## ２．TTC の概念に関連する文献

TTC の概念及び暴露推定方法について収集した主要な文献を以下に記した。

### （１）容器包装関連

本調査で収集した容器包装関連の文献を表 2-2-1 に示した。

表 2-2-1　容器包装関連の主要な文献

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Safety evaluation of mechanical recycling processes used to produce polyethylene terephthalate (PET) intended for food contact applications. | Barthélémy et al. | Food Addit Contam Part A; 31(3): 490-7 | 2014 |
| Multiple testing of food contact materials: A predictive algorithm for assessing the global migration from silicone moulds | Elskens et al. | Talanta 99: 161-166 | 2012 |
| A novel safety assessment strategy for non-intentionally added substances (NIAS) in carton food contact materials. | Koster et al. | Food Addit. Contam: Part A 31(3): 22-443 | 2014 |
| Food packaging and food safety modernization act: steps to take now | NFL | The NFL White Paper Series 13 | 2014 |
| Threshold of toxicological concern approach for the risk assessment of substances used for the manufacture of plastic food contact materials. | Pinalli et al. | Trends Food Sci Technol 22, 523–534. | 2011 |
| Assessing the safety of co-exposure to food packaging migrants in food and water using the maximum cumulative ratio and an established decision tree. | Price et al. | Food Addit Contam: Part A 31(3):414-21. | 2014 |
| Application of the threshold of toxicological concern (TTC) concept to the safety assessment of chemically complex food matrices | Rennen et al. | Food Chem Toxico. 49(4): 933-40 | 2011 |
| Is PET bottle-to-bottle recycling safe? Evaluation of post-consumer recycling processes according to the EFSA guidelines | Welle | Resour Conserv Recycl 73, 41-45 | 2013 |
| Determining the Applicability of Threshold of Toxicological Concern Approaches to Substances Found in Foods | Canady et al. | Critical Reviews in Food Science and Nutrition 53: 1239–1249 | 2013 |
| Toxic Threshoud Concern. | Food Packaging Forum | Food Packaging Forum 2013 | 2013 |
| Non-intentionally added substances (NIAS) | Food Packaging Forum | Food Packaging Forum June 24 | 2014 |

### （2）TTC 関連文献

本調査で収集した TTC の概念に関連する文献を表 2-2-2 に示した。

表 2-2-2　TTC の概念に関連する主要な文献

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Application of the threshold of toxicological concern approach to ingredients in personal and household care products.. | Blackburn K et al. | Regulatory Toxicology and Pharmacology 43: 249-59 | 2005 |
| Risk assessment of peak exposure to genotoxic carcinogens.. | Bos PMJ et al. | Toxicology Letters 151, 43-50 | 2004 |
| The TTC concept. Method of assessment of contaminants of unknown toxicity in drinking water | Brüschweiler BJ | Gas-Wasser-Abwasser 4: 295-303 | 2010 |
| TTC-based risk assessment of tetrachlorobutadienes and pentachlorobutadienes – the *in vitro* genotoxic contaminants in ground and drinking water | Brüschweiler BJ | Regulatory Toxicology and Pharmacology 58: 341-4 | 2010 |
| A tiered approach to threshold of regulation | Cheeseman et al. | Food and Chemical Toxicology 37: 387-412 | 1999 |
| Estimation of Toxic Hazard - A Decision Tree Approach | Cramer et al. | Food and Cosmetics Toxicology 16(3): 255-76 | 1978 |
| Toxicity assessment strategies, data requirements, and risk assessment approaches to derive health based guidance values for nonrelevant metabolites of plant protection products | Dekant W et al. | Regulatory Toxicology and Pharmacology 56: 135-42 | 2010 |
| Evaluation of the Threshold of Toxicological Concern (TTC) – Challenges and approaches | Dewhurst and Renwick | Regulatory Toxicology and Pharmacology 65: 168-77 | 2013 |
| Mode of action and aquatic exposure thresholds of no concern | De Wolf W et al. | Environmental Toxicology and Chemistry 24: 479-85 | 2005 |
| The application of structure-based asssessment to support safety and chemistry diligence to limit genotoxic impurities in active pharmaceutical ingredients during drug development | Dobo KL et al. | Regulatory Toxicology and Pharmacology 44: 282-93 | 2006 |
| The concentration of no toxicolo gical concern (CoNTC): A risk assessment screening tool for air toxics | Drew R, Frangos J | Journal of Toxicology and Environmental Health, Part A 70: 1584-93 | 2007 |
| Health risks of micropollutants – The need for a new approach | Fawell J | Water Science and Technology 57: 183-7 | 2008 |
| Potentially mutagenic impurities: analysis of structural classes and carcinogenic potencies of chemical intermediates in pharmaceutical syntheses supports alternative methods to the default TTC for calculating safe levels of impurities. | Galloway et al. | Regul Toxicol Pharmacol 66(3): 326-35 | 2013 |
| Quick estimate of the regulatory virtually safe dose based on the maximum tolerated dose for rodent bioassays | Gaylor DW, Gold LS | Regulatory Toxicology and Pharmacology 22, 57-63 | 1995 |
| A carcinogenesis potency database of the standardized results of animal bioassays | Gold LS et al. | Environmental Health Perspectives 58: 9-319 | 1984 |
| Chronological supplement to the carcinogenic potency database: standardized results of animal bioassays published through December 1982 | Gold LS et al. | Environ Health Perspect 67: 161-200 | 1986 |

