fertilizers, and water resources. Also covered are related areas such as biology and biotechnology, botany, ecology, and natural history. The database draws on bibliographies, serial articles, book chapters, monographs, computer files, serials, maps, audiovisuals, and reports. It covers the period 1970-present and is updated monthly.		17	0	9	36

Pro-vider	Database	Justification	Limits applied	Number*			
				Thiamethoxam initial search	Thiamethoxam top-up search	Clothianidin search	Total
STN	BIOSIS	A large and comprehensive worldwide life science database covers original research reports, reviews, and selected U.S. patents in biological and biomedical areas, with subject coverage ranging from aerospace biology to zoology. Sources include periodicals, journals, conference proceedings, reviews, reports, patents, and short communications. Nearly 6,000 life source journals, 1,500 international meetings as well as review articles, books, and monographs are reviewed for inclusion. It covers the period 1926 – present and is updated weekly.	10 years	89	16	51	156
	CABA	Covers worldwide literature from all areas of agriculture and related sciences including biotechnology, forestry, and veterinary medicine. Sources include journals, books, reports, published theses, conference proceedings, and patents. It covers the period 1973-present and is updated weekly.		515	27	198	740
	CAPLUS	Covers worldwide literature from all areas of chemistry, biochemistry, chemical engineering, and related sciences including applied, macromolecular, organic, physical, inorganic, and analytical chemistry. Current sources include over 8,000 journals, patents, technical reports, books, conference proceedings, dissertations, product reviews, bibliographic items, book reviews, and meeting abstracts. Electronic-only journals and Web preprints are also covered. Cited references are included for journals, conference proceedings and basic patents from the U.S., EPO, WIPO, and German patent offices added to the CAS databases from 1999 to the present. Also provides early access to the bibliographic information, abstracts and CAS Registry Numbers for documents in the process of being indexed by CAS. Covers the period 1907 – present and is updated daily		681	32	364	1077
	FSTA	The database provides worldwide coverage of all scientific and technological aspects of the processing and manufacture of human food products including basic food sciences, biotechnology, hygiene and toxicology, engineering, packaging, and all individual foods and food products. Sources include more than 2,200 journals, books, reviews, conference proceedings, patents, standards, and legislation. It covers the period 1969 – present and is updated weekly.		8	0	8	16
	FROSTI	The database contains citations to the worldwide literature on food science and technology including food and beverages, analytical methods, quality control, manufacturing, microbiology, food processing, health and nutrition, recipes, and additives. Sources include approximately 800 scientific and technical journals, bulletins, technical reports, conference proceedings, grey literature, and British, European (EP), U.S., Japanese, and international (PCT) patent applications. Covers the period 1972 – present and is updated twice weekly.		2	0	0	2

Pro-vider	Database	Justification	Limits applied	Number*			
				Thiamethoxam initial search	Thiamethoxam top-up search	Clothianidin search	Total
STN	GEOREF	Covers international literature on geology and geosciences. Sources include the Bibliography of North American Geology, Bibliography and Index of Geology Exclusive of North America, Geophysical Abstracts, Bibliography of Fossil Vertebrates, selected records from Geoline and from geology sections of PASCAL and state and national geological surveys. Covers the period 1669 – present and is updated twice a month.	10 years	1	1	1	3
	TOXCENTER	Covers the pharmacological, biochemical, physiological, and toxicological effects of drugs and other chemicals. It is composed of the following subfiles: BIOSIS, CAplus, IPA and MEDLINE and sources include abstracts, books and book chapters, bulletins, conference proceedings, journal articles, letters, meetings, monographs, notes, papers, patents, presentations, research and project summaries, reviews, technical reports, theses, translations, unpublished material, web reprints. Covers the period 1907 – present and is updated weekly		0	0	0	0
	PQSCITECH	Is a huge resource in all areas of science and technology from engineering to lifescience. The file is a merge of 25 STN databases formerly known as CSA databases (Cambridge Scientific Abstracts): AEROSPACE, ALUMINIUM, ANTE, AQUALINE, AQUASCI, BIOENG, CERAB, CIVILENG, COMPUAB, CONFSCI, COPPERLIT, CORROSION, ELCOM, EMA, ENVIROENG, HEALSAFE, LIFESCI, LISA, MATBUS, MECHENG, METADEX, OCEAN, POLLUAB, SOLIDSTATE, and WATER. Sources are journals, patents, books, reports, and conference proceedings spanning the period 1962 – present and it is updated monthly.		34	5	15	54
	PASCAL	The database provides access to the world's scientific and technical literature including physics and chemistry, life sciences (biology, medicine, and psychology), applied sciences and technology, earth sciences, and information sciences. French and European literature is particularly well represented. Approximately 5,000 journal titles are indexed. References to theses and to conference proceedings are also included. Spans the period 1977 to present and is updated weekly		11	0	6	17
	SCISEARCH	Is an international index to the literature covering virtually every subject area within the broad fields of science, technology, and biomedicine. SciSearch contains all the records published in Science Citation Index Expanded™ and additional records from the Current Contents series of publications. Bibliographic information and cited references from over 5,600 scientific, technical, and medical journals are contained in the database. Spans the period 1974 to present and is updated weekly.		60	7	30	97
	ANABST	Covers worldwide literature on analytical chemistry. The ANABSTR file contains bibliographic records with abstracts (since 1984) for documents reported in printed Analytical Abstracts. Sources for ANABSTR include journals, books, conference proceedings, reports, and standards. Spans the period 1980 to present and is updated weekly.		1	0	1	2

