

# **Aluminium silicate**

## **DOCUMENT M-CA, Section 9**

### **LITERATURE DATA**

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## Version history<sup>1</sup>

Date	Data points containing amendments or additions and brief description	Document identifier and version number
February 2019	Revisions following RMS comment	Version 2
February 2018	Original document	Version 1

<sup>1</sup> 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 Introduction

Under Article 8(5) of Regulation 1107/2009, a literature review must be submitted as part of the renewal dossier for plant protection products:

*“Scientific peer-reviewed open literature, as determined by the Authority, on the active substance and its relevant metabolites dealing with side-effects on health, the environment and non-target species and published within the last ten years before the date of dossier submission shall be added by the applicant to the dossier”.*

In compliance with Article 8.5 of Regulation (EC) No 1107/2009 and Part A of Commission Regulation (EU) No 283/2013, a search of the scientific peer reviewed open literature relative to aluminium silicate (kaolin) was performed and included in the dossier.

The literature search was performed between 1 November 2017 and 15 November 2017.

The search was organised in two parts, with an initial search focusing on identifying literature relative to aluminium silicate, kaolin and derivatives, including trade names, and a final part focusing on identifying literature relevant to each compartment of the dossier. Details of the search term, data mining strategies and results are presented herewith.

### CA 9.2 Literature search timing

Literature search span: the search was limited to the period spanning from 1 January 2005 (year of submission of the original Aluminium silicate (kaolin) inclusion dossier) until 8 November 2017. The search therefore covered eleven years and ten months of peer-reviewed publications and was performed less than six months before renewal dossier submission deadline (28 February 2018).

### CA 9.3 Methodology

#### CA 9.3.1 Search environment

The literature search was performed on the following databases: CAB, PubMed, Toxnet and Science Direct. In addition, relevant documents from Google, Google Scholar, ECHA, ResearchGate and the United States Environmental Protection agency database were downloaded and processed separately.

#### CA 9.3.2 Identification of peer-reviewed literature pertaining to the Chemical Active aluminium silicate (kaolin)

The reference collections were queried by name, with a typical query string presented below.

Typical name query	Kaolin OR "china clay" OR kaolinite OR "calcined kaolin" OR "hydrous kaolin" OR "Aluminium silicate" OR "Aluminum silicate" OR Aluminosilicate OR "Satintone 5HB" OR " <u>Surround WP</u> " OR " <u>Sokalciarbo WP</u> " OR " <u>Argical Pro</u> " OR " <u>Agri Jardin</u> ".
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Underlined text refers to trade names of aluminium silicate-containing products.

In addition, the following CAS numbers were included in the search:

Identification number (List)	Identity
1318-74-7 (CAS)	Kaolinite
1332-58-7 (CAS)	Kaolin
296-473-8 (EC)	Kaolin, calcined
310-194-1 (EC)	Kaolin
92704-41-1 (CAS)	Kaolin, calcined

The topics of interest, such as human toxicity, fate, residues, etc., were not included as a key element of the search strategy. Often an event or outcome is not explicitly described by the subject at the title or abstract level and it would be difficult to adequately describe the individual toxic effects one can envisage using key words and/or subject headings in a complex search query. Therefore, a sequential approach was preferred, and once a pool of documents referencing the chemical active had been identified and duplicates removed, a different approach was used to identify relevant literature.

This granular information was captured during the text processing phase using customised gazetteer lists such as the extract given in the table below for toxTestSystem and toxStudyType. In total the gazetteer list of terms describing tox Test Systems contained 81 entries and the tox study type gazetteer contained 97 entries.

#### Extract from "ToxTestSystem" and "ToxStudyType"

ToxTestSystem list	ToxStudyType list
CHO	Absorbtion
Chromosome aberration test	Acute toxicity
Comet assay	Adverse event
Corrositex®	Endocrine disruption
Corrositex	Endocrine disruptor
Dog	Inhibition
Dogs	Neurotoxicity
Dog	Reproductive toxicity
E. coli WP2 uvrA	Sensitisation
Epidermis	Sublethal
Erythrocyte	Toxicity

### CA 9.3.3 Identification of relevant literature in the selected peer-reviewed literature

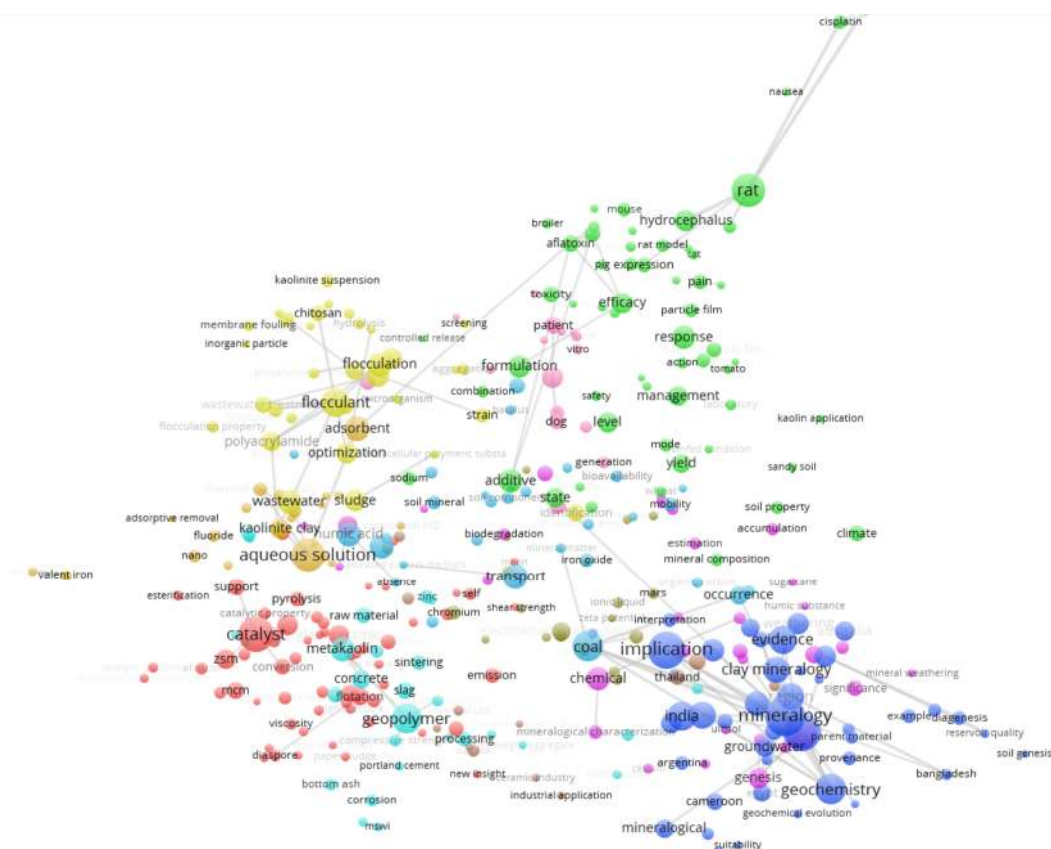
The search strategy highlighted 14,796 documents of potential interest to this literature review upon execution, including 676 from non-peer-reviewed literature. These were dismissed. The remaining 14120 documents contained a number of duplicates as a result of searching the reference collections separately.