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Second Chronological Supplement to the Carcinogenic Potency Database: Standardized Results of Animal Bioassays Published through December 1984 and by the National Toxicology Program through Mai 1986 | Gold LS et al. | Environ Health Perspect 74: 237-329 | 1987 |
| Summary of carcinogenic potency and positivity for 492 rodent carcinogens in the carcinogenic potency database. | Gold LS et al. | Environmental Health Perspectives 79: 259-72 | 1989 |
| Third chronological Supplement to the Carcinogenic Potency Database: Standardized Results of Animal Bioassays Published through December 1986 and by the National Toxicology Program through June 1987 | Gold LS et al. | Environ Health Perspect; 84: 215-85 | 1990 |
| The Carcinogenic Potency Database: Analyses of 4000 chronic animal cancer experiments published in the general literature and by the US National Cancer Institute/National Toxicology Program. | Gold LS et al. | Environ Health Perspect 96: 11-5 | 1991 |
| The fifth plot of the Carcinogenic Potency Database: results of animal bioassays published in the general literature through 1988 and by the National Toxicology Program through 1989. | Gold LS et al. | Environ Health Perspect 100: 65-135 | 1993 |
| Sixth plot of the Carcinogenic Potency Database: results of animal bioassays published in the general literature 1989 to 1990 and by the National Toxicology Program 1990 to 1993. | Gold LS et al. | Environ Health Perspect 103: 3-123 | 1995 |
| Supplement to the Carcinogenic Potency Database (CPDB): results of animal bioassays published in the general literature in 1993 to 1994 and by the National Toxicology Program in 1995 to 1996. | Gold LS et al. | Environ Health Perspect 107: 3-123 | 1999 |
| Supplement to the Carcinogenic Potency Database (CPDB): results of animal bioassays published in the general literature through 1997 and by the National Toxicology Program in 1997–1998. | Gold LS et al. | Toxicol Sci 85 (2): 747-808 | 2005 |
| Evaluation of acute inhalation toxicity for chemicals with limited toxicity information | Grant et al. | Regulatory Toxicology and Pharmacology 47: 261-273 | 2007 |
| Feasibility study: refinement of the TTC concept by additional rules based on *in silico* and experimental data. | Hauge-Nilsen and Keller | Archives of Toxicology; 89(1): 25-32 | 2014 |
| An overview of values for the threshold of toxicological concern | Hennes | Toxicology Letters 211: 296-303 | 2012 |
| Recent developments in the risk assessment of potentially genotoxic impurities in pharmaceutical drug substances | Humfrey CDN | Toxicological Sciences 100: 24-8 | 2007 |
| Threshold of toxicological concern values for non-genotoxic effects in industrial chemicals: reevaluation of the Cramer classification. | Kalkhof et al. | Archives of Toxicology 86: 17-25 | 2012 |
| Feasibility study to support a threshold of sensitisation concern concept in risk assessment based on human data | Keller et al. | Archives of Toxicology 83: 1049-60 | 2009 |
| Application of the TTC concept to unknown substances found in analysis of foods. | Koster et al. | Food Chem Toxicol 49(8): 1643-60 | 2011 |
| The threshold of toxicological concern concept in risk assessment. | Kroes et al. | Toxicological Sciences 86: 226-30 | 2005 |