* Total number of summary records retrieved after removing duplicates

Table 9.5-3: Detailed Search Parameters for Web searches

Website name and service publisher	URL	Justification	Search terms	Limits applied	Number*
A web search has not been conducted as the database search reported above is considered to provide an adequately comprehensive search of the quality peer reviewed literature.					

* Total number of summary records or full-text documents retrieved after removing duplicates

Table 9.5-4: Detailed Search Parameters for Journal Table of Contents

Journal name	Journal URL or publisher	Dates, volumes and issues searched	Method of searching	Search terms	Number*
A search for journal table of contents has not been conducted as the database search reported above is considered to provide an adequately comprehensive search of the quality peer reviewed literature.					

* Total number of summary records or full-text documents retrieved after removing duplicates

Table 9.5-5: Detailed Search Parameters for Reference Lists

Bibliographic details of documents whose reference lists were scanned	Number*
A search for reference lists has not been conducted as the database search reported above is considered to provide an adequately comprehensive search of the quality peer reviewed literature.	

* Total number of summary records or full-text documents retrieved after removing duplicates

CA 9.6 Results

Table 9.6-1: Results of study selection process

Data requirement(s) captured in the search	Substance	Number (Initial Search)	Number (Top-Up Search)
Total number of *summary records* retrieved after *all* [A)] searches of peer-reviewed literature (excluding duplicates)	Thiamethoxam	1644	87 [D)]
	Clothianidin [C)]	329 [D)]	
Number of *summary records* excluded from the search results after rapid assessment for relevance [B)]	Thiamethoxam	1621	85
	Clothianidin	326	
Total number of *full-text* documents assessed in detail [A)]	Thiamethoxam	23	2
	Clothianidin	3	
Number of *studies* excluded from further consideration after detailed assessment for relevance	Thiamethoxam	22	2
	Clothianidin	3	
Number of *studies* not excluded for relevance after detailed assessment (i.e. relevant studies and studies of unclear relevance)	Thiamethoxam	1	0
	Clothianidin	0	

[A)] Both from bibliographic databases and other sources of peer-reviewed literature
[B)] aligned with EFSA Journal 2011; 9(2):2092: rapid assessment means exclusion of "obviously irrelevant records" based on titles.
[C)] The search for clothianidin was done shortly before submission. Therefore, there is no distinction between initial and top-up search.
[D)] Hits which were already included in a previous search step (i.e. both thiamethoxam searches for clothianidin, initial thiamethoxam search for the thiamethoxam top-up search) were treated as duplicates and excluded.

The references that were assessed in detail are summarised below:

Table 9.6-2: List of references for all relevant and unclear studies listed by data point number

CA data point number	Author(s)	Year	Title	Source
Initial search – thiamethoxam				
7.1.1.3	Gupta S., Gajbhiye V.T., Gupta R.K.	2008	Effect of light on the degradation of two neonicotinoids viz acetamiprid and thiacloprid in soil	Bulletin of environmental contamination and toxicology, Vol. 81, No. 2, pp. 185-189
7.1.1.3	Suman G., Gajbhiye V.T., Gupta R.K., Gupta S.	2006	Effect of ultraviolet and sunlight on persistence of thiamethoxam in soil.	Pesticide Research Journal, Vol. 18, No. 2, pp. 211-214
7.1.1.3 & 7.2.1.2	Kurwadkar S.T., DeWinne D., White P., Mitchell F.	2014	Modeling photo-degradation kinetics of three systemic neonicotinoid insecticides in aqueous and soil environment	Abstracts of Papers, 247th ACS National Meeting & Exposition, Dallas, TX, USA
7.1.2.1	Saran R.K., Kamble S.T.	2008	Concentration-dependent degradation of three termiticides in soil under laboratory conditions and their bioavailability to eastern subterranean termites (Isoptera : Rhinotermitidae)	Journal of economic entomology, Vol. 101, No. 4, pp. 1373-1383
7.1.2.1 & 7.1.4.1	Gupta S., Gajbhiye V.T., Gupta R.K.	2008	Soil dissipation and leaching behavior of a neonicotinoid insecticide thiamethoxam.	Bulletin of environmental contamination and toxicology, Vol. 80, No. 5, pp. 431-7
7.1.2.2.1	Kumar N., Srivastava A., Chauhan S.S., Srivastava P.C.	2014	Studies on dissipation of thiamethoxam insecticide in two different soils and its residue in potato crop.	Plant, Soil and Environment, Vol. 60, No. 7, pp. 332-335

