ENVIRONMENTAL RISKS ASSOCIATED TO **PLASTICIZERS AND SWEETENERS** in the Nordic countries

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Project carried out for: **THE NORDIC SCREENING GROUP**

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Project carried out for the Nordic Screening Group
December 2010

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SUMMARY

The Nordic Screening Group has been assigned to draw attention to new environmental pollutants. Plasticizers and sweeteners are extensively used and the risk they represent as environmental pollutants needs to be assessed. Certain plasticizers and sweeteners have been listed on the Nordic Council's chemical priority list and are documented in this report as regards to the present knowledge available on their tonnage, physical/chemical properties, toxicity and environmental monitoring results. The aim is to make available a background that will allow the identification of those of greatest concern.

A literature research was carried out for each compound in the following databases ESIS, IUCLID and Toxnet (HSDB). The results were compared to REACH regulation standards in order to distinguish chemicals that are persistent, bioaccumulative and toxic. The SPIN database was used to establish the tonnage and consumption trend of each compound.

This study shows that to date knowledge regarding the environmental behaviour/toxicity of plasticizers is relatively well established, and lacks for sweeteners. The results of this study were used in order to prioritize which compounds would need to be further looked into, in particular monitor their presence in the Nordic environment. The prioritization was based on the following characteristics of the compound:

- persistence
- bioaccumulation
- toxicity to aquatic organisms
- longterm toxicity
- long range transport potential
- if it had been monitored in the Nordic environment and what quantities were detected
- tonnage and consumption trend

The following compounds were distinguished as those of greatest concern:

- bis(2-ethylhexyl) adipate and its metabolite 2-ethylhexanoic acid
- diisononyl adipate.
- di-''isononyl'' phthalate
- di-''isodecyl'' phthalate
- dioctyl phthalate (DnOP)
- bis(2-ethylhexyl) sebacate
- Polydimetylsiloxan
- bis(2-ethylhexyl) azelate
- tris(2-ethylhexyl) phosphate
- Triphenyl phosphate
- Parafin waxes and Hydrocarbon waxes, chloro
- Alkanes, C14-17, chloro
- aspratam
- cyclamate
- saccharin
- maltitol
- lactitol

SAMMENDRAG

Nordic Screening Group har fått i oppdrag å se på nye miljøgifter. Mykgjørere og søtstoffer er mye brukt og den risikoen de representerer som miljøgifter må vurderes. Visse mykgjørere og søtstoffer befinner seg på Nordisk Råds kjemiske prioriteringsliste og er dokumentert i denne rapporten med hensyn på tilgjengelig kunnskap vedrørende tonnasje, fysiske / kjemiske egenskaper, toksisitet og miljøovervåkingsresultater. Målet er å danne en bakgrunn for å identifisere de meste bekymringsfulle kjemikalier.

Et litteratursøk ble gjennomført for hvert stoff i følgende databaser: ESIS, IUCLID og Toxnet (HSDB). Resultatene ble sammenlignet med REACH-forordningens standarder for å skille ut kjemikalier som er persistente, bioakkumulerende og giftige. SPIN databasen ble brukt for å etablere tonnasje og forbrukstrend for hvert stoff.

Denne studien viser at oppdatert kunnskap om miljøatferd / toksisitet av mykgjørere er relativt godt etablert men mangler for søtningsmidler.

Resultatene av denne studien ble brukt for å prioritere hvilke forbindelser som ville trenge ytterligere vurdering, spesielt med hensyn på overvåkning av forekomstene til disse stoffene i det nordiske miljøet. Prioriteringen var basert på følgende kjemiske egenskaper:

- persistens
- bioakkumulering
- toksisitet for vannlevende organismer
- langsiktig toksisitet
- langtransport potensial
- om det hadde vært overvåket i det nordiske miljøet, og hvilke mengder som i så fall ble oppdaget
- tonnasje og forbrukstrend

Følgende forbindelser ble erklært som de mest bekymringsfulle:

- bis(2-etylhexyl) adipat og metabolitt 2-etylhexanoisk syre
- diisononyl adipat.
- di-''isononyl'' ftalat
- di-''isodecyl'' ftalat
- dioctyl phthalat (DnOP)
- bis(2-ethylhexyl) sebacat
- Polydimetylsiloxan
- bis(2-ethylhexyl) azelat
- tris(2-ethylhexyl) fosfat
- triphenyl fosfat
- klor parafin-vokser og Hydrokarbon-vokser
- klor alkaner, C14-17
- aspratam
- cyclamat
- saccharin
- maltitol
- laktitol

CONTENTS

INTRODUCTION

Today, industrials have an important variety of plasticizers and sweeteners to choose from. These components have comparable industrial properties but could behave differently once in the environment. In this manner, some could represent a potential threat to certain compartments of the biosphere, causing adverse effects in certain organisms and potentially extend to causing a risk to public health.

The Nordic Screening Group has been assigned to draw attention to new environmental pollutants, which would require further research or extended regulations as regards to their use and emission. Plasticizers and sweeteners are extensively used and the risk they represent as environmental pollutants needs to be assessed.

This study was carried out by Bergfald Miljørådgivere, on behalf of the Nordic screening group. The project was financed and supported by the Nordic Chemical Group on behalf of the Nordic Council of Ministers.

This report documents the present knowledge of use volume, use categories, physical/chemical data, available toxicity data and monitoring data for certain plasticizers and sweeteners, commonly used in a broad range of products in the Nordic countries. The aim is to make available a background that will allow the identification of those of greatest concern.

The data report reflects the current state of knowledge regarding the persistence, bioaccumulation and toxicity (PBT) properties of these components associated to their respective potential for long range transport and the import/consumption of these components in the Nordic countries.

This report also highlights where knowledge is lacking.

The overall objective is to provide the Nordic Screening Group with the necessary data and information to assess the need for a screening study on some or all of these substances in order to elucidate the occurrence of these in the environment.

This report includes available data on plasticizers and sweeteners present on the Nordic Screening Group's priority list and presented in Table 1 and Table 2.

PLASTICIZERS:
Additives that increase the plasticity or fluidity of the material to which they are added; these include plastics, cement, concrete, wallboard, and clay.

SWEETENERS:
A sugar substitute, classified as a food additive that duplicates the effect of sugar in taste, usually with less food energy. Some sugar substitutes are natural and some are synthetic.

Box 1: Definitions[1]

PLASTICIZERS

CAS:	NAME OF SUBSTANCE:
78-51-3	Tris(2-butoxyethyl) phosphate
63449-39-8	Parafin waxes and Hydrocarbon waxes, chloro
122-62-3	Bis(2-ethylhexyl) sebacate
143-29-3	Bis(2-(2-butoxyethoxy)ethoxy)methane
103-23-1	Bis(2-ethylhexyl) adipate
28553-12-0	Di-"isononyl" phthalate
85-68-7	Benzyl butyl phthalate
117-81-7	Bis(2-ethylhexyl) phthalate
84-74-2	Dibutyl phthalate
26761-40-0	Di-"isodecyl" phthalate
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)
63148-62-9	Polydimetylsiloxan
115-83-3	Pentaerythrityltetrastearate
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate
103-24-2	Bis(2-ethylhexyl) azelate
68515-41-3	Dialkyl(C7-C9)phthalate
3089-55-2	Benzyl octyl adipate
33703-08-1	Diisononyl adipate
85535-85-9	Alkanes, C14-17, chloro
27554-26-3	Diisooctyl phthalate
3370-35-2	N-(hydroxymethyl)stearamide
117-84-0	Dioctyl phthalate
141-17-3	Bis(2-(2-butoxyethoxy)ethyl) adipate
78-42-2	Tris(2-ethylhexyl) phosphate
25429-29-2	Pentachloro[1,1'-biphenyl]
133-49-3	Pentachlorobenzenethiol
115-86-6	Triphenyl phosphate
3648-20-2	Diundecyl phthalate

Table 1: Plasticizers considered in this report

SWEETENERS

CAS:	NAME OF SUBSTANCE:
50-70-4	Sorbitol, sorbitolsirap
69-65-8	Mannitol
55589-62-3	Acesulfame K
22839-47-0	Aspartam
100-88-9	cyclamate
64519-82-0	Isomalt
81-07-2	saccharin
56038-13-2	sucralose
53850-34-3	Taumatin
20702-77-6	Neohesperidindihydrochalcon/neohesperidin DC
585-88-6	Maltitol, maltitolsirap
585-86-4	Laktitol
87-99-0	Xylitol
149-32-6	Erytritol

Table 2: Sweeteners considered in this report

The report is divided in two sections; the first section is dedicated to the plasticizers and the second to the sweeteners. This document presents a summary of the main findings and conclusions for all the components in the main text, and more extensive data can be found in the annexes. At the end of each section, the reader can refer to a risk matrix in which the components of most concern are identified and areas where knowledge is lacking are highlighted.

LIST OF ABBREVIATIONS

aq. org.	aquatic organisms
B	Bioaccumulative
BCF	Bioaccumulation concentration factor
bioaccum.	bioaccumulation
BMF	Biomagnifying factor
bw	body weight
Carc.	Carcinogene
dw	dry weight
EC50	Effect concentration 50%
ECB	European chemical bureau
ESIS	European chemical substance information system
HPV	High production volume
ICCA	Internation council of chemical associations
LD50	Lethal dose 50%
lg.term	long term
LOAEL	Lowest observed adverse effect level
LOI w	Loss of ignition weight
LPV	Low production volume
LRT	long range transport
MSWD	Municipal Solid Waste Deposit
ND	not detectable (under detection limits)
NOAEL	Non observed adverse effect level
NSG	Nordic screening group
P	Persistent
R	Risk sentence
Repr.	Reprotoxic
STP	Sweage Treatment Plant
T	Toxic
TT	Toxic treshold
ww	wet weight

1. METHODOLOGY

This report is a classical literature study to assess the environmental risks associated to the use of 28 plasticizers and 14 sweeteners in the Nordic region. In addition, data was gathered to document laboratory analysis methodologies used for screening the environmental presence of these components.

The elements considered in the assessment were the following:

- General information on the components: identification (CAS, chemical formula, moleular structure, etc.), general physico-chemical properties;
- Toxicological and ecotoxicological data: documentation of the PBT properties and long range transport potential, and identification of main known metabolites;
- Registered tonnage of consumption/import of the components.
- Overview of monitoring data available in the Nordic countries.

As regards to the general and toxicity-ecotoxicity research, due to a restricted timeframe, research was restrained exclusively to the following databases: ESIS, IUCLID and Toxnet (HSDB). The databases were searched in a prioritised manner: ESIS first (EU risk assessment reports) and Toxnet last. If data was missing in the first database the second one would be consulted, etc. In this manner, not all databases were necessarily consulted for each component.
In addition to these databases, data provided by the members of the NSG was also considered.
In the case where data was absent from all three databases and the extra documentation provided by NSG, the data was considered absent.

To assess the PBT potential of the components, a comparison was carried out between the environmental behaviour and eco-toxicity and toxicity data and the criteria defined in Annex XIII of the REACH regulations, described in Table 3. In addition, when the specific data was not available to compare with the criteria defined in Table 3, the screening criteria described in Table 4 were used. Components that showed evidence of chronic toxicity in terms of neurotoxicity, carcinogenicity, mutagenicity, reprotoxicity or teratogenicity were automatically classified as toxic. When several values were available, the "worst case scenario" data was used for the comparison (e.g. the lowest LD50).
In this report no distinction was made between persistent, bioaccumulative (PB) and very persistent, very bioaccumulative (vPvB).

PROPERTY	PBT-CRITERIA	VPVB-CRITERIA
PERSISTENCE The assessment of the persistency in the environment shall be based on available half-life data collected under the adequate conditions, which shall be described by the registrant.	■ T1/2 > 60 days in marine water, or ■ T1/2 > 40 days in fresh- or estuarine water, or ■ T1/2 > 180 days in marine sediment, or ■ T1/2 > 120 days in fresh- or estuarine sediment, or ■ T1/2 > 120 days in soil.	■ T1/2 > 60 days in marine, fresh- or estuarine water, or ■ T1/2 > 180 days in marine, fresh- or estuarine sediment, or ■ T1/2 > 180 days in soil.
BIOACCUMULATION The assessment of bioaccumulation shall be based on measured data on bioconcentration in aquatic species. Data from freshwater as well as marine water species can be used.	BCF > 2000 L/kg	BCF > 5000 L/kg
TOXICITY	■ NOEC (long-term) < 0.01 mg/L for marine or freshwater organisms, or ■ substance is classified as carcinogenic (category 1 or 2), mutagenic (category 1 or 2), or toxic for reproduction (category 1, 2 or 3), or ■ there is other evidence of chronic toxicity, as identified by the classifications: T, R48, or Xn, R48, according to Directive 67/548/EEC.	