To identify which of these 14,120 records mentioned the aspects of interest to this particular project, a pipeline of processing resources (PR) was applied to each document in turn and only those which specifically mentioned toxic effects, environmental fate and behaviour, etc., of kaolin or its common variants, were identified as a positive result. This granular information was captured during the text processing phase using customised gazetteer lists. A complete set of search terms is provided in the search report, provided under KCA 9-01.

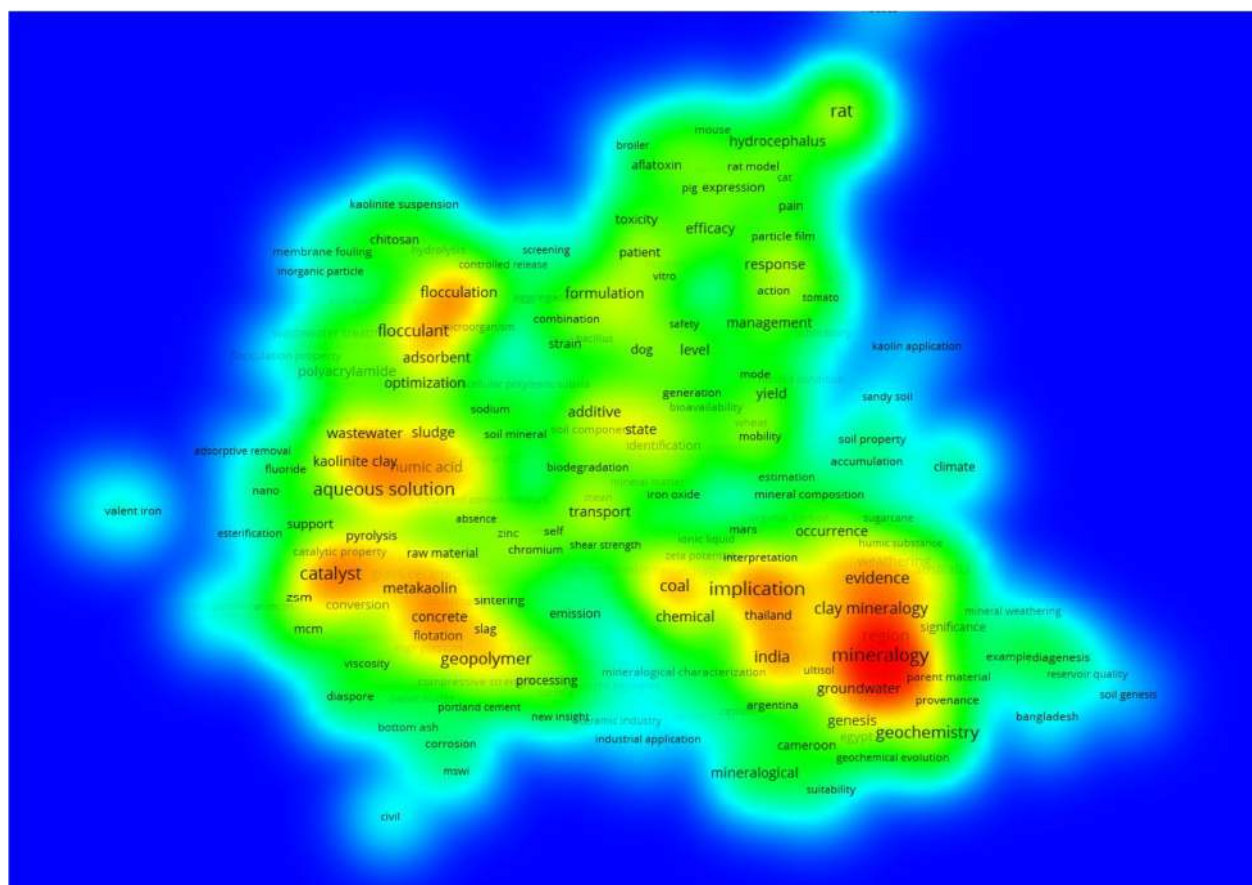
Each PR focused on a specific compartment and performs a different function and in general terms the approach taken was to Tokenise (identify individual words and features) and Sentence-split the documents; use the Gazetteer lists to identify any important key words and phrases such as dietary exposure; identify the Title and Abstract part of the document; look within the Title and Abstract for patterns matching the natural language expressions describing to the toxic effects of each active substance on humans, for example; and index the results. The rules used to identify these passages of text also make a simple allowance for co-referencing where we try to associate a word or phrase (the anaphor) with a previously mentioned entity (the antecedent). This technique was used to assist with the questions on Residue and Human Toxicity at the Sentence level only.

The results of the search were loaded into Microsoft Excel and duplicate records removed using several algorithms.

The entire collection of records was clustered to help with the identification of common themes and the output (network visualisation and density heat map) is provided in Figures 1 and 2



**Figure 1: Kaolin network visualisation**



**Figure 2: Kaolin density heat map**

## CA 9.4 Results

As a result of applying the text mining pipeline to the document corpus, a number of documents were identified as being of potential relevance to the four questions fundamental to the project, toxicity, ecotoxicology, fate & behaviour, and residues. No potentially relevant documents were identified for the Occupational health and safety category.

The following tables summarise the total number of documents retrieved from each reference collection noting that the total count in Table 2 will include duplicate records found in two or more reference collections. The results presented in Table 3 refer to unique records and show the number of documents identified by text mining as potentially relevant.

**Table 1: Number of documents retrieved from each reference location\***

Reference Collection	Total Document Retrieved
CAB	4,396
PubMed	2,873
ScienceDirect	6,807
Toxnet	44
<b>Total</b>	<b>14,120</b>

\*: includes duplicate documents



**Table 2: Number of documents identified as potentially relevant by text mining**

Compartment	Unique Documents Identified
Toxicity	301
Residues	52
Environmental Fate	248
Ecotoxicity	241

For each compartment described in Table 2, an excel spreadsheet was provided. Each potentially relevant entry consisted of one line, split into several columns: Database source and record number, date of publication, title, journal reference and author, URL and abstract.

The lists were screened for potential relevance, i.e. references that did not appear to be relevant based on title or abstract only were dismissed.

The remaining references were obtained and screened for relevance again.

## CA 9.4.1 Lists of relevant and non-relevant articles by dossier sections

### Mammalian Toxicology evaluation table (relevant articles)

Section	Authors	Year	Title	Source (Journal, volume, pages)	Fulfil data requirement?	Comments	Discussion on relevance
M-CA Section 5	Adamis Z., Williams R. B.	2005	Bentonite kaolin and selected clay minerals.	Environmental Health Criteria SN - 9241572310 SN - 0250-863X. PY - 2005 IS - No.231 SP - xvi + 175 pp. PB - World Health Organization LA - English CY - Geneva	No	Review set out to: (i) to assess information on the relationship between exposure to environmental pollutants and human health, and to provide guidelines for setting exposure limits; (ii) to identify new or potential pollutants; (iii) to identify gaps in knowledge concerning the health effects of pollutants; (iv) to promote the harmonization of toxicological and epidemiological methods in order to have internationally comparable results.	Relevant, has been used in dossier.