CA data point number	Author(s)	Year	Title	Source
7.1.2.2.1	Abd-Alrahman S.H.	2014	Residue and dissipation kinetics of thiamethoxam in a vegetable-field ecosystem using QuEChERS methodology combined with HPLC-DAD.	Food chemistry, **Vol. 159, pp. 1-4**
7.1.2.2.1	Wang X., Xiang Z., Yan X., Sun H., Li Y., Pan C.	2013	Dissipation rate and residual fate of thiamethoxam in tobacco leaves and soil exposed to field treatments.	Bulletin of environmental contamination and toxicology, Vol. 91, No. 2, pp. 246-50
7.1.3.2	Kurwadkar S.T., Dewinne D., Wheat R., McGahan D.G., Mitchell F.L.	2013	Time dependent sorption behavior of dinotefuran, imidacloprid and thiamethoxam.	Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 48, No. 4, pp. 237-42
7.1.4.1	Kurwadkar S., Wheat R., McGahan D.G., Mitchell F.	2014	Evaluation of leaching potential of three systemic neonicotinoid insecticides in vineyard soil.	Journal of contaminant hydrology, Vol. 170, pp. 86-94
7.1.4.2	Huseth A.S., Groves R.L.	2014	Environmental fate of soil applied neonicotinoid insecticides in an irrigated potato agroecosystem.	PloS one, Vol. 9, No. 5, pp. e97081
7.2.1.1	Guzsvany V., Csanadi J., Gaal F.	2006	NMR study of the influence of pH on the persistence of some neonicotinoids in water	Acta Chimica Slovenica , 53 (1), 52-57
7.2.1.1	Karmakar R., Singh S.B., Kulshrestha G.	2009	Kinetics and mechanism of the hydrolysis of thiamethoxam.	Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 44, No. 5, pp. 435-41
7.2.1.1	Liquing Z., Guoguang L., Dezhi S., Kun Y.	2006	Hydrolysis of thiamethoxam.	Bulletin of environmental contamination and toxicology, Vol. 76, No. 6, pp. 942-9
7.2.1.2	de Urzedo A.P.F.M., Diniz M.E.R., Narcentes C.C., Catharino R.R., Eberlin M.N., Augusti R.	2007	Photolytic degradation of the insecticide thiamethoxam in aqueous medium monitored by direct infusion electrospray ionization mass spectrometry.	Journal of mass spectrometry : JMS, Vol. 42, No. 10, pp. 1319-25
7.5	Anderson T.A., Salice C.J., Erickson R.A., McMurry S.T., Cox S.B., Smith L.M.	2013	Effects of landuse and precipitation on pesticides and water quality in playa lakes of the southern high plains.	Chemosphere, Vol. 92, No. 1 pp. 84-90
7.5	Hladik M.L., Calhoun D.L., Smalling K.L., Kuivila K.M., Kolpin D.W.	2013	Occurrence of neonicotinoid insecticides in water in two US regions	Abstracts of Papers, 246th ACS National Meeting & Exposition, Indianapolis, USA
7.5	Hladik M.L., Kolpin D.W., Kuivila K.M.	2014	Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA.	Environmental pollution, Vol. 193, pp. 189-96
7.5	Jones A., Harrington P., Turnbull G.	2014	Neonicotinoid concentrations in arable soils after seed treatment applications in preceding years.	Pest management science, Vol. 70, No. 12, pp. 1780-4
7.5	Main A.R., Headley J.V., Peru K.M., Michel N.L., Cessna A.J., Morrissey C.A.	2014	Widespread use and frequent detection of neonicotinoid insecticides in wetlands of Canada's Prairie Pothole Region [Erratum to document cited in CA161:497663]	PLoS One, 9 (6), e101400/1, 1 pp.
7.5	Main A.R.; Michel N.L.; Morrissey C.A., Headley J.V.; Peru K.M., Cessna A.J.	2014	Widespread use and frequent detection of neonicotinoid insecticides in wetlands of Canada's Prairie Pothole Region.	PLoS One, 9, No. 3, pp. e92821
7.5	Munz N., Leu C., Wittmer I.	2013	Pesticide measurements in watercourses	Aqua & Gas, 92 (11), 32-41
Un-specific	Fantke P., Gillespie B.W., Juraske R., Jolliet O.	2014	Estimating Half-Lives for Pesticide Dissipation from Plants	Environmental Science & Technology, 48 (15), 8588-8602

CA data point number	Author(s)	Year	Title	Source
Top-Up search - thiamethoxam				
7.1.2.2	Hilton M.J., Jarvis T.D., Ricketts D.C.	2015	The degradation rate of thiamethoxam in European field studies.	Pest management science
7.5	Hladik M.L., Kolpin D.W., Kuivila K.M.	2014	Neonicotinoid insecticide occurrence in agricultural and urban streams.	Abstracts of Papers American Chemical Society, (AUG 10 2014) Vol. 248, pp. 492-AGRO
Complete search - clothianidin				
7.1.3.1	Mulligan R.A., Parikh S J., Tjeerdema R.S.	2014	Abiotic partitioning of clothianidin under simulated rice field conditions.	Pest management science
7.5	de Perre C., Murphy T.M., Lydy M.J.	2015	Fate and effects of clothianidin in fields using conservation practices.	Environmental toxicology and chemistry / SETAC, Vol. 34, No. 2, pp. 258-65
Un-specific	de Perre, C., Lydy M.J.	2013	Seed-coated clothianidin fate in corn and soybean fields using conservation tillage.	Abstracts of Papers American Chemical Society, (SEP 8 2013) Vol. 246, pp. 75-AGRO