Table 3: PBT and vPvB criteria according to Annex XIII[3]

TYPE OF DATA	CRITERION	SCREENING ASSIGNMENT
PERSISTENCE		
Ready biodegradability test	readily biodegradable	Not P and not vP
Enhanced ready biodegradability test	readily biodegradable	Not P and not vP
Specified tests on inherent biodegradability		
Zahn-Wellens (OECD 302B)	≥70 % mineralisation (DOC removal) within 7 d; log phase no longer than 3d; removal before degradation occurs below 15%; no pre-adapted inoculum	Not P
MITI II test (OECD 302C)	≥70% mineralisation (O2 uptake) within 14 days; log phase no longer than 3d; no pre-adapted inoculum	Not P
Biowin 2 (non-linear model prediction) and Biowin 3 (ultimate biodegradation time) or	Does not biodegrade fast (probability < 0.5) and ultimate biodegradation timeframe prediction: ≥ months (value < 2.2) or	P
Biowin 6 (MITI non-linear model prediction) and Biowin 3 (ultimate biodegradation time)	Does not biodegrade fast (probability < 0.5) and ultimate biodegradation timeframe prediction: ≥ months (value < 2.2)	P
BIOACCUMULATION		
Convincing evidence that a substance can biomagnify in the food chain (e.g. field data)	e.g. BMF > 1	B or vB, definitive assignment possible
Octanol-water partitioning coefficient (experimentally determined or estimated by valid QSAR)	Log Kow ≤ 4.5	Not B and not vB
TOXICITY		
Long-term aquatic toxicity (algae,daphnia, fish)	EC50 or LC50 < 0.01 mg/L	T, criterion considered to be definitely fulfilled
Short-term aquatic toxicity (algae, daphnia, fish)	EC50 or LC50 < 0.1 mg/L	T
Avian toxicity (subchronic or chronic toxicity or toxic for reproduction)	NOEC < 30 mg/kg food	T

Table 4: Screening criteria for P, vP, B, vB and T[4]

Note 1: *Biodegradation tests other than MITI II test (OECD 302C), 14 days were considered when the latter was not available.*
Note 2: *log Kow is a theoretical value and bioaccumulation is dependant on other factors as well. In this report compounds with a log Kow< 4,5 and no bioaccumulation concentration factor (BCF) will be considered as "not bioaccumulative", this is an indication that should be taken with some reserve.*

Atmospheric long range transport potential of a component is directly related to the component's ability to persist in the atmosphere long enough to be transported a significant distance.

The long-range transport potential of the components was assessed according to guidance given in an ICCA discussion paper.[2] Only physico-chemical data and knowledge of the component's behavior in the environment are used in this report to estimate the long range transport potential of the components. The ICCA identifies: a component as persistent enough in the atmosphere to LRT if its half-life is above 2 days. The ICCA document referred to also looks into the deposition potential of components, which corresponds to the component's ability to partition out of the atmosphere and deposit in the biosphere, once it has been transported. This will not be considered in this report. However, the ability of the component to vaporise has been considered in the LRT assessment. In addition to long range transport in the air, the potential to long range transport in water is also considered by assessing the solubility of the components and their ability to persist in water.
This methodology only gives an indication as to the potential to long range transport.

Research regarding the tonnage of consumption/import was based on data from the SPIN database (Substances in Preparations In Nordic countries). Tonnage for the Faroe Islands is not registered in the SPIN database. If no data was registered in SPIN, the information was considered as unavailable. When possible the consumption/import trend of these components, over the last years was identified specifically for each country. However, it seems that not all countries

register the import and use of chemicals as thoroughly. For several of the chemicals, Sweden has much higher consumption than the other countries, without any obvious reason. Our knowledge of Norwegian industrial structure suggests that for some chemicals, actual consumption is higher than what is registered in the SPIN-database. This report does not discuss further the reasons of these potential discrepancies.

Examples of laboratory analysis used in studies to screen the presence of the components in the environment were retrieved and are briefly described in this report.

2. PLASTICIZERS

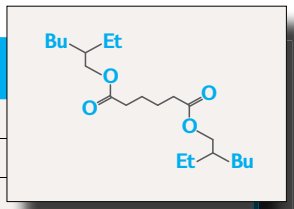
In this section each plasticizer selected by NSG and present on their priority list, is assessed one by one. For each component the persistence, bioaccumulation and toxicity and long range transport is assessed, according to knowledge currently available, as described in the methodology. Only the data used for the assessment is indicated in the main report and additional data can be found in the annex. In addition, the major applications of the components are also briefly described, in cases where information was available. If the component is registered on the SPIN database a brief review of the consumption trend is described by a graph. When data was retrieved as regards to possible analytical methodologies of the component, the latter is described.

More specific data can be found in the following annexes:

- Annex 1A: chemical and physical properties
- Annex 1B: environmental behaviour
- Annex 1C: toxicology in aquatic organisms
- Annex 1D: toxicology in mammals
- Annex 1E: toxicology in other species
- Annex 1F: Spectrometric data
- Annex 1G: Standardised analysis methodologies for plasticizers
- Annex H: Monitoring data in the Nordic countries

At the end of the section a matrix resuming the environmental risks associate to all the plasticizers and based on a colour code will allow the reader to compare the components between them.

BIS(2-ETHYLHEXYL) ADIPATE



IDENTIFICATION[5]	
CAS nr.	103-23-1
EC nr	203-090-1
Chemical formula	C22H42O4
EU Classification	Not classified.
Major applications[6]	Plasticizer commonly blended with general purpose plasticizers in processing polyvinyl and other polymers. Used in food wrapping. Functional (hydraulic) fluid. Plasticizer or solvent in cosmetics.
Tonnage in 2008 (tonnes)[7]	Europe: registered HPV Norway: 29,3 Denmark: 14,1 Sweden: 879 Finland: Conf.

PERSISTENCE[8]	Not Persistent Aerobic biodegradation in activated sludge, 28 days degradation > 66% Considered readily biodegradable
BIOACCUMULATION[8]	Bioaccumulative calculated log Kow= 8,114 calculated BCF= 27 000
TOXICITY[8]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50 96 (Daphnia magna) = 0,66mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l NOEC 21days(Daphnia magna) > 0,77mg/l Toxic over prolonged exposure Possible carcinogens. Dose-dependent foetotoxic.
METABOLITES[6]	In urine: adipic acid, CAS 124-04-9 2-ethylhexanol pathway: 2-ethylhexanoic acid, CAS 149-57-5 (either conjugated (glucuronidation) or submitted to other pathways.)
LONG-RANGE TRANSPORT[8]	Not expected to LRT Estimated environmental partitioning in air = 65,4% Indirect photolysis: T 1/2= 15,7 hours
ANALYTICAL METHODS[6]	HPLC for sample clean-up drinking water extracts for later analysis by GC/MS is described. Gas chromatography/flame ionization detection analysis of di (2-ethylhexyl) adipate in meat and meat/fat mixtures detection limit is not given. Standard methods: EMSLC Method 506; EMSLC Method 525.1.; EMSLC Method 525.2.
MONITORING IN THE NORDIC COUNTRIES	Detected in STPs: sludge. Detected in sediment. Detected in surface waters. Can be detected in biota. Detected in the air (indoors and outdoors)

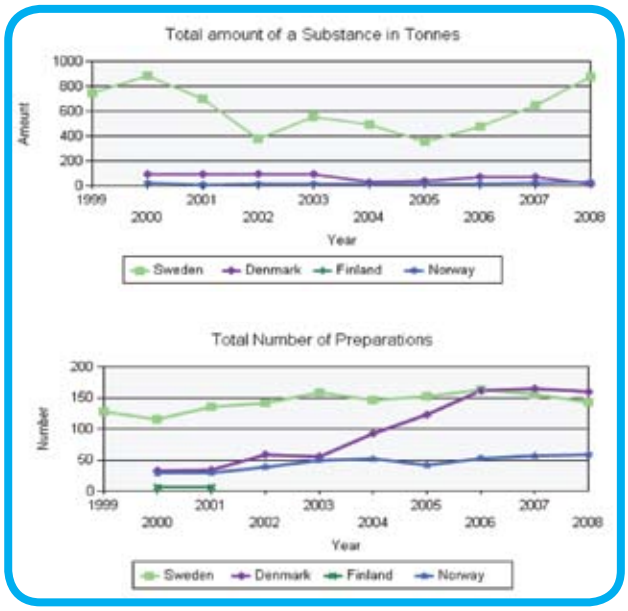
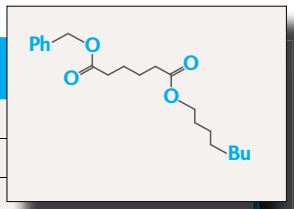


Figure 1: Tonnage of Bis(2-ethylhexyl) adipate in the Nordic countries[7]

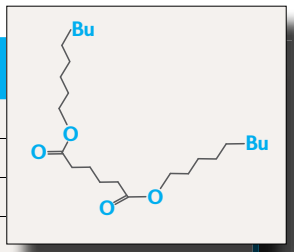
BENZYL OCTYL ADIPATE



IDENTIFICATION[5]	
CAS nr.	3089-55-2
EC nr	221-431-2
Chemical formula	C21H32O4
EU Classification	no classification
Tonnage in 2008 (tonnes)	No data

PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : No data No BCF
TOXICITY[9]	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed No data on long-term exposure, however data shows low acute toxicity Oral : LD 50 (rat) = 5000 mg/kg bw
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: cannot be assessed No data
ANALYTICAL METHODS	US EPA Standardised methods: EMSLC Method 506; EMSLC Method 525.1. ; EMSLC Method 525.2.
MONITORING IN THE NORDIC COUNTRIES	No data

DIISONONYL ADIPATE



IDENTIFICATION[5]	
CAS nr.	33703-08-1
EC nr	251-646-7
Chemical formula	C24H46O4
EU Classification	no classification
Tonnage in 2008 (tonnes)[7]	Norway: 0,1 Denmark: 1,3, Sweden: 325 Finland: no data
PERSISTENCE[10]	Not Persistent Aerobic biodegradation, activated sludge, domestic, non–adapted Degradation = 82 % after 28 day
BIOACCUMULATION	Bioaccumulative Log Kow = 9,56 – 10,4 [10] BCF= 203 [11]
TOXICITY[10]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50 96 hr.(Leuciscus idus) > 500 mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l NOEC 21 day (Daphnia magna) > 100 mg/l Toxic over prolonged exposure Showed to induce an adverse effect on fertility in dogs.
METABOLITES	No data
LONG-RANGE TRANSPORT[10]	Cannot be fully assessed, but is not expected to LRT Vapour pressure < 0,1 hPa at 20 C Low volatility Solubility in water < 1 mg/l at 20 C Is expected to biodegrade readily.
ANALYTICAL METHODS	US EPA Standardised methods: EMSLC Method 506; EMSLC Method 525.1. ; EMSLC Method 525.2.
MONITORING IN THE NORDIC COUNTRIES	No data

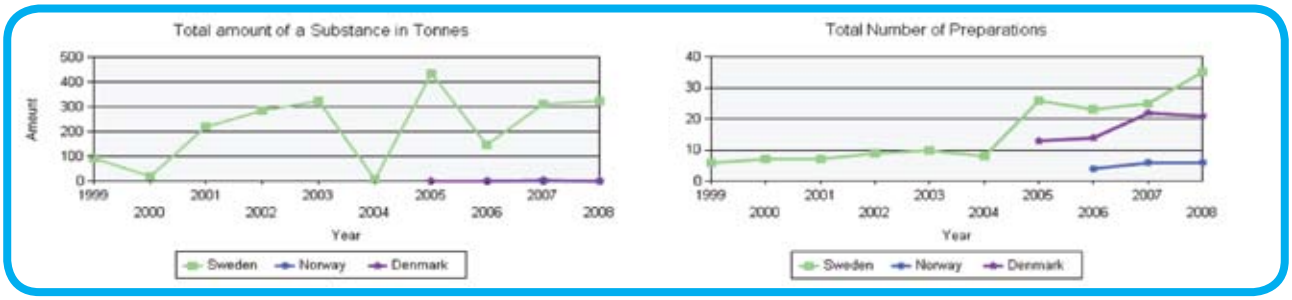
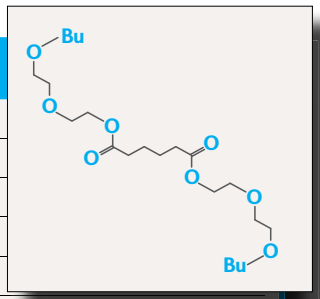


Figure 2: Tonnage of Diisononyl adipate in the Nordic countries[7]

BIS(2-(2-BUTOXYETHOXY)ETHYL) ADIPATE



IDENTIFICATION[5]	
CAS nr.	141-17-3
EC nr	205-465-5
Chemical formula	C22H42O8
EU Classification	Not classified.
Major applications[12]	Plasticizer for cellulose nitrate and polyvinyl acetate Plasticizer and softeners for natural and synthetic rubbers.
Tonnage in 2008 (tonnes) [7]	Europe: registered LPV Norway: no data Denmark: no data Sweden: 13 Finland: no data
PERSISTENCE[12]	Potentially Persistent Hydrolysis t1/2 (pH 7)= 294 days Hydrolysis t1/2 (pH 8)= 29 days May biodegrade in water.
BIOACCUMULATION	Not Bioaccumulative Log Kow = 3,24 [12] BCF= 61,66 [13]
TOXICITY[12]	Toxic: cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed No data for prolonged exposure. However acute toxicity in rats appears to be very low: Oral: LD 50 (rat)= 6g/kg bw
METABOLITES	No data
LONG-RANGE TRANSPORT[12]	Not expected to LRT Vapour pressure= 9,8.10-8 mmHg at 25C Vapour-phase is degraded in the atmosphere by reaction with hydroxyl radicals; t1/2 = 5 hours May also undergo direct photolysis. Particulate-phase may be removed from the air by wet and dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component. There is a no specific data available as regards to the solubility of the component in water. However, other adipates are relatively soluble and biodegrade in water.
ANALYTICAL METHODS[12]	HPLC for sample clean-up drinking water extracts for later analysis by GC/MS is described. Gas chromatography/flame ionization detection analysis of di (2-ethylhexyl) adipate in meat and meat/fat mixtures detection limit is not given. Standard methods: EMSLC Method 506; EMSLC Method 525.1.; EMSLC Method 525.2.
MONITORING IN THE NORDIC COUNTRIES	No data