### Mammalian Toxicology evaluation table (non-relevant articles)

Authors	Year	Title	Source (Journal, volume, pages)	Fulfil data requirement?	Comments	Discussion on relevance
Hummel TZ1, Kindermann A, Stokkers PC, Benninga MA, ten Kate FJ.	2014	Exogenous pigment in Peyer patches of children suspected of having IBD	J Pediatr Gastroenterol Nutr. 2014 Apr;58(4):477-80	No	An investigation of the distribution of exogenous pigment throughout the gastrointestinal tract of children suspected of having inflammatory bowel disease.	Not relevant, inflammatory bowel disease in children study, a speculative association with micro-particles was concluded.
Jung BG, Lee JA, Lee BJ.	2013	Antiviral effect of dietary germanium biotite supplementation in pigs experimentally infected with porcine reproductive and respiratory syndrome virus.	J Vet Sci. 2013;14(2):135-41	No	The effects of Germanium biotite (GB) on immune responses in a mouse model, were assessed to demonstrate the clearance effects of GB against Porcine reproductive and respiratory syndrome virus (PRRSV) in experimentally infected pigs as an initial step towards the development of a feed supplement that would promote immune activity and help prevent diseases.	Not relevant, Germanium biotite (GB) used.
Abbès S, Ouanes Z, ben Salah-Abbès J, Houas Z, Oueslati R, Bacha H, Othman O.	2006	The protective effect of hydrated sodium calcium aluminosilicate against haematological biochemical and pathological changes	Toxicol. 2006 Apr;47(5):567-74.	No	The findings suggested that deleterious effects of Zearalenone could be overcome or, at least, significantly were diminished by HSCAS.	Not relevant, hydrated sodium calcium aluminosilicate used.

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils data requirement?	Comments	Discussion on relevance
		induced by Zearalenone in mice.				
Ali L, Idrees M1, Ali M, Hussain A, Ur Rehman I, Ali A, Iqbal SA, Kamel EH.	2014	Inhibitory effect of kaolin minerals compound against hepatitis C virus in Huh-7 cell lines.	BMC Res Notes. 2014 Apr 17;7:247.	No	Kaolin mineral derivatives showed promising inhibitory effects against HCV genotypes 3a and 1a infection, which suggested a possible use as complementary and alternative medicine for HCV viral infection.	Not relevant, kaolin derived anti-HCV compounds were used to decrease the hepatitis C virus titre in vitro.
Attik G, Brown R, Jackson P, Creutzenberg O, Aboukhamis I, Rihn BH.	2008	Internalization cytotoxicity apoptosis and tumor necrosis factor-alpha expression in rat alveolar macrophages exposed to various dusts occurring in the ceramics industry.	Inhal Toxicol. 2008 Sep;20(12):1101-12	No	Various ceramic dusts were tested in a rat alveolar macrophage (AM) cell. Cell death was assessed.	Not relevant, ceramic dusts used.
Awad ME, López-Galindo A, Setti M, El-Rahmany MM, Iborra CV.	2017	Kaolinite in pharmaceuticals and biomedicine.	Int J Pharm. 2017 Nov 25;533(1):34-48	No	A review of some medical uses of kaolinite. It can be considered as a promising natural geomaterial for designing new derivatives that can contribute in the trials of discovering new therapeutic systems and treatment pathways.	Not relevant, as it describes the already varied uses of kaolinite in pharmaceutical applications.
Bart C. De Jonghe; Maureen P. Lawler; Charles C. Horn; Michael G. Tordoff	2009	Pica as an adaptive response: Kaolin consumption helps rats recover from chemotherapy-induced illness	Physiology & Behavior, Volume 97, Issue 1, 20 April 2009, Pages 87-90	No	Cisplatin induced chemical injury in rats could be beneficial to recovery,	Not relevant, paper describes a rat model treated with cisplatin with some recovery aided by clay consumption.
Bock-GieJung; Nguyen TatToan; Sun-JuCho; Jae-hyungKo; Yeon-KwonJung; Bong-JooLee	2010	Dietary aluminosilicate supplement enhances immune activity in mice and reinforces clearance of porcine circovirus type 2 in experimentally infected pigs	Veterinary Microbiology, Volume 143, Issues 2-4, 14 July 2010, Pages 117-125	No	The study aimed to evaluate immune enhancing effects of dietary aluminosilicate supplement (DAS) in mice, and to demonstrate clearance effects of DAS against porcine circovirus type 2 (PCV2) in experimentally infected pigs	Not relevant, DAS used: SiO <sub>2</sub> (61.90%), Al <sub>2</sub> O <sub>3</sub> (23.19%), Fe <sub>2</sub> O <sub>3</sub> (3.97%) and Na <sub>2</sub> O (3.36%).
Bowman PD, Wang X, Meledeo MA, Dubick MA, Kheirabadi BS.	2011	Toxicity of aluminum silicates used in hemostatic dressings toward human umbilical veins endothelial cells HeLa cells and RAW267.4 mouse macrophages.	J Trauma. 2011 Sep;71(3):727-32	No	Human umbilical vein endothelial cells HeLa cells, and RAW267.4 mouse macrophage-like cells were incubated directly with different concentrations of each mineral (hydrous aluminum silicate particles) for 24 hours.	Not relevant, the study looked at in vitro cell death as an endpoint, kaolin was the less toxic than the other substances tested. However, the model does not appear to take into account normal mammalian physiological parameters.
Diaz D. E., Smith T. K.	2005	Mycotoxin sequestering agents: practical tools for the neutralisation of mycotoxins.	The mycotoxin blue book SN - 1904761194. PY - 2005 SP - 323-339 PB - Nottingham	No	A review on mycotoxin decontamination from feedstuffs.	Not relevant, work on zeolites and other sequestering agents.

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils data requirement?	Comments	Discussion on relevance
			University Press LA - English CY - Nottingham			
Edwards JV, Prevost N.	2011	Thrombin production and human neutrophil elastase sequestration by modified cellulosic dressings and their electrokinetic analysis. ;	J Funct Biomater. 2011 Dec 15;2(4):391-413	No	Examination of the effects on wound healing of various surgical dressings.	Not relevant, kaolin-treated materials including a commercial haemorrhage control dressing (Quick Clot Combat Gauze) were used but no specific details was given on the kaolin used.
Gershkovich P, Darlington J, Sivak O, Constantinides PP, Wasan KM.	2009	Inhibition of intestinal absorption of cholesterol by surface-modified nanostructured aluminosilicate compounds. ;	J Pharm Sci. 2009 Jul;98(7):2390-400	No	An examination of the ability of aqueous suspensions of surface-modified nanostructured aluminosilicate (NSAS) compounds to reduce the intestinal absorption of cholesterol in a rat model.	Not relevant, Protonated nanostructured aluminosilicate (NSAS) used.
Habold C, Reichardt F, Le Maho Y, Angel F, Liewig N, Lignot JH, Oudart H.	2009	Clay ingestion enhances intestinal triacylglycerol hydrolysis and non-esterified fatty acid absorption.	Br J Nutr. 2009 Jul;102(2):249-57	No	Previous work had shown Rats fed an elemental diet with 10% kaolinite had greater body-mass gain after 14 d. Based on this study the explanation might then be that increased NEFA absorption in kaolinite-fed rats leads to an increase in lipid accretion.	Not relevant because the basic findings are already well known and the work on NEFA is too speculative.
Kato T, Toyooka T, Ibuki Y, Masuda S, Watanabe M, Totsuka Y.	2017	Effect of physicochemical character differences on the genotoxic potency of kaolin.	Genes Environ. 2017 May 1;39:12	No	Intratracheal administration of high doses of three types of kaolin to mice.	Not relevant, intratracheal administration of high doses of three types of kaolin. This is an unrealistic model with which to test genotoxicity.
Londono SC, Hartnett HE, Williams LB.	2017	Antibacterial Activity of Aluminum in Clay from the Colombian Amazon.	Environ Sci Technol. 2017 Feb 21;51(4):2401-2408.	No	Al toxicity plays a central role in the antibacterial action of a kaolin-rich clay from the Colombian Amazon (AMZ).	Not relevant, not kaolin, poorly defined clay -AMZ Clay used.
Pavel Gershkovich; Olena Sivak; Susana Contreras-Whitney; Jerald W.Darlington; Kishor M. Wasan	2012	Assessment of Cholesterol Absorption Inhibitors Nanostructured Aluminosilicate and Cholestyramine Using In Vitro Lipolysis Model	Journal of Pharmaceutical Sciences, Volume 101, Issue 1, January 2012, Pages 291-300	No	The effect of protonated nanostructured aluminosilicate (NSAS) on modeled intraluminal distribution of cholesterol was assessed using an in vitro lipolysis model.	Not relevant, fused aluminosilicate particles used.
Priest ND, Hoel DG, Brooks PN.	2006	Relative toxicity of chronic irradiation by 45Ca beta particles and 242Cm alpha particles with respect to the production of lung tumors in CBA/Ca mice.	Radiat Res. 2006 Nov;166(5):782-93.	No	Mice were exposed by inhalation to radiolabelled fused aluminosilicate particles and the responses of the lungs assessed.	Not relevant, poorly defined material used.