Table 9.6-3: List of references for all relevant and unclear studies listed by Author

CA data point number	Author(s)	Year	Title	Source
Initial search - thiamethoxam				
7.1.2.2.1	Abd-Alrahman S.H.	2014	Residue and dissipation kinetics of thiamethoxam in a vegetable-field ecosystem using QuEChERS methodology combined with HPLC-DAD.	Food chemistry, Vol. 159, pp. 1-4
7.5	Anderson T.A., Salice C.J., Erickson R.A., McMurry S.T., Cox S.B., Smith L.M.	2013	Effects of landuse and precipitation on pesticides and water quality in playa lakes of the southern high plains.	Chemosphere, Vol. 92, No. 1 pp. 84-90
7.2.1.2	de Urzedo A.P.F.M., Diniz M.E.R., Narcentes C.C., Catharino R.R., Eberlin M.N., Augusti R.	2007	Photolytic degradation of the insecticide thiamethoxam in aqueous medium monitored by direct infusion electrospray ionization mass spectrometry.	Journal of mass spectrometry : JMS, Vol. 42, No. 10, pp. 1319-25
Un-specific	Fantke P., Gillespie B.W., Juraske R., Jolliet O.	2014	Estimating Half-Lives for Pesticide Dissipation from Plants	Environmental Science & Technology, 48 (15), 8588-8602
7.1.1.3	Gupta S., Gajbhiye V.T., Gupta R.K.	2008	Effect of light on the degradation of two neonicotinoids viz acetamiprid and thiacloprid in soil	Bulletin of environmental contamination and toxicology, Vol. 81, No. 2, pp. 185-189
7.1.2.1 & 7.1.4.1	Gupta S., Gajbhiye V.T., Gupta R.K.	2008	Soil dissipation and leaching behavior of a neonicotinoid insecticide thiamethoxam.	Bulletin of environmental contamination and toxicology, Vol. 80, No. 5, pp. 431-7
7.2.1.1	Guzsvany V., Csanadi J., Gaal F.	2006	NMR study of the influence of pH on the persistence of some neonicotinoids in water	Acta Chimica Slovenica , 53 (1), 52-57
7.5	Hladik M.L., Calhoun D.L., Smalling K.L., Kuivila K.M., Kolpin D.W.	2013	Occurrence of neonicotinoid insecticides in water in two US regions	Abstracts of Papers, 246th ACS National Meeting & Exposition, Indianapolis, USA
7.5	Hladik M.L., Kolpin D.W., Kuivila K.M.	2014	Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA.	Environmental pollution, Vol. 193, pp. 189-96
7.1.4.2	Huseth A.S., Groves R.L.	2014	Environmental fate of soil applied neonicotinoid insecticides in an irrigated potato agroecosystem.	PloS one, Vol. 9, No. 5, pp. e97081

CA data point number	Author(s)	Year	Title	Source
7.5	Jones A., Harrington P., Turnbull G.	2014	Neonicotinoid concentrations in arable soils after seed treatment applications in preceding years.	Pest management science, Vol. 70, No. 12, pp. 1780-4
7.2.1.1	Karmakar R., Singh S.B., Kulshrestha G.	2009	Kinetics and mechanism of the hydrolysis of thiamethoxam.	Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 44, No. 5, pp. 435-41
7.1.2.2.1	Kumar N., Srivastava A., Chauhan S.S., Srivastava P.C.	2014	Studies on dissipation of thiamethoxam insecticide in two different soils and its residue in potato crop.	Plant, Soil and Environment, Vol. 60, No. 7, pp. 332-335
7.1.3.2	Kurwadkar S.T., Dewinne D., Wheat R., McGahan D.G., Mitchell F.L.	2013	Time dependent sorption behavior of dinotefuran, imidacloprid and thiamethoxam.	Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 48, No. 4, pp. 237-42
7.1.1.3 & 7.2.1.2	Kurwadkar S.T., DeWinne D., White P., Mitchell F.	2014	Modeling photo-degradation kinetics of three systemic neonicotinoid insecticides in aqueous and soil environment	Abstracts of Papers, 247th ACS National Meeting & Exposition, Dallas, TX, USA
7.1.4.1	Kurwadkar S., Wheat R., McGahan D.G., Mitchell F.	2014	Evaluation of leaching potential of three systemic neonicotinoid insecticides in vineyard soil.	Journal of contaminant hydrology, Vol. 170, pp. 86-94
7.2.1.1	Liquing Z., Guoguang L., Dezhi S., Kun Y.	2006	Hydrolysis of thiamethoxam.	Bulletin of environmental contamination and toxicology, Vol. 76, No. 6, pp. 942-9
7.5	Main A.R., Headley J.V., Peru K.M., Michel N.L., Cessna A.J., Morrissey C.A.	2014	Widespread use and frequent detection of neonicotinoid insecticides in wetlands of Canada's Prairie Pothole Region [Erratum to document cited in CA161:497663]	PLoS One, 9 (6), e101400/1, 1 pp.
7.5	Main A.R.; Michel N.L.; Morrissey C.A., Headley J.V.; Peru K.M., Cessna A.J.	2014	Widespread use and frequent detection of neonicotinoid insecticides in wetlands of Canada's Prairie Pothole Region.	PLoS One, 9, No. 3, pp. e92821
7.5	Munz N., Leu C., Wittmer I.	2013	Pesticide measurements in watercourses	Aqua & Gas, 92 (11), 32-41
7.1.2.1	Saran R.K., Kamble S.T.	2008	Concentration-dependent degradation of three termiticides in soil under laboratory conditions and their bioavailability to eastern subterranean termites (Isoptera : Rhinotermitidae)	Journal of economic entomology, Vol. 101, No. 4, pp. 1373-1383
7.1.1.3	Suman G., Gajbhiye V.T., Gupta R.K., Gupta S.	2006	Effect of ultraviolet and sunlight on persistence of thiamethoxam in soil.	Pesticide Research Journal, Vol. 18, No. 2, pp. 211-214
7.1.2.2.1	Wang X., Xiang Z., Yan X., Sun H., Li Y., Pan C.	2013	Dissipation rate and residual fate of thiamethoxam in tobacco leaves and soil exposed to field treatments.	Bulletin of environmental contamination and toxicology, Vol. 91, No. 2, pp. 246-50