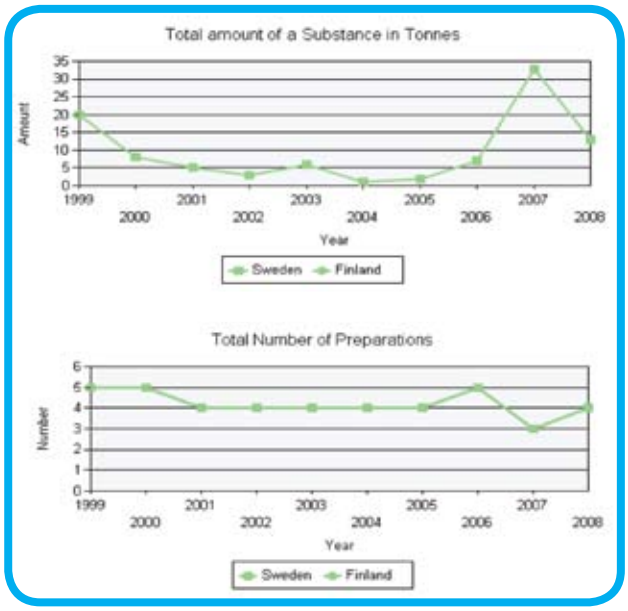
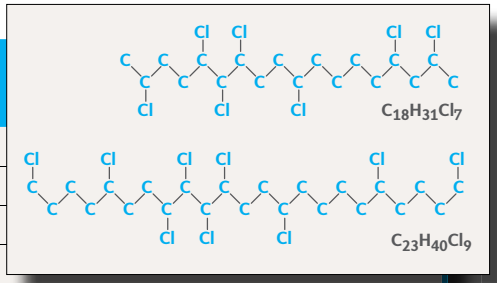


Figure 3: Tonnage of bis(2-(2-butoxyethoxy)ethyl) adipate in the Nordic countries[7]

PARAFIN WAXES AND HYDROCARBON WAXES, CHLORO: LONG CHAIN CHLORO-PARAFIN (LCCP)



IDENTIFICATION[5]	
CAS nr.	63449-39-8 (also sold under the CAS 85422-92-0)
EC nr	264-150-0
Chemical formula	C17-C23
EU Classification	Not classified.
Major applications[14]	In high-pressure lubricants, as flame retardant in plastics and textiles, plasticizer for PVC in polyethylene sealants, and in detergents. Extreme pressure lubricant additive-metal working industry. Rot-preventing agent. Historically also in marine paints and several other applications.
Tonnage in 2008 (tonnes)[7]	Europe: registered HPV Norway: 55,7 Denmark: 23,2 Sweden: 343 Finland: Stated as confidential

PERSISTENCE[15]	Persistent Not readily biodegradable 25 day biochemical oxygen demand (BOD) test, acclimatised microorganisms, C20-30 (42% chlorinated): Biodegradation = 23%
BIOACCUMULATION[14]	Bioaccumulative Log Kow > 6 BCF (fresh water fish)= 7800
TOXICITY[16]	Not Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC 50 24 (Daphnia magna) = 100 mg/l (60% Cl, with emulsifier) All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l) NOEC 60days (salmo gairdneri) >3,8mg/l (70% Cl) Shorter the chain higher the toxicity. Not Toxic over prolonged exposure Based on only one study over a 13 weeks period on rats.
METABOLITES[14]	Conjugates of N-acetylcysteine (mercapturic acid) and glutathione. Intermediate chain length chlorinated paraffin.
LONG-RANGE TRANSPORT[14]	Not expected to LRT Photodegrades: T1/2 (35% Cl)= 0,5 days T1/2 (53% Cl)= 1,4 days However, some of the degradation products have potential for LRT.
ANALYTICAL METHODS[14]	Capillary GC combined with negative ion chemical ionization mass spectrometry (MS) represents a suitable approach as does on-column reduction followed by either GC or combined GC-MS. Resolution of groups of isomers and homologues has been obtained by a GC-MS method.
MONITORING IN THE NORDIC COUNTRIES	Detected in STP sludge. No other monitoring data.

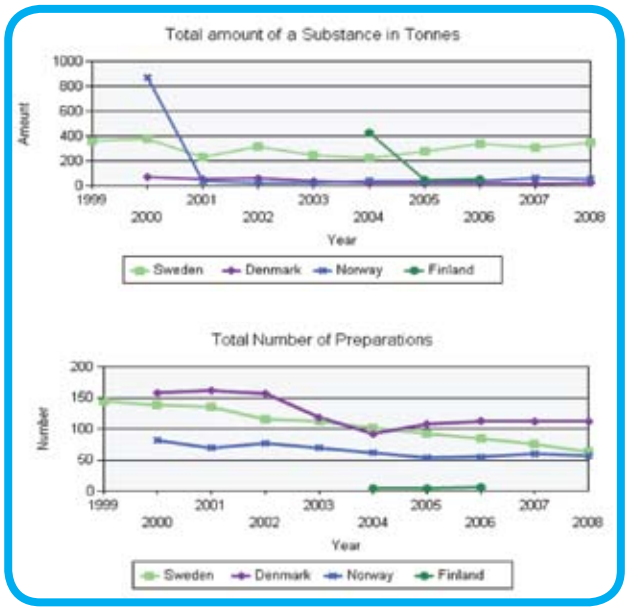
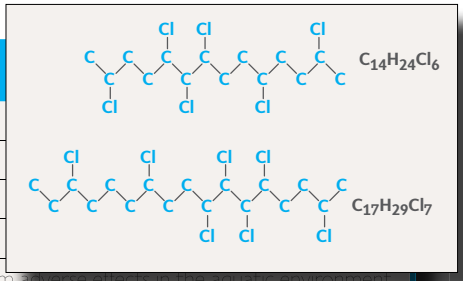


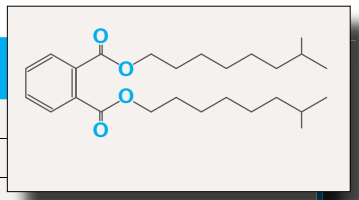
Figure 4: Tonnage of Parafin waxes and Hydrocarbon waxes, chloro in the Nordic countries [7]

ALKANES, C14-17, CHLORO: MEDIUM CHAIN CHLORINATED PARAFIN (MCCP)



IDENTIFICATION[5]	
CAS nr.	85535-85-9
EC nr	287-477-0
Chemical formula	CxH(2x-y+2)Cly, where x = 14-17 and y = 1-17
EU Classification	N; R50-53: very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R64: May cause harm to breastfed babies. R66: repeated exposure may cause skin dryness or cracking.
Major applications	
Tonnage in 2008 (tonnes)[7]	Norway: 145,1 Denmark: 100,5 Sweden: 196 Finland: 12
PERSISTENCE[17]	Persistent Not readily or inherently biodegradable and does not hydrolyse.
BIOACCUMULATION[17]	Bioaccumulative Log Kow = 5,78 – 8 BCF (rainbow trout)= 1 087 l/kg
TOXICITY[17]	Toxic Toxic to aquatic organisms Long-term toxicity: 21 day, multigenerational, NOEC (Daphnia Magna) = 0,010 mg/l Toxic over prolonged exposure Reprotoxic: NOAEL (rat)= 100 mg/kg food Effects on neonatal offspring exposed via lactation
METABOLITES	No data
LONG-RANGE TRANSPORT[17]	Expected to LRT Vapour pressure= 1,3.10-4 to 2,7.10-4 Pa at 20C Atmospheric T1/2= 2 days Low volatility but will persist in the atmosphere.
ANALYTICAL METHODS[18]	Capillary GC combined with negative ion chemical ionization mass spectrometry (MS) represents a suitable approach as does on-column reduction followed by either GC or combined GC-MS. Resolution of groups of isomers and homologues has been obtained by a GC-MS method.
MONITORING IN THE NORDIC COUNTRIES	Detected in sediment. Not detected in biota. No monitoring data for STPs and surface waters.

DI-"ISONONYL" PHTHALATE



IDENTIFICATION[5]	
CAS nr.	28553-12-0
EC nr	249-079-5
Chemical formula	C26H42O4
EU Classification	Not classified.
Major applications[19]	Plasticizers for PVC applications and flexible vinyls, adhesives, plastisols, and nitrocellulose lacquer coatings. Found in PVC toys. Used in perfumes, cosmetics, dyestuffs and pigments.
Tonnage in 2008 (tonnes)[7]	Europe: registered HPV Norway: 216,5 Denmark: 425,5 Sweden: 12 491 Finland: 25,6.

PERSISTENCE[19]	Not Persistent Readily biodegradable: Primary degradation in fresh water >95% in 12 days A shake flask CO2 evolution test: biodegradation T 1/2 =5,31 days
BIOACCUMULATION[20]	Bioaccumulative Log Kow = 5,52 BCF (Arca zebra) = 183.8
TOXICITY	Potentially Toxic Not Toxic to aquatic organisms[20] All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50 96 (Lepomis macrochirus) >0,14 mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l LC50 7 days (Ictalurus punctatus) = 0,42mg/l Potentially toxic over prolonged exposure[19] Mice, oral, 13 weeks: exposed to a dose of 20000 ppm: Results: reprotoxic effects were observed: immature/abnormal sperm forms in the epididymides hypoplasia in the uterus, and absence of corpora luteal in the ovaries.
METABOLITES[19]	Urine: phthalic acid or side-chain oxidation products of Mono-isononyl phtalate (MINP), In the liver: MINP and its side-chain oxidation products. Fat: MINP and its oxidation products.
LONG-RANGE TRANSPORT[19]	Not expected to LRT Vapour-phase: degraded by reaction with photochemically-produced hydroxyl radicals: T 1/2 = 16 hours Particulate-phase removed from the air by wet or dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component.
ANALYTICAL METHODS[21]	DINP and DIDP are complex mixtures of isomers and appear in gas chromatograms as partly unresolved "humps" in a quite broad retention window (about 4 min). Analysed on a 6890N gas chromatograph connected to a 5973N mass selective detector (Agilent). Helium was used as carrier gas. The detector was used in selected ion monitoring mode (SIM) with electron ionisation at the energy 70 eV. Analytes were identified by their characteristic retention time and one target ion used for quantification.
MONITORING IN THE NORDIC COUNTRIES	Can be detected in STP sludge. Can be detected in sediment. Not detected in biota. Detected in the air (indoors and outdoors) Detected in Urban runoff.

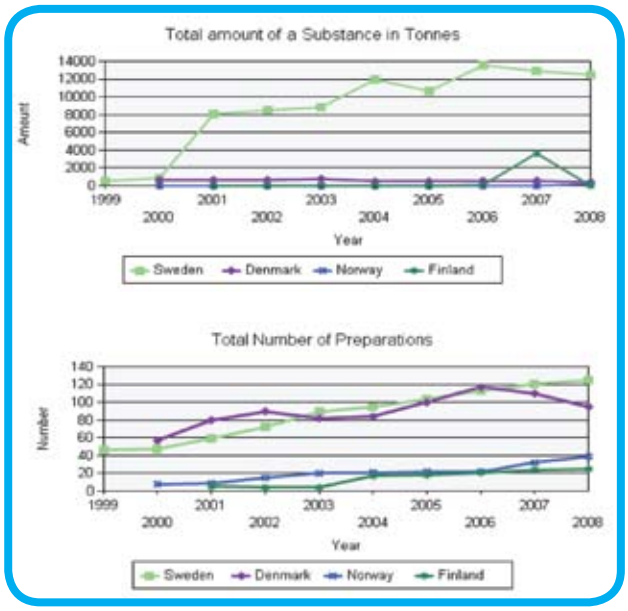


Figure 5: Tonnage of 28553-12-0 in the Nordic countries[7]

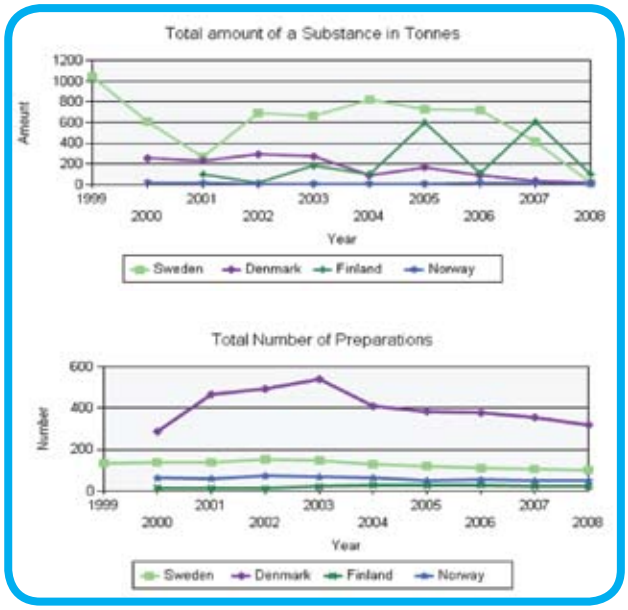
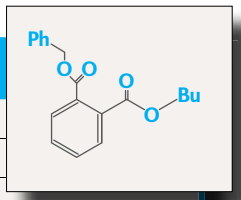