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils data requirement?	Comments	Discussion on relevance
Reichardt F, Chaumande B, Habold C, Robin JP, Ehret-Sabatier L, Le Maho Y, Liewig N, Angel F, Lignot JH.	2012	Kaolinite ingestion facilitates restoration of body energy reserves during refeeding after prolonged fasting.	Fundam Clin Pharmacol. 2012 Oct;26(5):577-88.	No	Clay ingestion appears to be beneficial for individuals undergoing extreme nutritional conditions such as refeeding and limited food supplies.	Not relevant. Effects of kaolinite ingestion are well known. However, the description of the effects on re-feeding are of interest for medical uses.
Reichardt F, Habold C, Chaumande B, Ackermann A, Ehret-Sabatier L, Le Maho Y, Angel F, Liewig N, Lignot JH.	2009	Interactions between ingested kaolinite and the intestinal mucosa in rat: proteomic and cellular evidences.	Fundam Clin Pharmacol. 2009 Feb;23(1):69-79	No	The study showed that kaolinite particles ingested as a food complement interacted with the intestinal mucosa to modify nutrient absorption.	Not relevant. Effects of kaolinite ingestion are in the public domain and commonly understood.
Ridha Ben Ali; Anouar Ounis; Dorra Ben Said; Chadli Dziri; Michèle Véronique; El May	2017	Gastroprotective effects of Tunisian green clay on ethanol-induced gastric mucosal lesion in rats	Applied Clay Science, Volume 149, 1 December 2017, Pages 111-117	No	A study of the biological effects of green clay was administered orally followed by administration of ethanol 95% to induce a gastric ulcer. A potential gastroprotective activity on ethanol induced gastric mucosal lesions was found.	Not relevant, Natural Green Clay used (specification not known), not kaolin.
Samir Abbès; Zouhour Ouane; Jalila Ben Salah-Abbès; Mosaad A. Abdel-Wahhab; RidhaOueslati; Hassen Bacha	2007	Preventive role of aluminosilicate clay against induction of micronuclei and chromosome aberrations in bone-marrow cells of Balb/c mice treated with Zearalenone	Mutation Research/Genetic Toxicology and Environmental Mutagenesis, Volume 631, Issue 2, 28 July 2007, Pages 85-92	No	The study investigated ability of hydrated sodium calcium aluminosilicate (HSCAS) to protect Balb/c mice against cytotoxicity and genotoxicity induced by Zearalenone.	Not relevant, hydrated sodium calcium aluminosilicate (HSCAS) used.
Sivak O, Darlington J, Gershkovich P, Constantinides PP, Wasan KM.	2009	Protonated nanostructured aluminosilicate (NSAS) reduces plasma cholesterol concentrations and atherosclerotic lesions in Apolipoprotein E deficient mice fed a high cholesterol and high fat diet	Lipids Health Dis. 2009 Jul 28;8:30	No	An investigation to assess the effect of chronic administration of protonated nanostructured aluminosilicate (NSAS) on the plasma cholesterol levels and development of atherosclerotic lesions in Apolipoprotein deficient mice.	Not relevant, protonated nanostructured aluminosilicate (NSAS) used not kaolin.
Spotti M, Fracchiolla ML, Arioli F, Caloni F, Pompa G.	2005	Aflatoxin B1 binding to sorbents in bovine ruminal fluid.	Vet Res Commun. 2005 Aug;29(6):507-15.	No	In vitro experiments to develop a rapid and cheap model using ruminal fluid to assess the ability of sorbent materials to bind aflatoxin B1 (AFB1). Seven sorbents (hydrated sodium calcium aluminosilicate; clinoptilolite; zeolite; two types of bentonite; sepiolite; and PHIL 75), commonly added to bovine diets were incubated in water and ruminal fluid in the presence of AFB1.	Not relevant, bentonite used.

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils data requirement?	Comments	Discussion on relevance
Totsuka Y, Higuchi T, Imai T, Nishikawa A, Nohmi T, Kato T, Masuda S, Kinai N, Hiyoshi K, Ogo S, Kawanishi M, Yagi T, Ichinose T, Fukumori N, Watanabe M, Sugimura T, Wakabayashi K.	2009	Genotoxicity of nano/microparticles in in vitro micronuclei in vivo comet and mutation assay systems.	Part Fibre Toxicol. 2009 Sep 3;6:23.	No	An examination of the effects manufactured nano or /microparticles of C60, CB and kaolin, in an in vitro micronuclei (MN) test. DNA damage and mutations were analysed by in vivo assay systems using transgenic mice which were intratracheally instilled with single or multiple doses.	Not relevant, they used manufactured nano/micro particles that are unlikely to be representative of normal kaolin.
Türkez H, Şişman T.	2007	Anti-genotoxic effect of hydrated sodium calcium aluminosilicate on genotoxicity to human lymphocytes induced by aflatoxin B1.	Toxicol Ind Health. 2007 Mar;23(2):83-9.	No	The anti-genotoxic potential of hydrated sodium calcium aluminosilicate (HSCAS) was investigated using sister chromatid exchanges (SCEs) induced by aflatoxin B1 (AFB1) as genotoxic endpoint in human lymphocytes.	Not relevant, hydrated sodium calcium aluminosilicate (HSCAS) used.
Voinot F, Fischer C, Bœuf A, Schmidt C, Delval-Dubois V, Reichardt F, Liewig N, Chaumande B, Ehret-Sabatier L, Lignot JH, Angel F.	2012	Effects of controlled ingestion of kaolinite (5%) on food intake gut morphology and in vitro motility in rats.	Fundam Clin Pharmacol. 2012 Oct;26(5):565-76.	No	The study was designed to investigate the effects of controlled kaolinite ingestion on food intake, gut morphology and in vitro motility in rats.	Not relevant as data are essentially already in the public domain i.e. kaolinite effects on gut motility.
Voinot F, Fischer C, Schmidt C, Ehret-Sabatier L, Angel F.	2014	Controlled ingestion of kaolinite (5%) modulates enteric nitrergic innervation in rats.	Fundam Clin Pharmacol. 2014 Aug;28(4):405-13.	No	Gastric emptying and intestinal transit have been shown to be regulated by nitric oxide, the effect of an imposed ingestion of kaolinite on enteric nitrergic innervation was determined. No clear conclusions were reached.	Not relevant, paper describes the effect of ingestion of kaolinite on enteric nitrergic innervation. The data are too speculative.
Yanagisawa R, Takano H, Ichinose T, Mizushima K, Nishikawa M, Mori I, Inoue K, Sadakane K, Yoshikawa T.	2007	Gene expression analysis of murine lungs following pulmonary exposure to Asian sand dust particles.	Exp Biol Med (Maywood). 2007 Sep;232(8):1109-18.	No	The examination of the effects of Asian sand dust particles on gene expression in the murine lung using microarray analysis.	Not relevant, kaolin not specifically tested.
Yiannikouris A1, Kettunen H, Apajalahti J, Pennala E, Moran CA.	2013	Comparison of the sequestering properties of yeast cell wall extract and hydrated sodium calcium aluminosilicate in three in vitro models accounting for the animal physiological bioavailability of zearalenone.	Food Addit Contam Part A Chem Anal Control Expo Risk Assess. 2013;30(9):1641-50	No	The sequestration/inactivation of the oestrogenic mycotoxin zearalenone (ZEA) by two adsorbents – yeast cell wall extract (YCW) and hydrated sodium calcium aluminosilicate (HSCAS) was studied. HSCAS was an effective sequestering agent,	Not relevant, hydrated sodium calcium aluminosilicate (HSCAS) used.