CA data point number	Author(s)	Year	Title	Source
Top-Up search - thiamethoxam				
7.1.2.2	Hilton M.J., Jarvis T.D., Ricketts D.C.	2015	The degradation rate of thiamethoxam in European field studies.	Pest management science
7.5	Hladik M.L., Kolpin D.W., Kuivila K.M.	2014	Neonicotinoid insecticide occurrence in agricultural and urban streams.	Abstracts of Papers American Chemical Society, (AUG 10 2014) Vol. 248, pp. 492-AGRO
Complete search - clothianidin				
7.5	de Perre C., Murphy T.M., Lydy M.J.	2015	Fate and effects of clothianidin in fields using conservation practices.	Environmental toxicology and chemistry / SETAC, Vol. 34, No. 2, pp. 258-65
Un-specific	de Perre, C., Lydy M.J.	2013	Seed-coated clothianidin fate in corn and soybean fields using conservation tillage.	Abstracts of Papers American Chemical Society, (SEP 8 2013) Vol. 246, pp. 75-AGRO
7.1.3.1	Mulligan R.A., Parikh S J., Tjeerdema R.S.	2014	Abiotic partitioning of clothianidin under simulated rice field conditions.	Pest management science

A detailed review of the full-text of documents identified in Table 9.6-2 resulted in the additional exclusion of the following studies from the dossier.

Table 9.6-4: List of references excluded following detailed review listed by data point number

CA data point number	Author(s)	Year	Title	Source	Reason(s) for not including the study in the dossier
Initial search - thiamethoxam					
7.1.1.1	Kumar N., Srivastava A., Chauhan S.S., Srivastava P.C.	2014	Studies on dissipation of thiamethoxam insecticide in two different soils and its residue in potato crop.	Plant, Soil and Environment, Vol. 60, No. 7, pp. 332-335	The study examines the degradation behaviour of thiamethoxam in the laboratory in two soils. The study was done with soil samples from India (regions of Pantnagar), i.e. they are not considered representative for EU conditions. Additionally, no degradation curves are presented.
7.1.1.3	Suman G., Gajbhiye V.T., Gupta R.K., Gupta S.	2006	Effect of ultraviolet and sunlight on persistence of thiamethoxam in soil.	Pesticide Research Journal, Vol. 18, No. 2, pp. 211-214	The study examines the degradation behaviour of thiamethoxam in soil exposed to UV light and natural sunlight during 6 hours per day. The study was done with soil samples from India (New Delhi region), i.e. they are not considered representative for EU conditions. Additionally, no details are given on light intensity and spectrum.
7.1.1.3	Gupta S., Gajbhiye V.T., Gupta R.K.	2008	Effect of light on the degradation of two neonicotinoids viz acetamiprid and thiacloprid in soil	Bulletin of environmental contamination and toxicology, Vol. 81, No. 2, pp. 185-189	The study examines the degradation behaviour or thiamethoxam under natural light and UV light in laboratory. Soil samples were taken in India (New Delhi region), i.e. they are not considered representative for EU conditions. No dark control samples included. No information on light source and intensity provided.