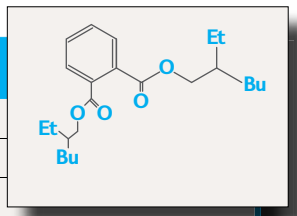
Figure 6: Tonnage of benzyl butyl phthalate in the Nordic countries[7]

BENZYL BUTYL PHTHALATE



IDENTIFICATION[5]	
CAS nr.	85-68-7
EC nr	201-622-7
Chemical formula	C19H20O4
EU Classification	T,N, Repr.2: may cause harm to unborn child Repr.3: poss risk to impaired fertility R60, R61 very toxic to aquatic organisms may cause long-term adverse effects
Major applications[22]	Plasticizer for polyvinyl and cellulose resins, organic intermediate, other plastics (e.g. ethyl cellulose). May be used in sealants, foams, adhesives, coating and inks, car care products, and cosmetics.
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 8,7 Denmark: 17,5 Sweden: 20 Finland:103,3
PERSISTENCE[23]	Not Persistent BBP is ready biodegradable under aerobic conditions fulfilling the 10-day window criterion.
BIOACCUMULATION[23]	Bioaccumulative Log Kow = 4,84 (is above the threshold set) measured BCF =135-663 L/kg
TOXICITY[23]	Toxic Toxic to aquatic organisms Acute toxicity: PNEC surface water is 7,5 µg/l Long-term toxicity: NOEC 28-day (Mysidopsis bahia)= 75 µg/l Estrogenic and anti-androgenic effects in fish are suspected to be induced. Toxic over prolonged exposure Reproduction toxicity study on rats: NOAEL= 50 mg/kgbw
METABOLITES[22]	mono-n-butyl phthalate (MBuP) mono-benzyl-phthalate (MBeP)
LONG-RANGE TRANSPORT[23]	Not expected to LRT Vapour pressure= 0.00112 Pa at 20°C (OH radicals) T1/2= 1,5 days Long distance transport is unlikely due to low volatility and short half-life in the atmosphere.
ANALYTICAL METHODS[22]	Standardised methods: Method EPA 8060; Method EPA 8250; Method: DOE OM100R; Method: EPA-EAD 1625; Method: EPA-EAD 606; Method: EPA-NERL 506; Method: EPA-NERL 525.2; Method: EPA-NERL 625; Method: EPA-OSW 8061A; Method: EPA-OSW 8270D; Method: Standard Methods 6410 B; Method: USGS-NWQL O-3118-83; Method: USGS-NWQL O-5130-95; Sampling Procedures: Two methods for the collection of ambient organic vapours (potential toxic and carcinogenic compounds) at the ng/cu m to ug/cu m level. The methods were adsorption/solvent extraction with polyurethane foam plugs (ASE/PUFP) and adsorption/thermal desorption with Tenax-GC cartridges (ATD/Tenax-GC). ASE/PUFP was used with a single sample flow rate in a single channel of the sampler. ATD/Tenax-GC was used with 2 different sample flow rates in 2 separate channels. Each method was well suited to the analysis of compounds in a specific range of volatility. The low sample volumes used with ATD/Tenax-GC for determinations at the ng/cu m level make it an attractive method for many applications.
MONITORING IN THE NORDIC COUNTRIES	Can be Detected in sediment. Detected in surface waters. Can be Detected in biota. Detected in Urban runoff.

BIS(2-ETHYLHEXYL) PHTHALATE



IDENTIFICATION[5]	
CAS nr.	117-81-7
EC nr	204-211-0
Chemical formula	C24H38O4
EU Classification	Classified T, R60-61 Repr. Cat. 2: may impair fertility and may cause harm to the unborn child
Major applications[24]	Plasticizer in chloride vinyl resins and other resins and synthetic rubbers. Used as a hydraulic fluid and as a dielectric fluid (a non-conductor of electric current) in electrical capacitors. Solvent (e.g. used in erasable ink) Pesticide (e.g. acaricide for use in orchards) Testing agent for air filtration systems Used in vaccum pump oil
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 5,3 Denmark: 124,1 Sweden: 1 489 Finland: 165,5
PERSISTENCE[25]	Persistent Aerobic biodegradation in sediment T1/2= 300 day Biodegradation in surface water T1/2= 50 day
BIOACCUMULATION[25]	Bioaccumulative Log Kow = 7,5 BCF (Gammarus) = 2 700
TOXICITY[25]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50(Rainbow trout) = 540 mg/l Toxic over prolonged exposure Classified reportoxic category 2 Reprotoxicity: NOEC(mammalian predators) = 33 mg/kg food Reprotoxicity: NOEC (birds)= 1700 mg/kg food Has or may have endocrine disrupting effects[26]
METABOLITES[24]	Mono(2-ethylhexyl)phthalate (MEHP)
LONG-RANGE TRANSPORT[25]	Not expected to LRT Atmospheric t½ = 1 day Photodegradation is important in the atmosphere.
ANALYTICAL METHODS[24]	Standardised methodologies: EPA Method 8060; EPA Method 8250; Method: NIOSH 5020, Issue 2; Method: OSHA 104; Method: EPA-EAD 1625; Method: EPA-EAD 606; Method: EPA-NERL 506; Method: EPA-NERL 525.2; Method: EPA-NERL 625; Method: EPA-OSW 8061A; Method: EPA-OSW 8270D; Method: DOE OM100R; Method: Standard Methods 6410 B; Method: USGS-NWQL O-3118-83; Method: USGS-NWQL O-5130-95
MONITORING IN THE NORDIC COUNTRIES	Detected in STPs: influent, effluent and sludge. Detected in sediment. Detected in surface waters. Not detected in seawater. Can be detected in biota. Detected in the air (indoors and outdoors) Detected in MSWD leachate. Detected in Urban runoff.

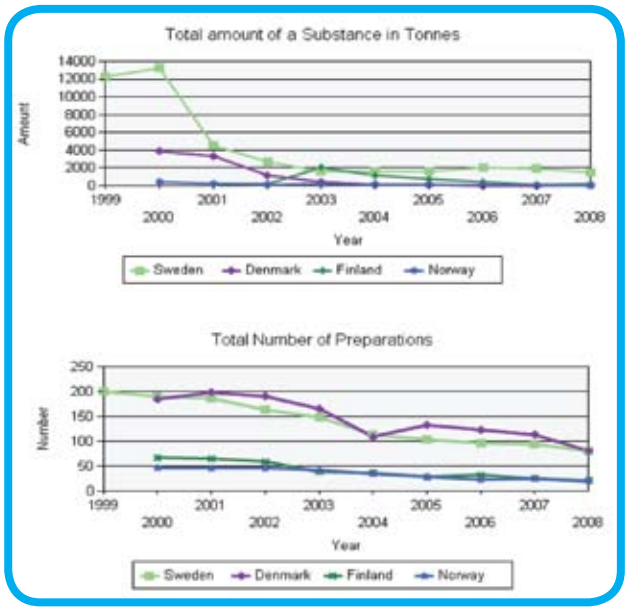
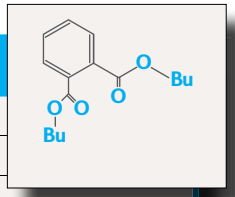


Figure 7: Tonnage of bis(2-ethylhexyl) phthalate in the Nordic countries[7]

DIBUTYL PHTHALATE



IDENTIFICATION[5]	
CAS nr.	84-74-2
EC nr	201-557-4
Chemical formula	C16H22O4
EU Classification	T: Repr. Cat. 2; R61 Repr. Cat. 3; R62 N; R50
Major applications[27]	Plasticizer, softener, PVC. Found in paints, varnish. Carrier in cosmetics, Insect repellent etc. Solvent for chlorinated rubber. Used in fuel matrix. Used as manometer fluid.
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 6,2 Denmark: 94,3 Sweden: 69 Finland:.322,6

PERSISTENCE[27]	Not Persistent Biodegradation in water: aerobic T 1/2= 1 day anaerobic T1/2= 2 days
BIOACCUMULATION	Bioaccumulative Log Kow = 4,57[28] BCF(algae)= 3399[27] BCF (Crustacean) = 662[27] reported BCF (fathead minnows)= 12 - 172[28]
TOXICITY[28]	Toxic Toxic to aquatic organisms Long-term toxicity on aquatic organisms is > 0,01 mg/l NOEC 99days (Onchorhynchus mykiss) = 0,1 mg/l Toxic over prolonged exposure Classified as reprotoxic Teratogenicity, embryotoxicity and maternal toxicity in mice: oral NOAEL = 100 mg/kg bw Has or may have endocrine disrupting effects[29]
METABOLITES[27]	Urine: Mono butyl phthalate (MBP) and its glucuronide: mono-(3-hydroxy-butyl) phthalate, mono-(4-hydroxy butyl) phthalate
LONG-RANGE TRANSPORT[28]	Not expected to LRT Vapour pressure= 9,7 +/- 3,3.10-5 hPa at 25C OH radicals: T1/2 = 1,8 days Low volatility and will not persist in the atmosphere. Water solubility= 10 mg/l at 20C Soluble in water but is expected to biodegrade readily. Particulate-phase removed from the air by wet or dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component.
ANALYTICAL METHODS[27]	Standardised methodologies: EPA Method 8060; EPA Method 8250; Method: NIOSH 5020, Issue 2; Method: OSHA 104; Method: EPA-EAD 1625; Method: EPA-EAD 606; Method: EPA-NERL 506; Method: EPA-NERL 525.2; Method: EPA-NERL 625; Method: EPA-OSW 8061A; Method: EPA-OSW 8270D; Method: DOE OM100R; Standard Methods 6410 B; Method: USGS-NWQL O-3118-83; Method: USGS-NWQL O-5130-95 Sampling Procedures: Matrix: air. Procedure: filter collection extraction with carbon disulphide, GC.
MONITORING IN THE NORDIC COUNTRIES	Detected in STPs: influent, effluent. Can be Detected in sediment. Detected in surface waters. Not Detected in biota.

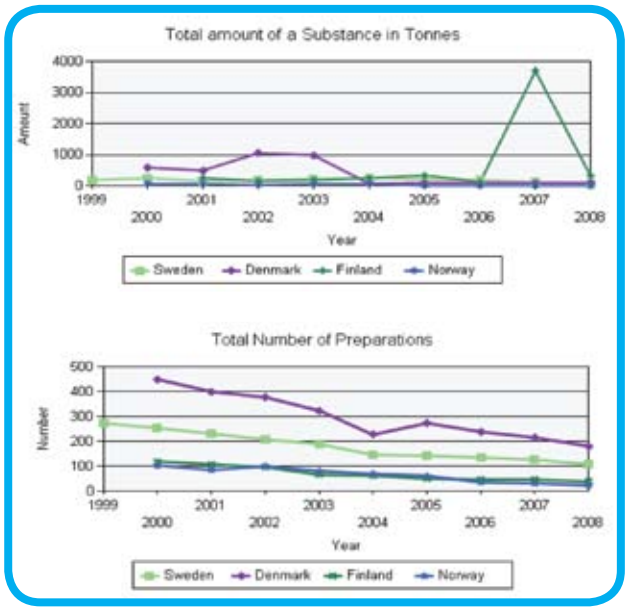
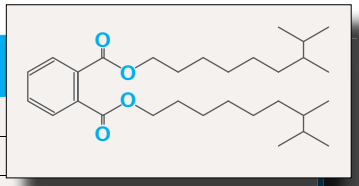


Figure 8: Tonnage of dibutyl phthalate in the Nordic countries[7]

DI-"ISODECYL" PHTHALATE



IDENTIFICATION[5]	
CAS nr.	26761-40-0
EC nr	247-977-1
Chemical formula	C28H46O4
EU Classification	not classified
Major applications[30]	Plasticizer for PVC and other vinyl resins, used in particular in wire and cable applications. In anti-corrosion and anti-fouling paints, sealing compounds, textile inks, etc.
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 39,1 Denmark: 24,4 Sweden: 1064 Finland:.no data

PERSISTENCE[31]	Persistent T1/2 in soil= 300 days T1/2 in surface water= 50 days
BIOACCUMULATION[31]	Bioaccumulative Log Kow = 8,8 measured BCF(Mytilus edulis) = 3,000-4,000
TOXICITY[31]	Potentially Toxic Not Toxic to aquatic organisms Acute toxicity: DIDP does not have adverse effects towards aquatic or benthic organisms at the limit of water solubility in laboratory tests. Long-term toxicity: Multigenerational study on Oryzias latipes showed no statistically significant changes in mortality or fecundity and normal development of embryos in F1 and F2. Potentially Toxic over prolonged exposure Two- generation study, showed a decrease in survival indices. No changes in reproductive indices were observed.
METABOLITES[30]	monoisodecyl phthalate (MIDP)
LONG-RANGE TRANSPORT[31]	Not expected to LRT Vapour pressure= 5,1.10-5 Pa at 25°C Estimated atmospheric T1/2= 0,6 day Water solubility= 0,2 .10-6 g/l at 20°C Both the volatility and water solubility are low.
ANALYTICAL METHODS[30]	Water was examined for the presence of anomalous lipophilic organic compound using GC-MS and high resolution mass spectrometry. Sampling Procedures: Analysis of phthalate esters in sediment. By utilizing the rapid ultrasonic extraction of dried sediment and detection capabilities of selected ion monitoring mass spectrometry, the analytical scheme was simplified to reduce systematic errors due to contamination and to improve recoveries. Matrix blank levels were 2.5 ng in 5 g dry samples, and spiked field sample recoveries were > 90%. Identification of different phthalate species was accomplished by multiple ion monitoring of characteristic ion fragments and retention time comparisons.
MONITORING IN THE NORDIC COUNTRIES	Not detected in STP sludge. Can be detected in sediment. Detected in surface waters. Not detected in biota. Detected in the air (indoors and outdoors) Detected in Urban runoff.