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Authors	Year	Title	Source (Journal, volume, pages)	Fulfils data requirement?	Comments	Discussion on relevance
Zhang Y, Long M, Huang P, Yang H, Chang S, Hu Y, Tang A, Mao L	2016	Emerging integrated nanoclay-facilitated drug delivery system for papillary thyroid cancer therapy.	Sci Rep. 2016 Sep 12;6:33335.	No	Investigation of nanoclay incorporation into dual functional drug delivery systems to promote efficiency in drug delivery and reduce the toxicity of doxorubicin used for thyroid cancer treatment.	Not relevant because nano-clay was used - methoxy-intercalated kaolinite - as a drug delivery system.

**Residue evaluation table (relevant)**

Section	Year	Authors	Title	Reference	Brief summary of the study
M-CA 6  (point CA 6.3.1.)	2005	Spiers <i>et. al.</i>	Effects of Kaolin Clay Application on Flower Bud Development, Fruit Quality and Yield, and Flower Thrips [ <i>Frankliniella</i> spp. ( <i>Thysanoptera: Thripidae</i> )] Populations of Blueberry Plants.	Small fruits review, pages 73-84	Three separate studies were conducted to report the effects of kaolin applications (Surround WP) on southern highbush blueberries ( <i>Vaccinium corymbosum</i> L.) and rabbiteye ( <i>V. ashei</i> Reade) blueberries. When kaolin was applied before fruit set, yield was increased with no significant residue left on the fruit.  The study does not directly address any of the relevant residues endpoints, but may be used as supporting information to supplement the residues case that there will be no kaolin residues present on the surface of harvestable commodities.

**Residue evaluation table (non-relevant)**

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils data requirement?	Comments	Discussion on relevance
Joint FAO/WHO	2015	Compendium of Food Additive Specifications: Joint FAO/WHO Expert Committee on Food Additives - 80th meeting 2015	FAO JECFA Monographs 17 (ISSN 1817-7077)	No	The document's only reference to 'aluminium silicate' refers to the withdrawal of its food additive specification	Not relevant.
Rogers <i>et. al.</i>	2016	Apple washers: removal of insect pests and contaminants from export apples.	New Zealand plant protection, 69, 160-166	No	Study described the use of a new apple washer using multi-nozzle rotors, which significantly reduced the incidence of insects and mites on apples. Weathered residues of kaolin and hydrated lime were similarly reduced by this apple washer.	The OECD guidance on crop field trials (OECD 509) outlines information on sampling procedures, with regards to washing, paragraph 71 states:  "Apart from superficial cleansing, i.e., removal of any extraneous matter, no intrusive cleaning should be attempted. In the case of root crops recovered with soil, where light brushing is not sufficient to remove soil, gentle minimal rinsing under cold running water may be used."  The information described within this report does not comply with this requirement, based on the rigorous cleaning measure used.



Alvarez <i>et. al.</i>	2015	Comparative effects of kaolin and calcium carbonate on apple fruit surface temperature and leaf net CO <sub>2</sub> assimilation.	Journal of Applied Horticulture, 17(3), 176-180	No	Study describes the use of reflective particles (i.e. kaolin and calcium carbonate) on apple fruits has been suggested as a tool to diminish its thermal charge and thus mitigate stress effects caused by high temperature.	Not relevant – the study provides no information which may be used to fulfil any of the data requirements / endpoints for the residues assessment.
Privé <i>et. al.</i>	2007	Gas Exchange of Apple and Blackberry Leaves Treated with a Kaolin Particle Film on Adaxial, Abaxial, or Both Leaf Surfaces.	HORTSCIENCE 42(5), 1177–1182	No	A study consisting of an apple field trial and a blackberry greenhouse trial was conducted during the 2005 growing season in Canada. The study aimed to characterise the leaf temperature and gas exchange responses of ‘Ginger Gold’ apple and ‘Triple Crown’ blackberry	Not relevant – the study provides no information which may be used to fulfil any of the data requirements / endpoints for the residues assessment.
Conde <i>et. al.</i>	2016	Kaolin Foliar Application Has a Stimulatory Effect on Phenyl propanoid and Flavonoid Pathways in Grape Berries.	Frontiers in Plant Science, 7, 1-14	No	Molecular and biochemical analysis to assess how foliar application of kaolin influences major secondary metabolism pathway associated with berry quality-traits, leading to biosynthesis of phenolics and anthocyanins, with a focus on the phenyl propanoid, flavonoid (both flavonol- and anthocyanin-biosynthetic) and stilbenoid pathways.	Not relevant – the study provides no information which may be used to fulfil any of the data requirements / endpoints for the residues assessment.
Wise <i>et. al.</i>	2010	Sprayer type and water volume influence pesticide deposition and control of insect pests and diseases in juice grapes.	Crop Protection, 29, 378–385	No	Kaolin residues on grape clusters were analyzed to compare the total amount of spray material deposited, percent of fruit surface covered, number of deposits, size of deposits and distance between deposits.	Not relevant – the study relied on the use of kaolin as a visual marker to determine the spray deposition of a pesticide active ingredients to grapevines using different sprayers / water volumes.  Residues of kaolin on the grape surfaces were determined using optical methods, but this does not represent the same treatment scenario as intended for Surround WP (treatments are to be made to the grapevines prior to the formation of the edible components). The study consequently does not provide any information which would be relevant for the renewal.