CA data point number	Author(s)	Year	Title	Source	Reason(s) for not including the study in the dossier
7.1.1.3 & 7.2.1.2	Kurwadkar S.T., DeWinne D., White P., Mitchell F.	2014	Modeling photo-degradation kinetics of three systemic neonicotinoid insecticides in aqueous and soil environment	Abstracts of Papers, 247th ACS National Meeting & Exposition, Dallas, TX, USA	Abstract of a conference only - full text is not available. Therefore, the reference is considered not relevant.
7.1.2.1	Saran R.K., Kamble S.T.	2008	Concentration-dependent degradation of three termiticides in soil under laboratory conditions and their bioavailability to eastern subterranean termites (Isoptera : Rhinotermitidae)	Journal of economic entomology, Vol. 101, No. 4, pp. 1373-1383	The study does not include thiamethoxam, the term “thiamethoxam” only appears in the introduction.
7.1.2.1 & 7.1.4.1	Gupta S., Gajbhiye V.T., Gupta R.K.	2008	Soil dissipation and leaching behavior of a neonicotinoid insecticide thiamethoxam.	Bulletin of environmental contamination and toxicology, Vol. 80, No. 5, pp. 431-7	The study examines soil degradation of thiamethoxam in laboratory and leaching behaviour of thiamethoxam in column experiments. Soils samples were taken in India (New Delhi region), i.e. they are not considered representative for EU conditions. Leaching experiments were not done with undisturbed soil columns (columns were packed); additionally they were done under saturated flow conditions.
7.1.2.2.1	Abd-Alrahman S.H.	2014	Residue and dissipation kinetics of thiamethoxam in a vegetable-field ecosystem using QuEChERS methodology combined with HPLC-DAD.	Food chemistry, Vol. 159, pp. 1-4	The study describes the determination of soil half-lives of thiamethoxam from dissipation experiment in potato fields. The site is not considered representative for EU condition: The study was performed in Egypt.
7.1.2.2.1	Wang X., Xiang Z., Yan X., Sun H., Li Y., Pan C.	2013	Dissipation rate and residual fate of thiamethoxam in tobacco leaves and soil exposed to field treatments.	Bulletin of environmental contamination and toxicology, Vol. 91, No. 2, pp. 246-50	The study describes the determination of soil half-lives of thiamethoxam from dissipation experiment in tobacco fields. The sites are not considered representative for EU conditions: The study was performed in China (Qingdao and Changsha region).
7.1.3.2	Kurwadkar S.T., Dewinne D., Wheat R., McGahan D.G., Mitchell F.L.	2013	Time dependent sorption behavior of dinotefuran, imidacloprid and thiamethoxam.	Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 48, No. 4, pp. 237-42	The study describes experiments on time dependent sorption of thiamethoxam in soil samples from vineyards in Texas, USA. There is no information on the history of the sampling sites. No mass balance is provided and stability of the test item has not been demonstrated. The study is thus not considered relevant.

CA data point number	Author(s)	Year	Title	Source	Reason(s) for not including the study in the dossier
7.1.4.1	Kurwadkar S., Wheat R., McGahan D.G., Mitchell F.	2014	Evaluation of leaching potential of three systemic neonicotinoid insecticides in vineyard soil.	Journal of contaminant hydrology, Vol. 170, pp. 86-94	In the study, the leaching behaviour of thiamethoxam was examined in column experiments with disturbed soil from Texas, USA. The experiments were done under steady-state and saturated flow conditions until breakthrough of the applied substance was complete (i.e. until 100 % of applied substance had drained). This set up does not fulfil the intention of OECD 312: After initial saturation, columns should be allowed to drain (so flow becomes unsaturated), and they are irrigated only with a fixed amount of "artificial rain". The intention of the OECD is to measure how far the substance is moved in soil and which percentage of substance drained at the respective amount of "artificial rain". The study is thus not considered relevant.
7.1.4.2	Huseth A.S., Groves R.L.	2014	Environmental fate of soil applied neonicotinoid insecticides in an irrigated potato agroecosystem.	PloS one, Vol. 9, No. 5, pp. e97081	The paper describes lysimeter studies in USA (Wisconsin). The study does not meet requirements on the depth of the soil monolith (minimum 1 m) and on the duration of the sampling period (sufficient years): A tension plate lysimeter (25 x 25 x 25 cm) buried at a depth of only 75 cm below the soil surface was used. Samples were only taken during a few months per year. The study is thus not considered relevant.
7.2.1.1	Guzsvany V., Csanadi J., Gaal F.	2006	NMR study of the influence of pH on the persistence of some neonicotinoids in water	Acta Chimica Slovenica , 53 (1), 52-57	The study examines hydrolysis of thiamethoxam at different pH values. The focus of the study lies on the analytical method. Information on the degradation of experiments is very scarce: No half-lives or degradation curves (except one example) and no information on sampling dates or mass balance are provided. The study is not in line with OECD 111 and thus not considered relevant for the environmental fate section.
7.2.1.1	Liquing Z., Guoguang L., Dezhi S., Kun Y.	2006	Hydrolysis of thiamethoxam.	Bulletin of environmental contamination and toxicology, Vol. 76, No. 6, pp. 942-9	The study examines hydrolysis of thiamethoxam at different pH values and different temperatures. Information on the experiments is scarce: It is not clear whether time-zero samples were analysed. There is no information on LOD / LOQ, recovery or mass balance, and blank or control samples. The study is thus considered to be not in line with OECD 111 and thus not considered relevant for the environmental fate section.