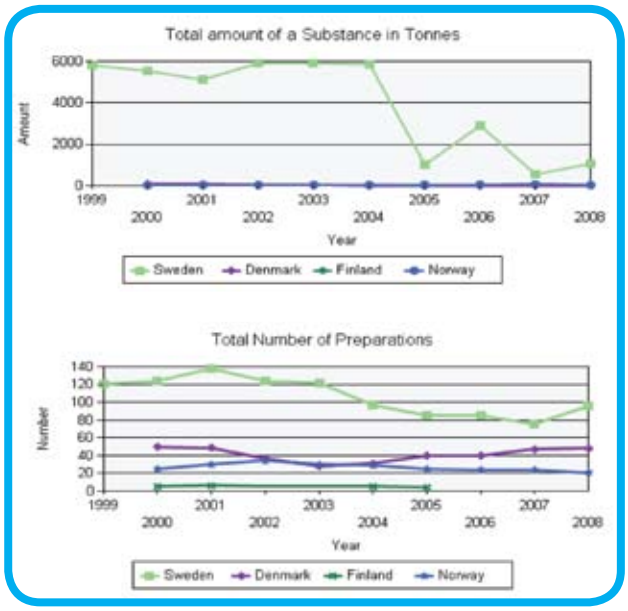


Figure 9: Tonnage of di-"isodecyl" phthalate in the Nordic countries[7]

1,2-BENZENEDICARBOXYLIC ACID, DI-C6-10-ALKYL ESTERS (DIALKYLPHTHALAT C6–10)

IDENTIFICATION[5]	
CAS nr.	68515-51-5
EC nr	271-094-0
Chemical formula	
EU Classification	no classification
Major applications	Plasticizer for PVC and other vinyl resins, used in particular in wire and cable applications. In anti-corrosion and anti-fouling paints, sealing compounds, textile inks, etc.
Tonnage in 2008 (tonnes) [7]	Norway: Stated as confidential Denmark: 0 Sweden: Stated as confidential Finland: Stated as confidential

PERSISTENCE[32]	Not Persistent Aerobic, activated sludge, domestic, non-adapted, 28 day test Degradation = 87 %
BIOACCUMULATION[32]	Bioaccumulative Log Kow = 3,5 terrestrial–aquatic ecosystem BCF= 2570 – 28 183 aquatic ecosystem BCF= 1,16- 9332,5
TOXICITY[32]	Potentially Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC50 6 day (Freshwater green alga) > 0,1 mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l LOEC 16 day (Daphnia magna) = 1,0 mg/l NOEC 28 day (Pimephales promelas)= 3200 µg/l Potential toxic over prolonged exposure Showed to induce an adverse effect on male fertility in one study, but no adverse effects were observed in other reprotox/development studies.
METABOLITES	No data
LONG-RANGE TRANSPORT[32]	Not expected to LRT Vapour pressure < 0.001 hPa at 20 C (OH radicals) T1/2= 0,8 day Water solubility= ca. 2,8 mg/l at 24C Is expected to readily biodegrade in water.
MONITORING IN THE NORDIC COUNTRIES	No data

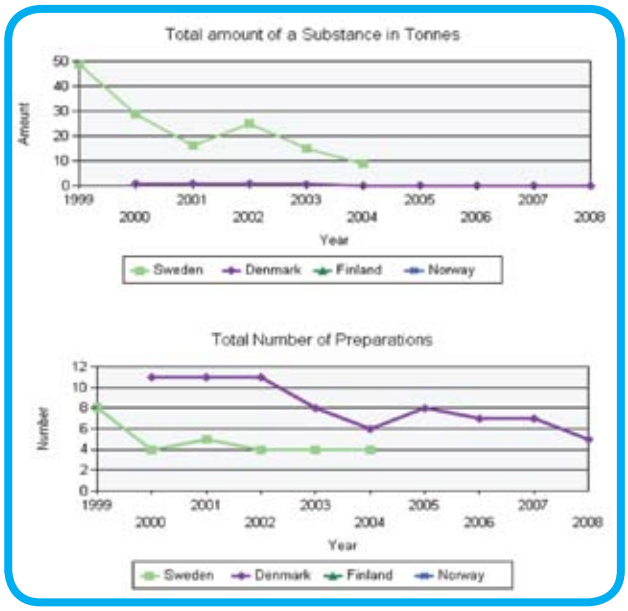


Figure 10: Tonnage of 1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters in the Nordic countries [7]

1,2-BENZENEDICARBOXYLIC ACID, DI-C7-9-BRANCHED AND LINEAR ALKYL ESTERS (DI C7–9 ALKYL PHTHALATE)

IDENTIFICATION[5]	
CAS nr.	68515-41-3
EC nr	271-083-0
Chemical formula	
EU Classification	no classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: Stated as confidential Finland: no data

PERSISTENCE[33]	Not Persistent Activated sludge, biodegradation, 24 hr. Degradation = 65 %
BIOACCUMULATION[33]	Bioaccumulative Log Kow = 4,97 Aquatic organisms estimated BCF = 630
TOXICITY[33]	Not Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l NOEC 96 hr.(Lepomis macrochirus) > 0,18 mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l EC50 21 day (Daphnia magna) > 0,5 mg/l Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects. Long-term studies on mammals showed adverse effects on the liver.
METABOLITES	No data
LONG-RANGE TRANSPORT[33]	Not expected to LRT Vapour pressure= 0.001 hPa at 100 C Low volatility. Solubility in water= < 1 mg/l Is expected to biodegrade readily in water.
ANALYTICAL METHODS[34]	US EPA Standardised methods: Method 8060; Method 8250
MONITORING IN THE NORDIC COUNTRIES	No data

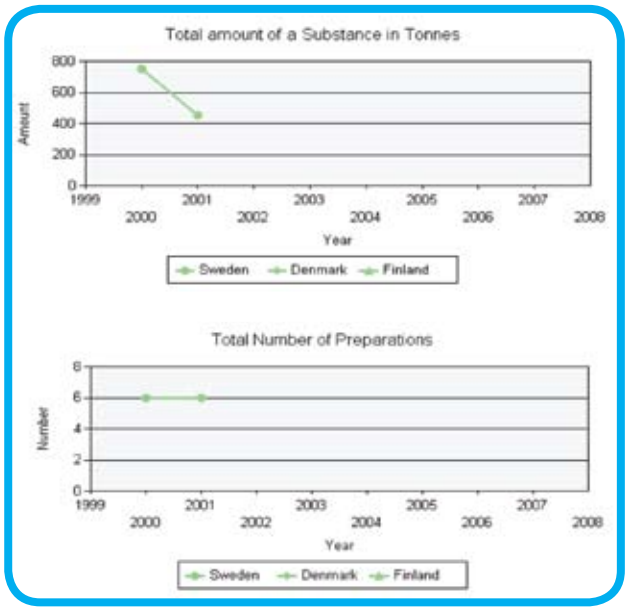
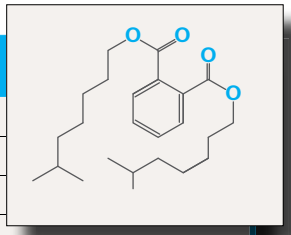


Figure 11: Tonnage of 1,2-Benzenedicarboxylic acid, di-C7-9-branched and linear alkyl esters in the Nordic countries[7]

DIISOOCTYL PHTHALATE



IDENTIFICATION[5]	
CAS nr.	27554-26-3
EC nr	248-523-5
Chemical formula	C24H38O4
EU Classification	no classification
Major applications[35]	Plasticizers for PVC, vinyl, cellulosic and acrylate resins, and synthetic rubber.
Tonnage in 2008 (tonnes) [7]	Norway: Stated as confidential Denmark: Stated as confidential Sweden: 1 Finland: no data
PERSISTENCE[35]	Not Persistent Activated sludge biodegradation, 28 day: Degradation = 99%
BIOACCUMULATION	Not Bioaccumulative Log Kow = 3 – 4 [35] BCF(Mosquito fish)= 207 [35] BCF= 640 [36]
TOXICITY[35]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC50 96 hr. (Paratanytarsus parthenogeneticus) >0,12 mg/L Toxic over prolonged exposure Showed to induce an adverse effect on fertility for both sexes in mammals.
METABOLITES	No data
LONG-RANGE TRANSPORT	Not expected to LRT Vapour pressure= 1,33 at 200C [37] Low volatility. Vapour-phase is degraded by reaction with hydroxyl radicals: estimated T1/2= 19 hours [35] Is susceptible to direct photolysis by sunlight. [35] Particulate-phase may be removed from the air by wet or dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component. Water solubility < 0,1 g/l at 20 C [37] Is expected to biodegrade readily in water.
ANALYTICAL METHODS[35]	US EPA Standardised methods: Method 8060; Method 8250
MONITORING IN THE NORDIC COUNTRIES	No data

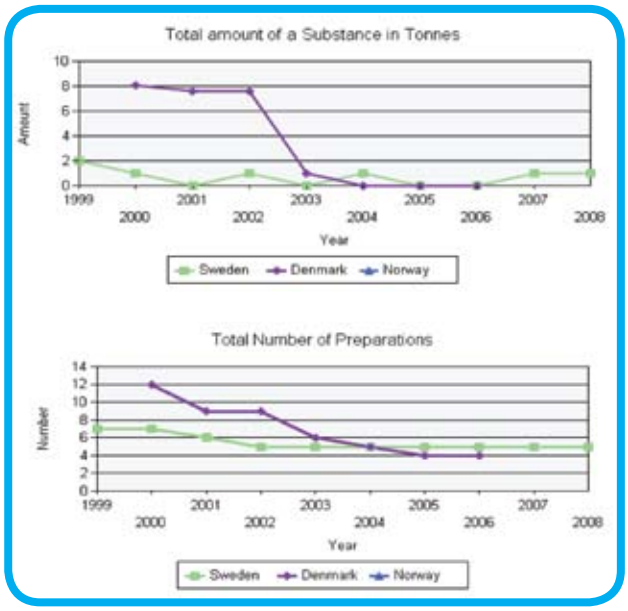
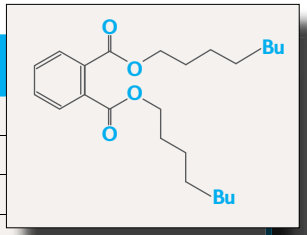


Figure 12: Tonnage of diisooctyl phthalate in the Nordic countries[7]

DIOCTYL PHTHALATE (Di-n-octyl phtalate DnOP)



IDENTIFICATION[5]	
CAS nr.	117-84-0
EC nr	204-214-7
Chemical formula	C24H38O4
EU Classification	no classification
Major applications[38]	DnOP: Plasticizer in cellulose ester resins, polysytren resins, vinyl resins and PVC. Dye carrier. Is found in cosmetics and colorants. A carrier for catalysts or initiators and as a substitute for electrical capacitor fluid.
Tonnage in 2008 (tonnes) [7]	Europe: not registered HPV nor LPV Norway: Stated as confidential Denmark: 72,8 Sweden: Stated as confidential Finland: no data

PERSISTENCE[38]	Not Persistent 10 days incubation in Rhine river water: Biodegradation (at 20 C) = 85% In a model terrestrial-aquatic ecosystem: DnOP t1/2= 5 days DnOP anaerobic t1/2= 513,4 hours
BIOACCUMULATION[38]	Bioaccumulative Log Kow = 8,10 BCF (Oedogonium cardiacum) = 28 500
TOXICITY[38]	Toxic Toxic to aquatic organisms Acute toxicity: LC50 (Ictalurus punctatus), 7 days = 0,1 mg/l/day Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects.
METABOLITES[38]	Mono-n-octyl phthalate (MnOP) Mono-carboxymethyl phthalate (MCMP) Mono-(5-carboxy-n-pentyl) phthalate (MCPeP), Mono-(7-carboxy-n-heptyl) phthalate (MCHpP), Isomers of mono-hydroxy-n-octyl phthalate (MHOP) n-Octanol In urine: mono-(3-carboxypropyl) phthalate (MCPP).
LONG-RANGE TRANSPORT[38]	Not expected to LRT Vapour pressure= 1,0.10-7 mmHg at 25C Vapour-phase : (OH reaction) T1/2 = 19 hours DnOP is susceptible to direct photolysis. Particulate-phase may be removed from the air by wet or dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component. Water solubility= 0,022 mg/l at 25C Is expected to biodegrade readily in water. Low volatility and low solubility in water.
ANALYTICAL METHODS[38]	Standardised methods for di-n-octyl phthalate: EPA Method 8060; EPA Method 8250; Method DOE OM100R; Method: EPA-EAD 1625; Method: EPA-EAD 606; Method: EPA-NERL 506; Method: EPA-NERL 625; Method: EPA-OSW 8061A; Method: EPA-OSW 8270D; Standard Methods 6410 B; Method: USGS-NWQL O-5130-95; Method: OSHA 104
MONITORING IN THE NORDIC COUNTRIES	Can be detected in STP sludge. Can be detected in surface waters. Can be detected in Urban runoff. No monitoring data as regards to biota and sediment.