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**Environmental fate evaluation table (relevant articles)**

None of the articles obtained were relevant to environmental fate with regards to degradation, dissipation, adsorption/desorption, leaching, water/sediment contamination or air contamination:

- Degradation of kaolin takes place through geological processes that happen at geological timescales. For all intent and purposes, kaolin is stable at human timescales.
- When dissipation takes place, kaolin from the use of the plant protection product and natural kaolin cannot be distinguished and undergo the same fate.
- As a component of artificial soils used as adsorption/desorption substrate, kaolin cannot be tested for adsorption/desorption. In that respect, one can state that kaolin is very strongly bound to soil and may have variable adsorptive capacity towards exogenous molecules.
- As an insoluble substance, kaolin cannot undergo leaching, which is the transport of solute through soil pores. Kaolin can reach groundwater through mechanical percolation through soil pores; however, any kaolin from the use of the plant protection product will be indistinguishable from natural kaolin.
- Kaolin is generally present in still or slow-moving water bodies (slow rivers, ponds, lakes, seas or oceans) as part of the sediment. Any addition from the use of the plant protection product will be marginal, as evidenced in PEC<sub>sw</sub> calculations. In fast-moving water bodies (streams for example), kaolin particles will be washed off until they can deposit in the sediment and be indistinguishable from naturally-present kaolin.
- Kaolin is non-volatile. As such, it cannot be volatilized and deposited. However, kaolin particles can be suspended in air and re-deposited as fine solids. Extreme storms occurring over non-vegetated areas (arid landscapes) may lift significant concentrations of particles that are later redeposited via rain. However, with an application rate of 30 kg/ha, equivalent to 3 g/m<sup>2</sup>, kaolin particles from the use of the plant protection product will be marginal in concentration compared to that of natural soil or sand particles.

**Environmental fate evaluation table (non-relevant articles)**

Authors	Year	Title	Reference	Fulfills data requirements	Comments	Discussion on relevance
Ahn MY, Filley TR, Jafvert CT, Nies L, Hua I, Bezares-Cruz J.	2006	Photodegradation of Decabromodiphenyl Ether Adsorbed onto Clay Minerals, Metal Oxides, and Sediment	Environ. Sci. Technol. Vol 40, p.215-220	No	This article refers to the degradation of organic contaminant on clay-type particles.	Not relevant. Degradation of contaminants bound to clay particles does not affect the substrate.
Beini Gong, Pingxiao Wu, Zhujian Huang, Yewu Li, Zhi Dang, Bo Ruan, Chunxi Kang, Nengwu Zhu	2016	Enhanced degradation of phenol by <i>Sphingomonas</i> sp. GY2B with resistance towards suboptimal environment through adsorption on kaolinite	Chemosphere, 148 p.388-394	No	Kaolin is effective at enhancing bacterial degradation of phenols by <i>Sphingomonas</i> sp.GY2B.	Not relevant to environmental fate or the agricultural use of the active substance.
Chizallet C, Raybaud P.	2009	Pseudo-bridging silanols as versatile Bronsted acid sites of amorphous aluminosilicate surfaces.	Angewandte Chemie International 48 (16), p2891-3	No	This article refers to the preparation of pseudo-bridging silanols on amorphous silica-alumina (SAS) surfaces. The material used (alumina, Al <sub>2</sub> O <sub>3</sub> ) is not representative of kaolin and the article refers to the grafting of silanol (Si(OR) <sub>4</sub> ) groups on alumina to form SAS. None of the information presented has any relevance to the environmental fate of kaolin.	Not relevant to environmental fate.
Comber S. D. W., Gardner M. J., Churchley J.	2005	Aluminium speciation: implications of wastewater effluent dosing on river water quality.	Chemical Speciation and Bioavailability 17, 117-128	No	Refers to aluminium ions dosage in waste water treatment plants. The objective of the experiment was to determine whether quantification of total aluminium (i.e. including undissolved inert particles of aluminosilicates) could allow for extrapolation of reactive (i.e. toxic) aluminium species. Results showed total aluminium is not a suitable surrogate for reactive aluminium	Not relevant. Analysis of total aluminium does not allow for quantification of reactive aluminium
Congrong Yu, Bin Gao, Rafael Muñoz-Carpena, Yuan Tian, Lei Wu, Oscar Perez-Ovilla	2011	A laboratory study of colloid and solute transport in surface runoff on saturated soils.	Journal of Hydrology 402 (159-164)	No	When subsurface flow or drainage is limited, colloid surface transport is equivalent to solute transport when colloid particles are 0.4 µm in size or smaller. Particle size analysis of kaolin particles in SURROUND WP CROP PROTECTANT shows that 10% of particles are 0.786 µm in size or smaller. Therefore, it can be assumed that colloid transport of SURROUND WP CROP PROTECTANT concerns less than 10% of the product.	Not relevant for risk assessment.
Hongfei Cheng, Qinfu Liu, Jing Yang, Ray L.Frost	2010	Thermogravimetric analysis of selected coal-bearing strata kaolinite	Thermochimica Acta, Vol 507-508, p. 84-90	No	This article refers to analysis of specific coal-bearing kaolinite seams from China and is not relevant to the specific kaolin ores mined in Georgia (USA) and used in the preparation of aluminium silicate used in SURROUND WP CROP PROTECTANT.	Not relevant to the active substance.
Hongfei Cheng, Jing Yang, Qinfu Liu,	2010	Thermochimica Acta, Vol 507-508, p. 106-114	Thermochimica Acta, Vol 507-508, p. 106-114	No	This article refers to analysis of specific coal-bearing kaolinite seams from China and is not relevant to the specific kaolin ores	Not relevant to the active substance.

Junkai He, Ray L.Frost					mined in Georgia (USA) and used in the preparation of aluminium silicate used in SURROUND WP CROP PROTECTANT.	
Jolin WC, Sullivan J, Vasudevan D, MacKay AA.	2016	Column Chromatography To Obtain Organic Cation Sorption Isotherms	Environmental science & technology 50 (15) p.8196-8204	No	This article refers to establishing a simpler method for the determination of soil sorption isotherms. However, none of the substrates involved in the experiments was kaolin.	Not relevant. Adsorption/desorption testing considers kaolin as substrate for adsorption, not as adsorbed substance.
Lecomte K. L., Pasquini A. I., Depetris P. J.	2005	Mineral weathering in a semiarid mountain river: its assessment through PHREEQC inverse modeling.	Aquatic Geochemistry 11:173–194	No	This article documents the reverse modelling process investigated to elucidate mountain weathering processes via analysis of minerals dissolved in overlying river water. However, this article confirms that erosion of granite rocks will lead to kaolinite, while erosion of gneiss will give rise to illite.	Not relevant. Erosion modelling of river basins
Lesturgez G., Poss R., Noble A., Grünberger O., Chintachao W., Tessier D.	2006	Soil acidification without pH drop under intensive cropping systems in Northeast Thailand.	Agriculture ecosystems and environment 114, 239-248	No	Refers to kaolin as a soil component in field trials.	Not relevant as the target substance is not applied as test material
MacCarthy Jennifer, Nosrati Ataollah, Skinner William, Addai-Mensah Jonas	2015	Effect of mineralogy and temperature on atmospheric acid leaching and rheological behaviour of model oxide and clay mineral dispersions	Powder Technology, 286 p.420-430	No	The article refers to rheology and composition of mining slurries and pulps for the mining industry.	Not relevant to environmental fate and agricultural applications.
Santos B. M., Salame-Donoso T. P., Whidden A. J.	2012	Reducing sprinkler irrigation volumes for strawberry transplant establishment in Florida.	HortTechnology 22, 224-227	No	Although the use of Kaolin spray is effective at reducing water needs for strawberry transplants, this article presents no data on the environmental fate of kaolin	Not relevant to environmental fate
Steenari B.-M., Karlfeldt Fedje K.	2010	Addition of kaolin as potassium sorbent in the combustion of wood fuel - Effects on fly ash properties	Fuel 89, p.2026-2032	No	The addition of kaolin to forest residue during combustion reduces ash settling time and improves ash structure.	Not relevant to agricultural uses of the active substance.
Ta CAK, Pebsworth PA, Liu R, Hillier S, Gray N, Arnason JT, Young SL.	2017	Soil eaten by chacma baboons adsorbs polar plant secondary metabolites representative of those found in their diet.	Environ Geochem Health	No	This article refers to investigating whether Baboons will preferentially choose the most efficacious type of clay for adsorbing plant secondary metabolites. No dosages or histology performed	Not relevant to environmental fate.
Táborosi A, Szilágyi RK.	2016	Behaviour of the surface hydroxide groups of exfoliated kaolinite in the gas phase and during water adsorption	Dalton Transactions, vol 45 (6), p. 2523-2535	No	Computerised model of the behavior of exfoliated kaolin sheets, investigating the reactivity of disorganised surface hydroxyl groups. Theoretical research.	Not relevant to environmental fate
Tokarčíková Michaela, Tokarský Jonáš, Čabanová Kristina, Matějka Vlastimil, Mamulová Kutlákova Kateřina, Seidlerová Jana	2014	The stability of photoactive kaolinite/TiO <sub>2</sub> composite	Composites Part B, 67 p.262-269	No	When kaolin and calcined kaolin are leached with deionized water, leaching of aluminium is marginal (0.62 and 0.16 mg/L for kaolin and calcined kaolin respectively). Leaching in pH2 buffer (H <sub>2</sub> SO <sub>4</sub> ) or pH12 (NaOH) released higher quantities of aluminium, however, these pH values are not representative of soil water or surface water natural pH ranges in agricultural areas	Not relevant to environmental fate. Leaching conditions not representative of soil water or surface water natural pH ranges in agricultural areas