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Structure-based thresholds of toxicological concern (TTC): guidance for application to substances present at low levels in the diet | Kroes et al. | Food and Chemical Toxicology 42: 65–83 | 2004 |
| Threshold of toxicological concern (TTC) in food safety assessment | Kroes R, Kozianowski G | Toxicology Letters 127: 43-6 | 2002 |
| Threshold of toxicological Concern for chemical substances present in the diet: a practical tool for assessing the need for toxicity testing. | Kroes et al. | Food and Chemical Toxicology 38: 255-312 | 2000 |
| Correlation of chemical structure with reproductive and developmental toxicity as it relates to the use of the threshold of toxicological concern. | Laufersweiler et al. | Regulatory Toxicology and Pharmacology 62: 160-82 | 2012 |
| Complex mixtures: relevance of combined exposure to substances at low dose levels. | Leeman et al. | Food Chem Toxicol 58: 141-8 | 2013 |
| Reevaluation of the Munro dataset to derive more specific TTC thresholds. | Leeman et al. | Regul Toxicol Pharmacol. 69(2): 273-8 | 2014 |
| Application of the ‘‘threshold of toxicological concern” to derive tolerable concentrations of ‘‘non-relevant metabolites” formed from plant protection products in ground and drinking water. | Melching-Kollmuß S et al. | Regulatory Toxicology and Pharmacology 56: 126-34 | 2010 |
| The Threshold of Toxicological Concern (TTC) in risk assessment | Munro et al. | Toxicology Letters 180: 151-6 | 2008 |
| Correlation of structural class with no-observed-effect levels: a proposal for establishing a threshold of concern | Munro et al. | Food and Chemical Toxicology 34: 829-67 | 1996 |
| Safety assessment procedures for indirect food additives: an overview. Report of a workshop. | Munro IC | Regulatory Toxicology and Pharmacology 12: 2-12 | 1990 |
| Stepwise approaches for estimating intakes of chemicals in food. | Parmar B et al. | Regulatory Toxicology and Pharmacology 26: 44-51 | 1997 |
| Screening health risk assessment of micropollutants for indirect potable reuse schemes: a three-tiered approach. | Rodriguez C et al. | Water Science and Technology 56: 35-42 | 2007 |
| A proposed approach for the assessment of chemicals in indirect potable reuse schemes. | Rodriguez C | Journal of Toxicology and Environmental Health Part A 70: 1654-63 | 2007 |
| De Minimis and the threshold of regulation.: | Rulis AM | Food Protection Technology, ed. C.W. Felix, 29-37 | 1986 |
| Establishing a level of concern. | Rulis AM | In Risk Assessment in Setting National Priorities, Plenum Press, New York 7: 71-278 | 1989 |
| The Dermal Sensitisation Threshold—A TTC approach for allergic contact dermatitis.: | Safford RJ | Regulatory Toxicology and Pharmacology 51: 195-200 | 2008 |

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Refinement of the Dermal Sensitisation Threshold (DST) approach using a larger dataset and incorporating mechanistic chemistry domains. | Safford et al. | Regulatory Toxicology and Pharmacology 60: 218-24 | 2011 |
| The Dermal Sensitisation Threshold—A TTC approach for allergic contact dermatitis. | Safford . | Regulatory Toxicology and Pharmacology 51:195-200 | 2008 |
| Establishing the level of safety concern for chemicals in food without the need for toxicity testing | Schilter et al. | Regulatory Toxicology and Pharmacology 68: 275-96 | 2014 |
| Feasibility study of nonclinical safety assessments on homeopathic preparations using the example of protoanemonin in Pulsatilla pratensis L. | Schrenk D et al. | Regul Toxicol Pharmacol 66(1): 104-8 | 2013 |
| Refinement of TTC values: identification of outliers in Cramer class I-III. Poster abstract presented at EUROTOX, September 2009. / Use of RepDose for evaluation / refinement of the TTC concept: derivation of guideline- specific TTC values. | Tluczkiewicz et al. | Report on CEFIC LRI project. | 2009 |
| Improvement of the Cramer classification for oral exposure using the database TTC RepDose – a strategy description. | Tluczkiewicz et al. | Regul. Toxicol. Pharmacol 61: 340-50 | 2011 |
| The Threshold of toxicological concern for prenatal developmental toxicity. | van Ravenzwaay et al. | Regulatory Toxicology and Pharmacology 59: 81- 90 | 2011 |