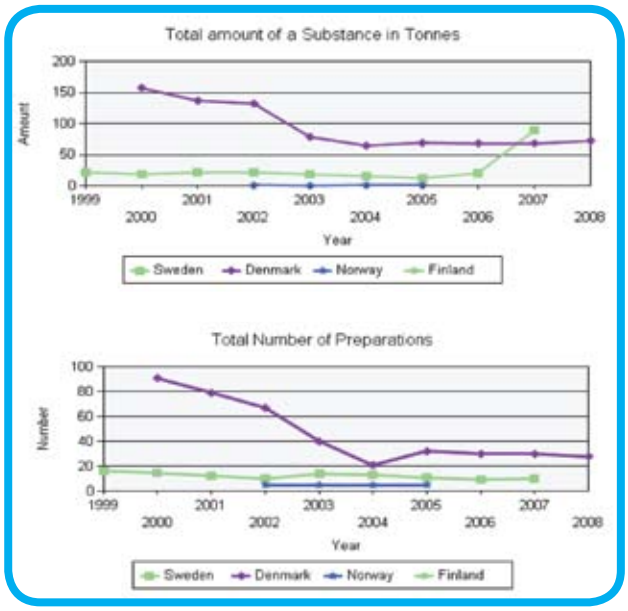
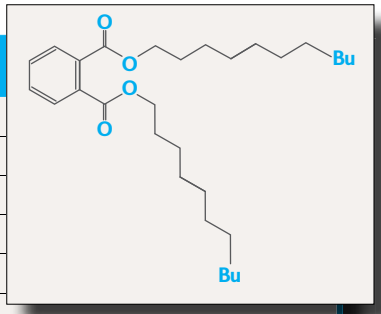


Figure 13: Tonnage of dioctyl phthalate in the Nordic countries [7]

DIUNDECYL PHTHALATE



IDENTIFICATION[5]	
CAS nr.	3648-20-2
EC nr	222-884-9
Chemical formula	C30H50O4
EU Classification	no classification
Major applications[39]	Primary plasticizer for PVC in particular in insulator on electrical wiring. In perfumes and cosmetics
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: no data Denmark: Stated as confidential Sweden: 154 Finland: no data

PERSISTENCE[39]	Not Persistent Acclimated shake flask CO2 evolution test, using an inoculums prepared from soil and sewage, 28 days: Degradation > 99%
BIOACCUMULATION[40]	Bioaccumulative Log Kow = 4,95 BCF (fish) = 640
TOXICITY	Potentially Toxic Not Toxic to aquatic organisms [40] All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50 96 hr. (Cyprinodon variegatus) > O,22 mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l EC50 21 days (Daphnia magna) = 12,4 mg/l Potentially Toxic over prolonged exposure Reprotoxic in rats[41] Potentially induces peroxisome proliferation:[39] NOEL= 0.3% (diet) = ca. 280 mg/kg/day
METABOLITES	No data
LONG-RANGE TRANSPORT	Not expected to LRT Vapour pressure= 0,00015 hPa at 25 C[40] Low volatility Expected to exist solely in the particulate phase in the ambient atmosphere, which may be removed from the air by wet or dry deposition. [39] T1/2 air = 10,2 hours[40] Water solubility= 0,83 - 1,39 mg/l at 25 C[40] Is expected to biodegrade in water.
ANALYTICAL METHODS[39]	US EPA Standardised methods: Method 8060; Method 8250
MONITORING IN THE NORDIC COUNTRIES	No data

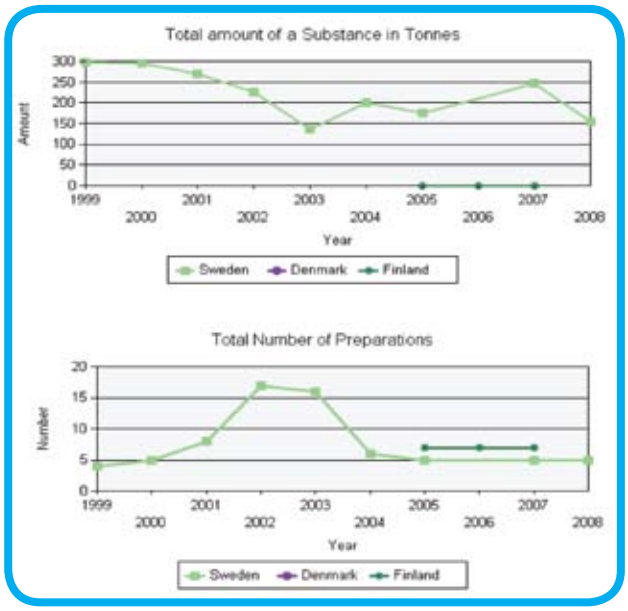
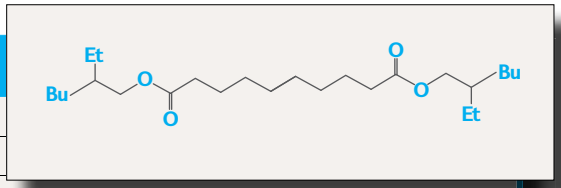


Figure 14: Tonnage of diundecyl phthalate in the Nordic countries[7]

BIS(2-ETHYLHEXYL) SEBACATE



IDENTIFICATION[5]

CAS nr.	122-62-3
EC nr	204-558-8
Chemical formula	C26H50O4
EU Classification	no classification
Major applications[42]	Plasticizer Used in vacuum pumps Synthetic lubricant for reaction motors
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 7 Denmark: 0,4 Sweden: 59 Finland: no data

PERSISTENCE[43]	Persistent Does not biodegrade readily: Activated sludge, 28 days: Biodegradation = 65%
BIOACCUMULATION[44]	Bioaccumulative Log Kow = 10,08 No BCF available
TOXICITY	Not Toxic Not Toxic to aquatic organisms[43] All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LD 50 96hr (Leuciscus idus)> 1000 mg/l Not Toxic over prolonged exposure[44] Studies on mammals showed no longterm effects.
METABOLITES	No data
LONG-RANGE TRANSPORT[44]	Not expected to LRT Vapour pressure= 1. 10-7 mmHg at 25C Water solubility= 3,5 .10-7 g/l at 25C This indicates very low volatility and low solubility therefore it is not expected to be mobile.
ANALYTICAL METHODS	Analysis of the composition of polycarboxylic acids obtained by catalytic hydrocarboxylation of polybutadienes.[45] HPLC analysis of polycarboxylic acids used as durable press finishing agents/ organic catalysts for cellulosic material. [46]
MONITORING IN THE NORDIC COUNTRIES	Can be detected in STP sludge. No other monitoring data.

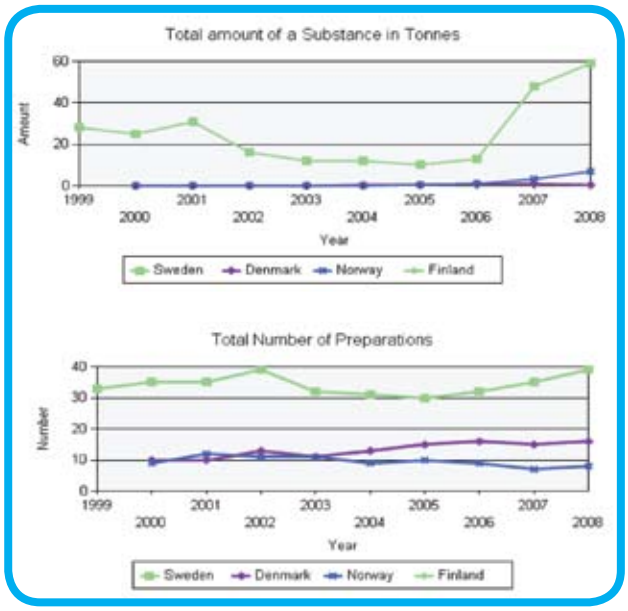
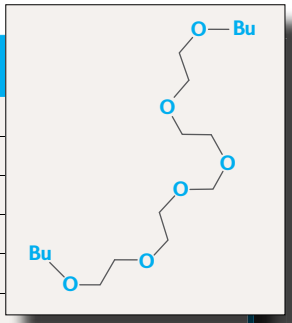


Figure 15: Tonnage of bis(2-ethylhexyl) sebacate in the Nordic countries[7]

BIS(2-(2-BUTOXYETHOXY)ETHOXY)METHANE



IDENTIFICATION[5]

CAS nr.	143-29-3
EC nr	205-598-9
Chemical formula	C17H36O6
EU Classification	No classification
Major applications[47]	Plasticizer and softener for rubbers (natural; chloroprene; nitrile-butadiene rubber; styrene-butadiene) and resins-EG, acrylics, urethanes.
Tonnage in 2008 (tonnes) [7]	Europe: registered as LPV Norway: registered as confidential Denmark: 0,1 Sweden: 13 Finland: no data

PERSISTENCE[48]	Persistent Not readily biodegradable activated sludge,28 days Degradation = 51,3 – 55,5 % Estimated T1/2 water= 360 days Estimated T1/2 sediment= 1440 days
BIOACCUMULATION[48]	Bioaccumulative Log Kow= 6,2
TOXICITY[49]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l NOEC 96hr (Selenastrum capricornutum) = 11,4 mg/l Toxic over prolonged exposure NOAEL Parental: = 100 mg/kg bw NOAEL F1 Offspring: = 100 mg/kg bw Reprotoxic: decrease in the fertility index and an increased incidence in the number and percentage of pre-birth loss. Teratogenic: agenesis and/or microdactily
METABOLITES	No data
LONG-RANGE TRANSPORT[48]	Not expected to LRT vapour pressure < 0,00978 hPa at 25 C solubility in water < 0,0001 mg/l at 20 C Low volatility and estimated half-life in the atmosphere is very short. T1/2= 1,5hr Low solubility in water, expected to adsorbe to particles and sediment.
ANALYTICAL METHODS[47]	Identified in water samples by GC-MS methods.
MONITORING IN THE NORDIC COUNTRIES	No data

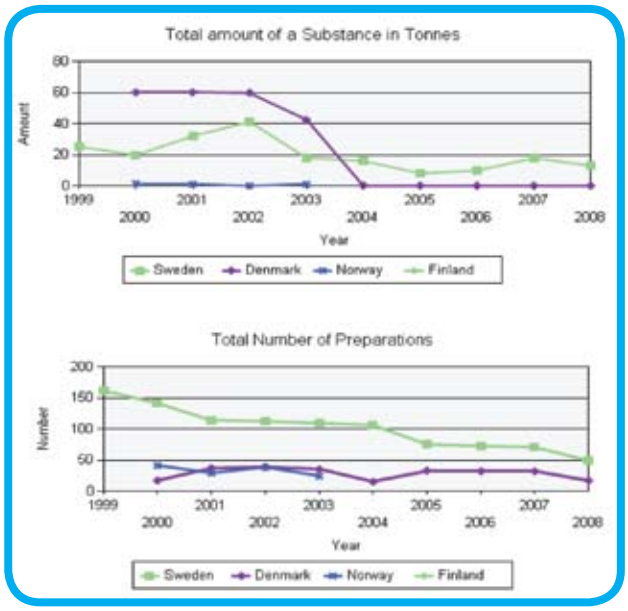


Figure 16: Tonnage of Bis(2-(2-butoxyethoxy)ethoxy)methane in the Nordic countries[7]

DISTILLATES (PETROLEUM), HYDROTREATED LIGHT NAPHTHENIC

IDENTIFICATION[5]	
CAS nr.	64742-53-6
EC nr	265-156-6
Chemical formula	hydrocarbons in the range of C15 - C30 (belongs to Group 7C substances)
Chemical structure	Hydrocarbons with carbon numbers predominantly in the range of C15 through C30 and produces finished oil with a viscosity of less than 100 SUS at 100°F (19cSt at 40°C). It contains relatively few normal parafins.
EU Classification	T Carc. Cat. 2; R45 (may cause cancer)
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 1016,4 Denmark: 438,5 Sweden: 93046 Finland:.184,2

PERSISTENCE[49]	Persistent Aerobic biodegradation 28 days test in domestic sewage: Degradation: = 6 %
BIOACCUMULATION[49]	Bioaccumulative Log Kow = 3,9 – 6 No BCF
TOXICITY[49]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50 96 (Salmo gairdneri) > 1000 mg/l All toxic values for long-term toxicity on aquatic organisms are > 0,01 mg/l NOEC 21 day(Daphnia magna) > 1 mg/l Toxic over prolonged exposure Classified carcinogen cat. 2 In vitro genotoxicity studies were positive to the substance. The substance induced a carcinogenic effect in studies on mammals.
METABOLITES	No data
LONG-RANGE TRANSPORT[49]	Not expected to LRT Expected to have little or no tendency to partition to air. T1/2 by reaction with hydroxyl radicals (troposphere) < 1 day Very low solubility in water.
ANALYTICAL METHODS	Standardised methods: Method: NIOSH 1550, Issue 2; Method: OSHA 48
MONITORING IN THE NORDIC COUNTRIES	No data