CA data point number	Author(s)	Year	Title	Source	Reason(s) for not including the study in the dossier
7.2.1.2	de Urzedo A.P.F.M., Diniz M.E.R., Narcentes C.C., Catharino R.R., Eberlin M.N., Augusti R.	2007	Photolytic degradation of the insecticide thiamethoxam in aqueous medium monitored by direct infusion electrospray ionization mass spectrometry.	Journal of mass spectrometry : JMS, Vol. 42, No. 10, pp. 1319-25	The paper describes an aqueous photolysis study with thiamethoxam. The focus of the experiments is on the analytical method, not on the behaviour of the substance. There were only four sampling times; information on substance purity, LOD / LOQ, mass balance and dark control samples is missing; the wavelength was 254 nm, which is not in the range of 290 – 800 nm as recommended by OECD 316. The study is thus not considered relevant.
7.5	Anderson T.A., Salice C.J., Erickson R.A., McMurry S.T., Cox S.B., Smith L.M.	2013	Effects of landuse and precipitation on pesticides and water quality in playa lakes of the southern high plains.	Chemosphere, Vol. 92, No. 1 pp. 84-90	The paper presents measured concentrations of various pesticides in water and sediment in the playa wetlands (ephemeral lakes) in the Southern High Plaines, in Texas, USA during one growing season. The region and landscape type are not really typically for European conditions. Details on analytical methods (LOD / LOQ, recovery, control samples) are scarce. No information is given on application rates in the surrounding of the lakes. Therefore, this study is not considered relevant.
7.5	Hladik M.L., Calhoun D.L., Smalling K.L., Kuivila K.M., Kolpin D.W.	2013	Occurrence of neonicotinoid insecticides in water in two US regions	Abstracts of Papers, 246th ACS National Meeting & Exposition, Indianapolis, USA	Abstract of a conference only - full text is not available. Therefore, the reference is considered not relevant.
7.5	Hladik M.L., Kolpin D.W., Kuivila K.M.	2014	Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA.	Environmental pollution, Vol. 193, pp. 189-96	The paper presents concentration of neonicotinoids (including thiamethoxam and clothianidin) measured in streams in 9 basins of Iowa (USA) during 1 growing season. In 8 basins, samples were only taken at a monthly basis; only in 1 basins, samples were taken more often and also in response to runoff events. Applied amounts in the basins are unknown; therefore, measured concentrations were only set in context with the percentage of cropped area. Data on discharge and precipitation is only provided for 1 basin; for the others, measured concentrations cannot be linked to rainfall or runoff events. The paper is thus not considered relevant for the environmental fate section.

CA data point number	Author(s)	Year	Title	Source	Reason(s) for not including the study in the dossier
7.5	Jones A., Harrington P., Turnbull G.	2014	Neonicotinoid concentrations in arable soils after seed treatment applications in preceding years.	Pest management science, Vol. 70, No. 12, pp. 1780-4	The study provides are general survey on the concentration and average field half-lives of thiamethoxam and clothianidin in agricultural soil in England, on which the substances are applied. Application and sampling dates are not provided; application rates are not available for many plots. Background concentrations were not measured. Some average half-lives are provided for the active substances, but no details are available on raw data, calculation methods or individual half-lives for each soil. The study is thus not considered relevant.
7.5	Main A.R.; Michel N.L.; Morrissey C.A., Headley J.V.; Peru K.M., Cessna A.J.	2014	Widespread use and frequent detection of neonicotinoid insecticides in wetlands of Canada's Prairie Pothole Region.	PLoS One, 9, No. 3, pp. e92821	The paper presents concentration of neonicotinoids (including thiamethoxam and clothianidin) measured in water and sediment of wetlands in agricultural fields in Canada (Saskatchewan). 'Real' application rates are not available for the catchments of the wetland; only assumptions were made based on cropped area and GAP. Information on hydrology and geology and details on sampling dates are missing. There is no link between measured concentrations and rainfall events or runoff volumes, and no clear information on entry paths. The paper is thus not considered relevant for the environmental fate section.
7.5	Main A.R., Headley J.V., Peru K.M., Michel N.L., Cessna A.J., Morrissey C.A.	2014	Widespread use and frequent detection of neonicotinoid insecticides in wetlands of Canada's Prairie Pothole Region [Erratum to document cited in CA161:497663]	PLoS One, 9 (6), e101400/1, 1 pp.	This hit is only an amendment to the study above.
7.5	Munz N., Leu C., Wittmer I.	2013	Pesticide measurements in watercourses	Aqua & Gas, 92 (11), 32-41	Article could not be obtained.
Un-specific	Fantke P., Gillespie B.W., Juraske R., Jolliet O.	2014	Estimating Half-Lives for Pesticide Dissipation from Plants	Environmental Science & Technology, 48 (15), 8588-8602	The paper evaluates half-life values of a large variety of pesticides within plants. There are no soil or water half-lives and no focus on thiamethoxam. The paper is thus not considered relevant for the environmental fate section.