### （３）暴露関係文献

本調査で収集した暴露に関連する文献を表 2-2-3 に示した。

表 2-2-3　暴露に関連する主要な文献

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Exposure-triggered reproductive toxicity testing under the REACH legislation: a proposal to define significant/relevant exposure | Bernauer et al. | Toxicology Letters 176: 68-76 | 2008 |
| Exposure based waiving: the application of the toxicological threshold of concern (TTC) to inhalation exposure for aerosol ingredients in consumer products | Carthew et al. | Food and Chemical Toxicology 47: 1287-95 | 2009 |
| Evaluation of inhalation TTC values with the database RepDose. | Escher et al. | Regulatory Toxicology and Pharmacology 58: 259-74 | 2010 |
| Refining the threshold of toxicological concern (TTC) for risk prioritization of trace chemicals in food | Felter et al. | Food and Chemical Toxicology 47: 2236-45 | 2009 |
| Guidelines on route-to-route extrapolation of toxicity data when assessing health risks of chemicals. | IGHRC | Institute of Environment and Health, Cranfield University, Silsoe, Bedfordshire, UK | 2006 |
| Application of the threshold of toxicological concern (TTC) to the safety evaluation of cosmetic ingredients. | Kroes et al. | Food and Chemical Toxicology 45: 2533-62 | 2007 |
| The use of food consumption data in assessments of exposure to food chemicals including the application of probabilistic modelling. | Lambe J | Proceedings of the Nutrition Society 61: 11-8 | 2002 |
| International experience in addressing combined exposures: increasing the efficiency of assessment. | Meek | Toxicology 313(2-3): 185-9 | 2013 |
| A rationale for determining, testing, and controlling specific impurities in pharmaceuticals that possess potential for genotoxicity | Müller et al. | Regulatory Toxicology and Pharmacology 44: 198-211 | 2006 |
| Migrants from food cans revisited – application of a stochastic model for a more realistic assessment of exposure to bisphenol A diglycidyl ether (BADGE). Packaging. | Oldring PKT et al. | Technology and Science 19: 121-37 | 2006 |
| Feasibility of route extrapolation in risk assessment. | Pepelko | British Journal of Industrial Medicine 44: 649-51 | 1987 |
| Risk assessment of non-listed substances (nls) and not-intentionally added substances (nias) under article 19 of Comission Regulation (EU) No 10/2011 of 14 January 2011 of plastic materials and articles intended to come into contact with food | Plastics Europe | Plastics Europe Home Page | 2014 |
| Migration of odorous compounds from adhesives used in market samples of food packaging materials by chromatography olfactometry and mass spectrometry (GC-O-MS). | Vera et al. | Food Chem 145: 237-44 | 2014 |
| FACET exposure tool | Food Packaging Forum | Food Packaging Forum | 2014 |

### （4）データベース関連文献

本調査で収集したデータベースに関連のする文献を表 2-2-4 に示した。

表 2-2-4　データベースに関連する主要な文献

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| REPDOSE: a database on repeated dose toxicity studies of commercial chemicals – a multifunctional tool | Bitsch et al. | Regulatory Toxicology and Pharmacology 46: 202-10 | 2006 |
| Refinement of the Dermal Sensitisation Threshold (DST) approach using a larger dataset and incorporating mechanistic chemistry domains. | Safford RJ et al. | Regulatory Toxicology and Pharmacology 60: 218-24 | 2011 |
| The OSIRIS Weight of Evidence approach: ITS for the endpoints repeated-dose toxicity (RepDose ITS). | Tluczkiewicz et al. | Regul Toxicol Pharmacol 67(2): 157-69 | 2013 |

### （5）その他

本調査で収集した上記以外の文献を表 2-2-5 に示した。

表 2-2-5　その他の文献

| 表題 | 著者 | 出典 | 発行年 |
|---|---|---|---|
| Alternatives to the carcinogenicity bioassay: *in silico* methods, and the *in vitro* and *in vivo* mutagenicity assays. | Benigni et al. | Expert Opinion on Drug Metabolism & Toxicology 6: 809-819 | 2010 |
| Health related guide values for drinking-water since 1993 as guidance to assess presence of new analytes in drinking-water. | Dieter HH. | Int J Hyg Environ Health 217(2-3): 117-32. | 2014 |
| Regulatory Forum Opinion Piece*: Supporting the Need for International Harmonization of Safety Assessments for Food Flavoring Substances. | Konishi et al. | Toxicol Patho. 42(6): 949-53 | 2014 |
| Use of the Threshold of Toxicological Concern (TTC) approach for deriving target values for drinking water contaminants. | Mons et al. | Water Res 15;47(4) 1666-78. | 2013 |
| A procedure for the safety evaluation of flavouring substances | Munro et al. | Food and Chemical Toxicology 37: 207-232. | 1999 |
| Feasibility study of nonclinical safety assessments on homeopathic preparations using the example of protoanemonin in Pulsatilla pratensis L. | Schrenk et al. | Regul Toxicol Pharmacol. Jun 66(1): 104-8. | 2013 |
| TTC and Science. EFSA/WHO Stakeholder Meeting | PAN Europe, Muilerman H | http://www.efsa.europa.eu/en/141202/docs/141202-p05.pdf | 2014 |