Tokarčíková Michaela; Mamulová Kutlákova Kateřina, Seidlerová Jana	2016	Leaching test for calcined kaolinite and kaolinite/TiO <sub>2</sub> photoactive composite	Chemical Papers, Volume 70, Issue 9, pp 1253–1261	No	Calcination of kaolinite has no impact on elemental leaching in deionized water and in H <sub>2</sub> SO <sub>4</sub> /HNO <sub>3</sub> mix at pH 3.95	Not relevant to environmental fate and agricultural applications.
Tokarčíková Michaela, Tokarský Jonáš, Mamulová Kutlákova Kateřina, Seidlerová Jana	2017	Testing the stability of magnetic iron oxides/kaolinite nanocomposite under various pH conditions	Journal of Solid State Chemistry 253 329–335	No	Kaolin and nanocomposite kaolin bound with magnetite (Fe <sub>3</sub> O <sub>4</sub> ) subject to extraction in pH 2, 4, 6.7, 9 and 11 do not release significant amounts of aluminium.	Not relevant to the active substance, which is a calcined form of kaolin.
Werner JJ, McNeill K, Arnold WA.	2009	Photolysis of Chlortetracycline on a Clay Surface	J. Agric. Food. Chem., Vol 57, p. 6932-6937	No	As with most adsorption/desorption work, this article refers to the behavior of an organic contaminant when adsorbed on kaolin clay. Kaolin clay is part of standard soil composition and as such cannot be tested for adsorption/desorption properties on itself.	Not relevant. Adsorption/desorption testing considers kaolin as substrate for adsorption, not as adsorbed substance.
World Health Organisation	2005	Bentonite, kaolin and selected clays	Environmental health criteria, 231	No	This publication is more concerned about human and animal health than environmental fate. The report states in its conclusions to the environmental effects of kaolin and bentonite: <i>"There is no reason to believe that the mining or processing of bentonite, kaolin, and other clays poses significant toxicological dangers to the environment. However, physical disturbance to the land, excessive stream sedimentation, and similar destructive processes resulting from the large-scale mining and processing of clays, like any large-scale mining operation, have a potential for significant environmental damage."</i>	Not relevant to environmental fate.
Zhou Yong, Yao Jun, He Minyan, Choi Martin M.F., Feng Liang, Chen Huilun, Wang Fei, Chen Ke, Zhuang Rensheng, Maskow Thomas, Wang Gejiao, Zaray Gyula.	2010	Reduction in toxicity of arsenic(III) to <i>Halobacillus</i> sp. Y35 by kaolin and their related adsorption studies	Journal of Hazardous Materials 176 487–494	No	The combination of kaolin and <i>Halobacillus</i> sp. Y35 shows more binding affinity to arsenic(III) than either kaolin or <i>Halobacillus</i> sp. Y35 alone	Not relevant to agricultural uses of the active substance.

**Ecotoxicology evaluation table (relevant articles)**

Section	Authors	Year	Title	Reference	Brief summary of the study
CA 8.1.1	Martin, C.D. and Mullens, B.A.	2012	Housing and dustbathing effects on northern fowl mites ( <i>Ornithonyssus sylviarum</i> ) and chicken body lice ( <i>Menacanthus stramineus</i> ) on hens	Medical and Veterinary Entomology. Vol 26 (3): 323-333	Supplementary, no data to impact RA Housing and dustbathing effects of fowl mites and chicken body lice
CA 8.1.2.2	Ta, C.A.K, Pebsworth, P.A., Liu, R, Hillier, S., Gray, N., Arnason, J.Y., and Young, S.L.	2017	Soil eaten by chacma baboons absorbs polar plant secondary metabolites representative of those found in their diet	Environ Geochem Health. Springer Netherlands	Supplementary, no data to impact RA Testing this hypothesis of baboon soil preference and why mammals consume clay.
CA 8.2.6.1	Sengo, M.R., and Anderson, D.M.	2004	Controlling Harmful Algal Blooms Through Clay Flocculation	J. Eukaryot. Microbiol. vol 51, no. 2: 169-172	Supplementary, no data to impact RA An evaluation of using clays to control algal blooms.
CA 8.3.2	Gharbi, N., and Abdallah, B.A.	2016	Laboratory Evaluation of Side-Effects of Kaolin on Two Predatory Species Found on Olive Groves	Tunisian Journal of Plant Protection 11: 83-90	Supplementary, no data to impact RA Reporting that the active substance, kaolin, applied to olive leaves at 5 kg a.s./hL caused minimal adverse effects to <i>Anthocoris nemoralis</i> and <i>Chrysoperla carnea</i> .
CA 8.6	Glenn, D.M., and Puterka, G.J.	2005	Particle Films, A New Technology for Agriculture	Horticultural Reviews. Vol 31. Edited by Janick K. John Wiley & Sons, Inc	Supplementary, no data to impact RA Evaluating crop quality from the use of clays.
CP 10.1.2	Ta, C.A.K, Pebsworth, P.A., Liu, R, Hillier, S., Gray, N., Arnason, J.Y., and Young, S.L.	2017	Soil eaten by chacma baboons absorbs polar plant secondary metabolites representative of those found in their diet	Environ Geochem Health. Springer Netherlands	Supplementary, no data to impact RA Testing this hypothesis of baboon soil preference and why mammals consume clay.
CP 10.2	Kefford, B.J., Zalizniak, L., Dunlop, J.E., Nugegoda, D and Choy, S.C.	2010	How are macroinvertebrates of slow flowing lotic systems directly affected by suspended and deposited sediments?	Environmental Pollution 158: 543-550	Supplementary, no data to impact RA Investigating potential adverse effects from long-term turbidity.
CP 10.2	Talaat, H.A., <i>et al.</i>	2011	Evaluation of Heavy Metals Removal Using Some Egyptian Clay	2011 2 <sup>nd</sup> International Conference on Environmental Science and Technology. IPCBEE vol 6, Singapore	Supplementary, no data to impact RA Reporting how kaolin can be used as an absorbent to reduce the aquatic toxicity of certain chemicals.
CP 10.2	Abu-Safa, A., Abu-Safa, S., Mosa, M., and Gharaibeh, S.	2012	Low Cost Pre-Treatment of Pharmaceutical Wastewater	International Journal of Chemical and Biological Engineering vol 6	Supplementary, no data to impact RA reporting how kaolin can be used as an absorbent to reduce the aquatic toxicity of certain chemicals.
CP 10.3.2	Benhadi-Marin, J., Pereira, J.A., and Santos, S.A.P.	2016	Effects of kaolin particle films on the life span of an orb-weaver spider	Chemosphere 144: 918-924	Supplementary, no guideline data to impact RA. Reference does indicate that orb-weaver spider can be sensitive to based on different routes of exposure.
CP 10.3.2.2/01	Porcel, M., Cotes, B., and Campos, M.	2011	Biological and behavioural effects of kaolin particle film on larvae and adults of <i>Chrysoperla carnea</i> (Neuroptera: Chrysopidae)	Biological Control 59: 98-105	Relevant. OECD summary provided. Laboratory and field experiments reporting the effect of Surround WP on <i>Chrysoperla carnea</i>
CP 10.3.2.2/02	Bengochea, P., <i>et al.</i>	2010	Side effects of kaolin on natural enemies found on olive crops	Pesticides and Beneficial Organisms vol 55: 61-67	Relevant. OECD summary provided. Evaluating the effects of Surround on <i>Psytalia concolor</i> , <i>Chrysoperla carnea</i> , <i>Chilocorus nigritus</i> and <i>Anthocoris nemoralis</i> according to IOBC sequential scheme.