CA data point number	Author(s)	Year	Title	Source	Reason(s) for not including the study in the dossier
Top-Up search - thiamethoxam					
7.1.2.2	Hilton M.J., Jarvis T.D., Ricketts D.C.	2015	The degradation rate of thiamethoxam in European field studies.	Pest management science	18 field soil degradation rates in Europe under realistic agronomic conditions conducted between 1995 and 2000 according to GLP and in accordance with the regulatory requirements and guidance of the EU in place at the time they were conducted. The article summarises field studies which are already part of the safety data package generated in support of product registration in the European Community. Therefore, this article is redundant.
7.5	Hladik M.L., Kolpin D.W., Kuivila K.M.	2014	Neonicotinoid insecticide occurrence in agricultural and urban streams.	Abstracts of Papers American Chemical Society, (AUG 10 2014) Vol. 248, pp. 492-AGRO	Abstract of a conference only - full text is not available. Therefore, the reference is considered not relevant.
Complete search - clothianidin					
7.1.3.1	Mulligan R.A., Parikh S J., Tjeerdema R.S.	2014	Abiotic partitioning of clothianidin under simulated rice field conditions.	Pest management science	The paper summarises sorption studies with clothianidin and soils from Californian rice fields. The paper does not give any information on the history and storage of the soils; soils were autoclaved though only air drying is recommended by OECD 106. Additionally, information on mass balance and LOD / LOQ is missing. The study is thus not considered relevant.
7.5	de Perre C., Murphy T.M., Lydy M.J.	2015	Fate and effects of clothianidin in fields using conservation practices.	Environmental toxicology and chemistry / SETAC, Vol. 34, No. 2, pp. 258-65	The study investigated the fate of clothianidin applied every other year as a corn seed-coating at 2 different rates in an agricultural field undergoing conservation tillage. Concentrations were measured in soil, surface runoff, infiltration, and groundwater, and soil half-lives in field were determined. The study does not give any details on the study site (i.e. on soil type, hydrology, slope, meteorological conditions). Site history is unknown, and relatively high background concentrations were measured. Application rates per area are not provided. Additionally, not detailed results for measured concentrations are provided. The study is thus not considered relevant.
Un-specific	de Perre, C., Lydy M.J.	2013	Seed-coated clothianidin fate in corn and soybean fields using conservation tillage.	Abstracts of Papers American Chemical Society, (SEP 8 2013) Vol. 246, pp. 75-AGRO	Abstract of a conference only - full text is not available. Therefore, the reference is considered not relevant.

All documents listed in Table 9.6-2 and not excluded (i.e. not listed in Table 9.6-4) are given below. These documents have been summarised in the relevant Document MCA where an assessment of reliability has been conducted and the conclusions documented.

Table 9.6-5: List of references which are discussed further in MCA Section 7 (listed by data point number)

CA Data Point/ Ref Number	Authors	Year	Title	Source
CA 7.2.1.1/01	Karmakar, R., Singh, S.B., Kulshrestha, G	2009	Kinetics and mechanism of the hydrolysis of thiamethoxam	Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 44, No. 5, pp. 435-41

Detailed assessment part*

Reference	Summary	Categorisation & comments
Karmakar, R. et al. (2009). Kinetics and mechanism of the hydrolysis of thiamethoxam Journal of environmental science and health. Part. B, Pesticides, food contaminants, and agricultural wastes, Vol. 44, No. 5, pp. 435-41	The degradation of thiamethoxam [(EZ)-3-(2-chloro-1,3-thiazol-5-yl-methyl)-5-methyl-1,3,5-oxadiazinan-4-ylidene (nitro) amine] insecticide in buffers at different pH and temperature levels was investigated in laboratory studies. Acidic hydrolysis under conventional heating conditions and alkaline hydrolysis under both conventional heating and microwave conditions were carried out. Different hydrolysis products were found to form under alkaline and acidic conditions. Hydrolysis of thiamethoxam in acidic, neutral and alkaline buffers followed first-order reaction rate kinetics at pH 4, 7 and 9.2, respectively. Thiamethoxam readily hydrolysed in alkaline buffer but was comparatively stable in neutral buffer solution. The main products formed under different conditions were characterized on the basis of infrared (IR), 1H-NMR and Mass spectroscopy. No reference standards were used for independent verification of structures. The possible mechanisms for the formation of these hydrolysis products have also been proposed.	(b) Study that only supplies supplementary information that does not alter the risk assessment parameters. Thiamethoxam was stable to hydrolysis in pH 1, 5 and 7 buffer solutions at environmental relevant temperatures (20 and 25° C). Under alkaline conditions (pH 9 buffer solution), hydrolysis of thiamethoxam was rapid This literature study also showed that thiamethoxam was rapidly hydrolyzed in alkaline buffer (pH 9.2 at 28° C), but was comparatively stable in neutral and acidic buffer solutions (pH 7 and 4 at 28° C).

*This part was prepared by applicant (Syngenta Japan) in 2022 because the categorization hasn’t been conducted in EU dossier in 2015.