CP 10.3.2.2/03	Bengochea, P., <i>et al.</i>	2014	Non-target effects of kaolin and copper applied on olive trees for the predatory lacewing <i>Chrysoperla carnea</i>	Biocontrol Science and Technology, vol 24, no 6: 625-640	Relevant. OECD summary provided. Laboratory and field experiments reporting the effect of Surround WP on <i>Chrysoperla carnea</i>
CP 10.3.2.2/04	Bengochea, P., <i>et al.</i>	2013	Kaolin and copper-based products applications: Ecotoxicology on four natural enemies	Chemosphere 91: 1189-1195	Relevant. OECD summary provided. The effect of kaolin on <i>Anthrenus nemoralis</i> , <i>Chelonus inanitus</i> , <i>Chilocorus nigritus</i> and <i>Scutellista cyanea</i> were investigated under extended laboratory conditions
CP 10.3.2.4/10	Pascual, S., Cobos, G., Seris, E., and Gonzalez-Nunez, M.	2010	Effects of processed kaolin on pests and non-target arthropods in a Spanish olive grove	J Pest Sci 83:121-133	Relevant. OECD summary provided. A 3 year field trial to assess the effects of Surround WP on the arthropod community of olive trees.
CP 10.3.2.4/11	Marko, V., Bogya, S., Kondorosy, E., and Blommers, L.H.M.	2009	Side effects of kaolin particle films on apple orchard bug, beetle and spider communities	International Journal of Pest Management vol 56: 189-199	Relevant. OECD summary provided. The effects of multiple applications of kaolin particle film on apple orchard bug (Heteroptera), beetle (Coleoptera) and spider (Araneae).
CP 10.6	Wang, M., Chen, L, Chen, S. and Ma, Y.	2011	Alleviation of cadmium-induced root growth inhibition in crop seedlings by nanoparticles	Ecotoxicology and Environmental Safety 79 (2012): 48-54	Supplementary, data not used in guideline RA. A root growth inhibition study.

### Ecotoxicology evaluation table (non-relevant articles)

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils ecotox data requirement?	Comments	Discussion on relevance
Benhadi-Marin, J., Pereira, J.A., and Santos, S.A.P.	2016	Effects of kaolin particle films on the life span of an orb-weaver spider	Chemosphere 144: 918-924	No	Non-guideline study, focusing on route of exposure.	Not relevant
Brennan, F.P., Moynihan, E., Griffiths, B.S., Hillier, S., Owen, J., Pendrowski, H., and Avery, L.M.	2014	Clay mineral type effect on bacterial enteropathogen survival in soil	Science of the Total Environment 468-469:302-305	No	The effects of clay on the survival of enteropathogens in the environment.	Not relevant
Dutertre, M., Barille, L., Haure, J., and Cogne, B.	2007	Functional responses associated with pallial organ variations in the Pacific oyster <i>Crassostrea gigas</i> (Thunberg, 1793)	Journal of Experimental Marine Biology and Ecology 352: 139-151	No	Non-guideline research on the plasticity and function of the pallial organs in the Pacific oyster.	Not relevant
Karise, R., Muljar, R., Smagghe, G., Kaart, T., Kuusik, A., Dreyersdorff, G., Williams, I.H., and Mand, M.	2016	Sublethal effects of kaolin and the biopesticides Prestop-Mix and BotaniGard on metabolic rate, water loss and longevity in bumble bees ( <i>Bombus terrestris</i> )	J Pest Sci 89:171-178	No	Non-guideline study. Findings irrelevant for risk assessment	Not relevant
Mahmoud, A.E.M., El-Sebai, O.A., Shahen,	2010	Impact of kaolin-based particle film dusts on <i>Callosobruchus maculatus</i> (F.) and <i>C.</i>	Julius-Kuhn Archiv, 425. 10 <sup>th</sup> International Working	No	An efficacy trial to determine if kaolin powder could help in prolonging storage of broad bean seeds.	Not relevant

Authors	Year	Title	Source (Journal, volume, pages)	Fulfils ecotox data requirement?	Comments	Discussion on relevance
A.A., and Marzouk, A.A.		<i>chinensis</i> (L.) after different storage periods of treated broad bean seeds	Conference on Stored Product Protection			
Michel, C, Herzog, S, de Capitani, C, Burkhardt-Holm, P., and Pietsch, C.	2014	Natural mineral particles are cytotoxic to rainbow trout gill epithelial cells <i>in vitro</i>	PLOS ONE	No	Non-guideline <i>in vitro</i> study on trout gills. Finding no relevant for risk assessment.	Not relevant
Mommaerts, V., Put, K., Vandeven, J., and Smagghe, G	2011	Miniature-dispenser-based bioassay to evaluate the compatibility of powder formulations used in an entomovectoring approach	Pest Management Science	No	Bioassay development	Not relevant
Zhang, X., Guo, P., Huang, J., and Hou, X.	2013	Effects of suspended common-scale and nanoscale particles on the survival, growth and reproduction of <i>Daphnia magna</i>	Chemosphere 93: 2644-2649	No	Non-guideline study. Reference focuses more on other compounds other than kaolin.	Not relevant