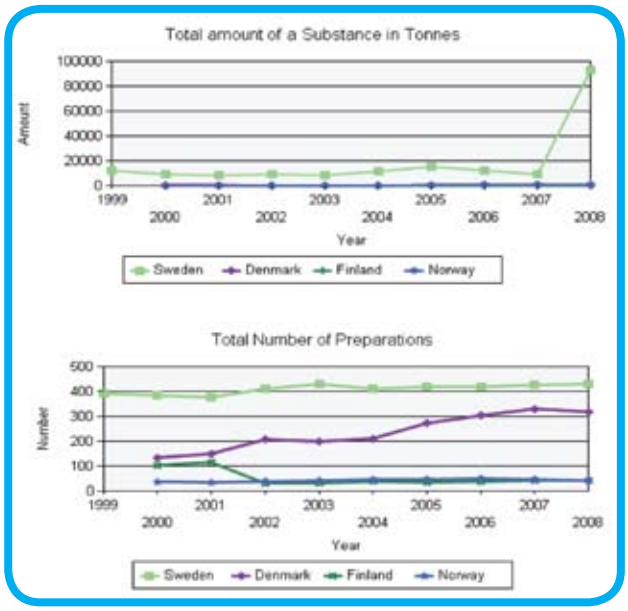


Figure 17: Tonnage of Distillates (petroleum), hydrotreated light naphthenic in the Nordic countries [7]

POLYDIMETHYLSILOXANE

IDENTIFICATION[5]	
CAS nr.	63148-62-9
EC nr	Not registered in ESIS
EU Classification	No classification
Major applications[50]	Pesticide A dielectric coolant and in solar energy installations. In wound dressing Used in fire resistant transformers. Used in cosmetics and toiletries, food and related products. Used in silicone rubbers. In soft contact lenses
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: 1016,4 Denmark: 438,5 Sweden: 93046 Finland:.184,2

PERSISTENCE	Persistent : cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : no data No BCF
TOXICITY[50]	Toxic Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed Showed to be potentially clastogenic in in vitro. Showed to be potenially teratogenic.
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: Cannot be assessed No data
ANALYTICAL METHODS[50]	Standardised methodologies: NIOSH Method: 227 Determination of volatile polydimethylsiloxane by adsorption using a charcoal column and pyrolysis GC. Atomic absorption spectrophotometric method for determination of polydimethylsiloxane residues in pine-apple juice. Polydimethylsiloxane was determined in emulsions by extraction with org solvents (eg, MeCOBu-iso or n-hexane) and subjected to gel-permeation chromatography on a polystyrene-divinylbenzene column with toluene mobile phase Sampling Procedures: NIOSH Method: 227. Analyte: Polymethylsiloxane mist in air. Matrix: Air. Procedure: Filter collection; solvent extraction. Flow Rate: 1.7 l/min. Sample Size: 400 liters.
MONITORING IN THE NORDIC COUNTRIES	No data

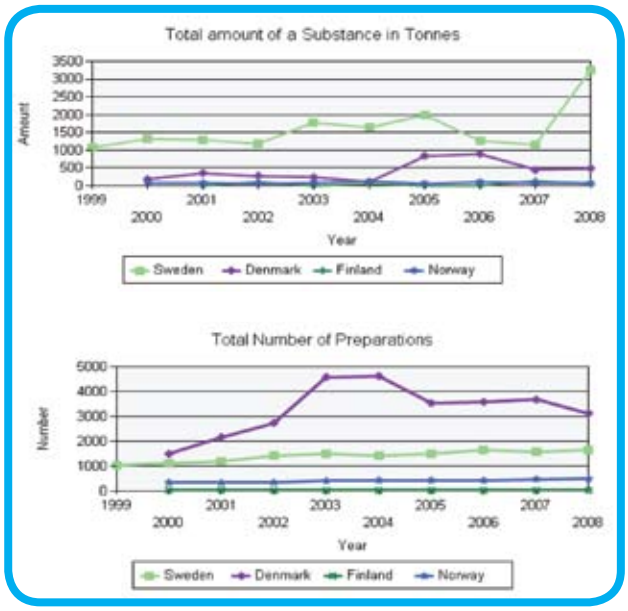
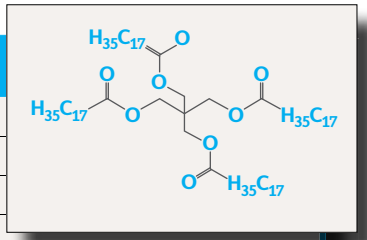


Figure 18: Tonnage of Polydimethylsiloxane in the Nordic countries[7]

PENTAERYTHRITOL TETRASTEARATE



IDENTIFICATION[5]	
CAS nr.	115-83-3
EC nr	204-110-1
Chemical formula	C77H148O8
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: Stated as confidential Sweden: 5 Finland: no data
PERSISTENCE	Persistent : cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : No data No BCF
TOXICITY[51]	Potentially Toxic Toxic to aquatic organisms: cannot be assessed No data Potentially toxic over prolonged exposure One case of long-term exposure was reported to cause pulmonary fibrosis
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: Cannot be assessed No data Based on a molecular weight of 1205 g/mol s not expected to be mobile.
ANALYTICAL METHODS	No methodology was found
MONITORING IN THE NORDIC COUNTRIES	No data

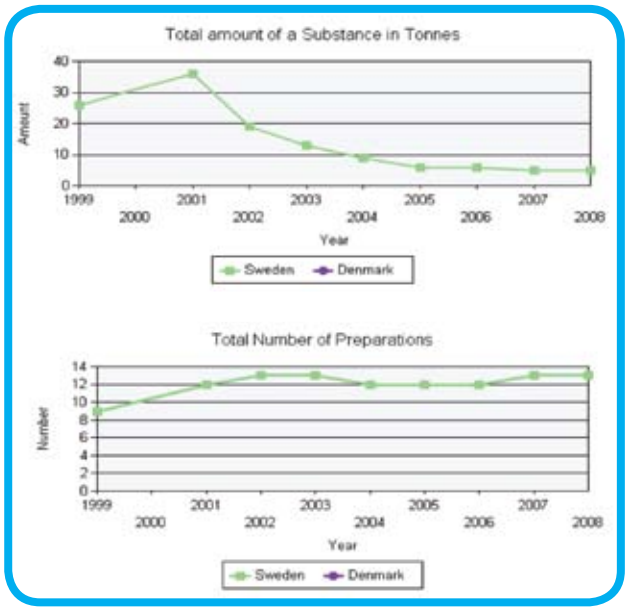
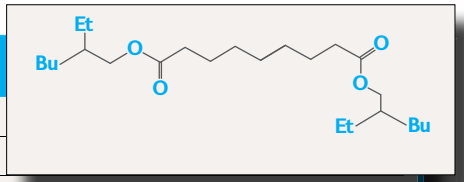


Figure 19: Tonnage of pentaerythritol tetrastearate in the Nordic countries
[7]

BIS(2-ETHYLHEXYL) AZELATE



IDENTIFICATION[5]	
CAS nr.	103-24-2
EC nr	203-091-7
Chemical formula	C25H48O4
EU Classification	No classification
Major applications [52]	Plasticizer for cellulosic, polystyrene and vinyl plastics, especially used as low-temperature plasticizer Base for synthetic lubricants.
Tonnage in 2008 (tonnes) [7]	Norway: Stated as confidential Denmark: 7 Sweden: 303 Finland: No data

PERSISTENCE[53]	Persistent Activated sludge, 28 days Biodegradation = 81% Did not meet the 10-day window criterion for readily biodegradability.
BIOACCUMULATION[52]	Bioaccumulative Log Kow = 9,6 BCF= 3,2
TOXICITY[52]	Toxic : cannot be assessed Toxic to aquatic organisms No data Toxic over prolonged exposure No data, but expected to have low toxicity
METABOLITES[52]	Hydrolysis: 2-ethylhexanol non anedioic acid
LONG-RANGE TRANSPORT[52]	Not expected to LRT Vapour pressure= 3,8.10-6 mm Hg at 25C Vapor: (OH reaction) T1/2= 13 hours, Expected to undergo direct photolysis. Particulate-phase removed from the air by wet or dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component. Insoluble in water.
ANALYTICAL METHODS	Analysis of the composition of polycarboxylic acids obtained by catalytic hydrocarboxylation of polybutadienes.[54] HPLC analysis of polycarboxylic acids used as durable press finishing agents/ organic catalysts for cellulosic material.[55]
MONITORING IN THE NORDIC COUNTRIES	No data

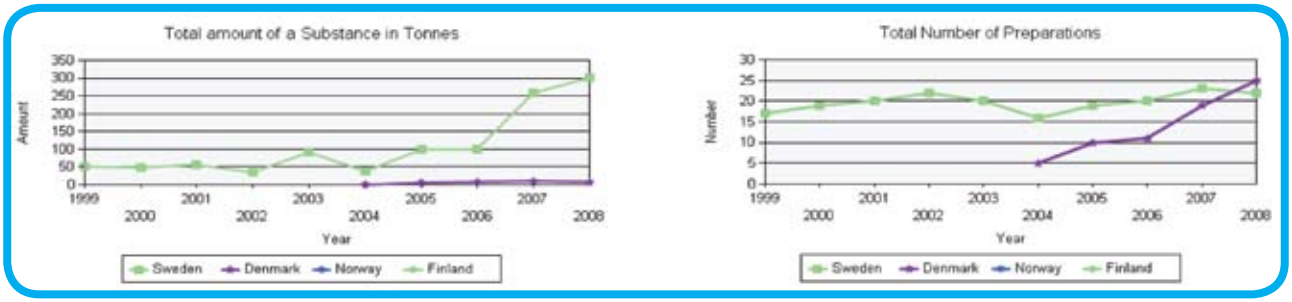
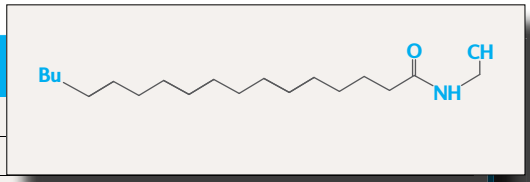


Figure 20: Tonnage of bis(2-ethylhexyl) azelate in the Nordic countries[7]



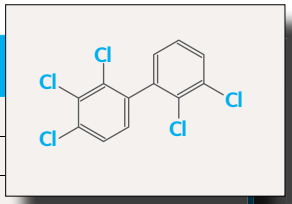
N-(HYDROXYMETHYL)STEARAMIDE

IDENTIFICATION[5]

CAS nr.	3370-35-2
EC nr	222-147-1
Chemical formula	C19H39NO2
EU Classification	No classification
Tonnage in 2008 (tonnes)	No data

PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : No data No BCF
TOXICITY	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed No data
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: cannot be assessed No data
ANALYTICAL METHODS	US EPA Standardised methods: EMSLC Method 506; EMSLC Method 525.1. ; EMSLC Method 525.2.
MONITORING IN THE NORDIC COUNTRIES	No data

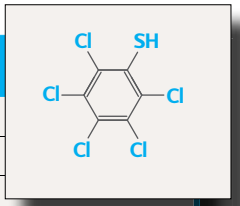
PENTACHLORO[1,1'-BIPHENYL] (PENTACHLOROBIPHENYL)



IDENTIFICATION[5]	
CAS nr.	25429-29-2
EC nr	246-974-2
Chemical formula	C12H5Cl5 (corresponds to this group of PCBs, it is not specific to the position of the chlors)
EU Classification	no classification (PCBs were forbidden in Europe, mid 1980's)
Tonnage in 2008 (tonnes) [7]	One confidential record for Denmark for year 2000 No data for the other countries.

PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION[56]	Bioaccumulative Log Kow : No data BCF= 7501
TOXICITY[56]	Toxic Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure Shown to be reprotoxic and carcinogenic.
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: cannot be assessed No data
ANALYTICAL METHODS	No specific method for pentachlorobiphenyl has been found, but analytical methods for PCBs are well known.
MONITORING IN THE NORDIC COUNTRIES	No data

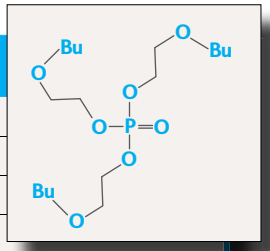
PENTACHLOROBENZENETHIOL



IDENTIFICATION[5]	
CAS nr.	133-49-3
EC nr	205-107-8
Chemical formula	C6HCl5S
EU Classification	No classification
Major applications[57]	Peptizer for synthetic & natural rubbers Chemical intermediate for its metal salts
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Only records for Sweden from 1999-2004

PERSISTENCE	Persistent Volatilization when adsorption is considered T1/2(model pond)= 150 days [57] Domestic sewage, 30days: [58] Biodegradation= 0%
BIOACCUMULATION	Bioaccumulative Log Kow = 6,4 [58] estimated BCF(aquatic organisms)= 3700 [57] BCF= 7079 [59]
TOXICITY[57 58]	Not Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC0 48 hr (Leuciscus idus) = 0,1 mg/l, this indicates that LC50> 0,1mg/l Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects. (only one study available)
METABOLITES	No data
LONG-RANGE TRANSPORT[57]	Expected to LRT Vapour pressure < 0,022 hPa at 100 C Photodegradation T1/2= 115 days. Water solubility= 4,2 mg/l Relativly soluble in water and expected to persist in water.
ANALYTICAL METHODS[57]	No specific method was found for this compound. Indeed, its spectra is known to be complex. A standardised US EPA methodology could potentially be used: EPA Method 8250
MONITORING IN THE NORDIC COUNTRIES	No data

TRIS(2-BUTOXYETHYL) PHOSPHATE



IDENTIFICATION[5]

CAS nr.	78-51-3
EC nr	201-122-9
Chemical formula	C18H39O7P
EU Classification	not classified
Major applications[60]	Primary plasticizer for most resins and elastomers, wide applications including in rubber intended for contact with food or drink and rubber stoppers in blood specimen containers. Flame-retarding agent.
Tonnage in 2008 (tonnes) [7]	Europe: registered as HPV Norway: 0,1 Denmark: 12,3 Sweden: 58 Finland: Stated as confidential

PERSISTENCE[61]	Not Persistent (uncertainties) Aerobic biodegradation in seawater = 14 days t 1/2 in estuarine water= 50days
BIOACCUMULATION	Not Bioaccumulative measured Log Kow = 3,65 [61] BCF= 25,7 [62]
TOXICITY[61]	Potentially Toxic Not Toxic to aquatic organisms LD50 and EC50 on marine and fresh water species > 0,1 mg/l LC50 48 (Oryzias latipes)= 6,8 mg/l Potentially Toxic over prolonged exposure Shown to be neurotoxic but at high doses in mammals.
METABOLITES[60]	2-butoxyethanol (suggested metabolite)
LONG-RANGE TRANSPORT	Not expected to LRT Expected to exist in particulate phase only in the ambient atmosphere.[60] (OH radicals) t 1/2 air = 3hours[61]
ANALYTICAL METHODS[60]	In human adipose tissues: fractioned from fat by gel permeation chromatography with CH2Cl2-cyclohexane (5 + 95) as solvent. After Florisil column cleanup, the gel permeation chromatography extract was analyzed by capillary column gas chromatography using a N-P selective detector. TBEP is usually analysed by gas chromatography (GC) coupled with mass spectrometry (MS), infrared spectroscopy or nuclear magnetic resonance spectrometry.
MONITORING IN THE NORDIC COUNTRIES	Detected in STPs: influent, effluent and sludge. Detected in recipient waters. Detected in sediment of landfills and car demolishing sites. Can be detected in biota. Can be detected in the air (indoors and outdoors)

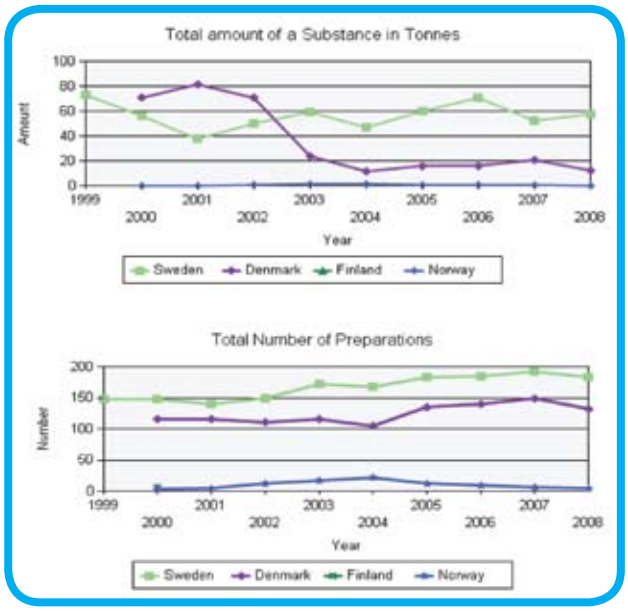
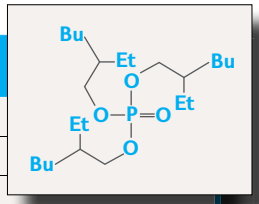


Figure 21: Tonnage of tris(2-butoxyethyl) phosphate in the Nordic countries[7]

TRIS(2-ETHYLHEXYL) PHOSPHATE



IDENTIFICATION[5]

CAS nr.	78-42-2
EC nr	201-116-6
Chemical formula	C24H51O4P
EU Classification	no classification
Major applications[63]	Flame retardant plasticizer for PVC and cellulose nitrate Solvent, antifoaming agent, plasticizer Hydrogen peroxide production co- solvent
Tonnage in 2008 (tonnes) [7]	Europe: registered HPV Norway: Stated as confidential Denmark: 6,4 Sweden: 15 Finland: 142,7

PERSISTENCE[63]	Persistent Great variability in results of biodegradation. In a semi-continuous activated sludge study, 34 weeks, degradation = 20%. Biodegradation on activated sludge seed, 4 weeks, 100 mg/l: biodegradation= 0% Semi-continuous activated sludge study, 3 mg/l per 24 hours, 34 weeks Biodegradation= 20% In a screening test, on activated sludge seed, 48 hours: Biodegradation= 40-60%
BIOACCUMULATION[63]	Bioaccumulative Estimated Log Kow = 9,8 BCF (carp) = 9.2 - 22
TOXICITY[63]	Toxic Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure Showed to be genotoxic in vitro and to induce a carcinogenic effect on mammals.
METABOLITES[63]	2-ethylhexanol
LONG-RANGE TRANSPORT[63]	Expected to LRT Vapour pressure= 8,25.10-8 mmHg at 25C Expected to exist almost entirely in the particulate phase in the ambient atmosphere. Particulate-phase may be removed from the air by wet and dry deposition. The particulate phase is only expected to be produce from the manufacturing process of the component. Water solubility= 0,6 mg/l at 24C Relatively soluble and is expected to persist in water.
ANALYTICAL METHODS[63]	GC determinations of trialkyl phosphates and triaryl phosphates in drinking water, following isolation using macroreticular resin.
MONITORING IN THE NORDIC COUNTRIES	Detected in STP sludge. Rarely detected in biota. No other monitoring data.

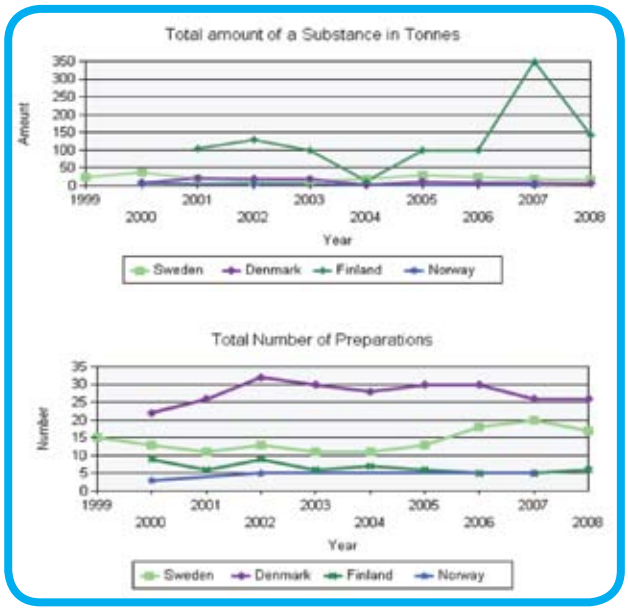
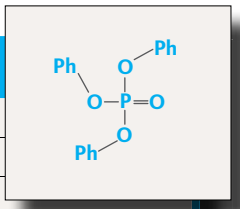


Figure 22: Tonnage of tris(2-ethylhexyl) phosphate in the Nordic countries[7]

TRIPHENYL PHOSPHATE



IDENTIFICATION[5]	
CAS nr.	115-86-6
EC nr	Not registered in ESIS
Chemical formula	C18H15O4P
EU Classification	no classification
Major applications[64]	Plasticizer in lacquers and varnishes and hot-melt adhesives. Fireproofing agent. Noncombustible substitute for camphor in celluloid, and for impregnating roofing paper. One component of lubricating oil and hydraulic fluids. Flame retardant in ABS and HIPS, as well as in certain epoxy and phenolic resins.
Tonnage in 2008 (tonnes) [7]	Norway: 18,4 Denmark: 8,3 Sweden: 70 Finland: 57,1

PERSISTENCE[64]	Not Persistent Japanese MITI test, activated sludge, 28 days: biodegradation= 83-94% Hydrolyses: T1/2= 19 days at pH 7
BIOACCUMULATION	Bioaccumulative Log Kow = 4,59 [65] measured BCF (rainbow trout)= 573 [64] BCF= 1743 [66]
TOXICITY[64]	Toxic Toxic to aquatic organisms Longterm toxicity: NOEC 90 days (Salmo gairdneri) = 0,0014 mg/l Toxic over prolonged exposure Showed to be neurotoxic in animals. Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects.
METABOLITES[64]	In vivo: diphenyl p-hydroxyphenol phosphate
LONG-RANGE TRANSPORT[64]	Not expected to LRT Vapour pressure: 6.28X10-6 mm Hg at 25 deg C T1/2 air= 35 hours at 25 deg C Water solubility = 19 mg/l at 25C Is expected to biodegrade readily in water.
ANALYTICAL METHODS[64]	NIOSH Method 5038 (matrix: air) A method for determining the content in air of triphenyl phosphate is based on its hydrolysis in an alkaline medium to form phenol, which is then combined with diazotized p-nitroaniline. The azo compound formed after diazotization, 4-hydroxy-4-nitrobenzene, has an intense red color, which can be determined visually or photometrically. An XAD-2 screening method developed previously for organophosphorus pesticides was extended to determine trialkyl/aryl phosphates in drinking water at the ng/L level. Recovery studies at 1, 10, and 100 ng/L levels were carried out by fortification onto XAD-2 resin and by direct on-stream fortification of drinking water. Recoveries were >70% for triphenyl phosphate. Extracts of fish samples were cleaned up by gel permeation chromatography/alumina column chromatography; sediment extracts received alumina treatment only. Compounds were determined by GLC with nitrogen-phosphorus detection. Recoveries of triphenyl phosphate from fortified river water (0.5, 5.0 and 50 ug/L), by shaking with dichloromethane, ranged from 91-118%. Sampling Procedures: NIOSH Method S210
MONITORING IN THE NORDIC COUNTRIES	Detected in STPs: influent, effluent and sludge. Detected in recipient waters. Detected in sediment of landfills and car demolishing sites. Detected in biota. Detected in the air (indoors and outdoors)

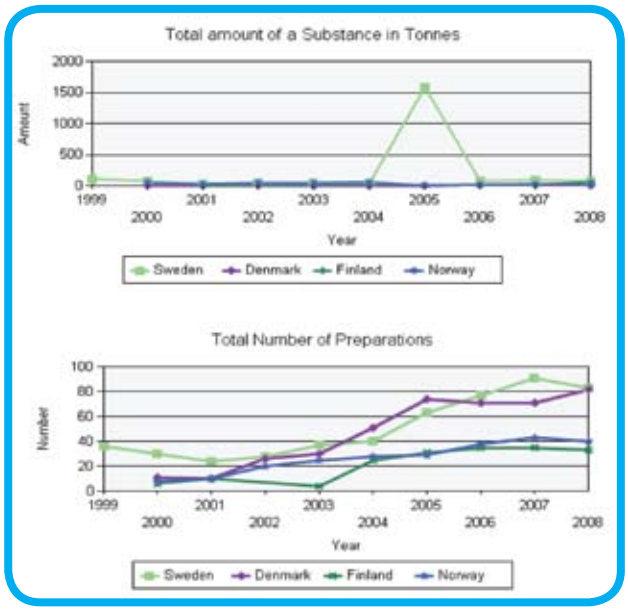


Figure 23: Tonnage of triphenyl phosphate in the Nordic countries[7]

3. SWEETENERS

In this section each sweetener selected by NSG and present on their priority list, is assessed one by one. For each component the persistence, bioaccumulation and toxicity and long range transport is assessed, according to knowledge currently available, as described in the methodology. Only the data used for the assessment is indicated in the main report and additional data can be found in the annex. In addition, the major applications of the components are also briefly described, in cases where information was available. If the component is registered on the SPIN database a brief review of the consumption trend is described by a graph. The tonnages registered in the SPIN database appear to be a clear underestimate of the real import/consumption in the Nordic countries. When data was retrieved as regards to possible analytical methodologies of the component, the latter is described.

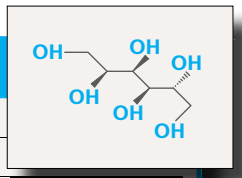
More specific data can be found in the following annexes:

- Annex 2A: chemical and physical properties
- Annex 2B: environmental behaviour
- Annex 2C: toxicology in aquatic organisms
- Annex 2D: toxicology in mammals
- Annex 2E: Spectrometric data

At the end of the section a matrix resuming the environmental risks associate to all the plasticizers and based on a colour code will allow the reader to compare the components between them.

The monitoring of sweeteners is not common. In the Nordic countries only Sucralose has been subject to a couple of screenings in Sweden and Norway. The results of these studies can be found in Annex H: Monitoring data in the Nordic countries.

SORBITOL, (SORBITOLSIRAP, D-GLUCITOL, D-SORBITOL)



IDENTIFICATION[5]	
CAS nr.	50-70-4 : Natural occurrence in fruits
EC nr	200-061-5
Chemical formula	C6H14O6
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: 7,1 Denmark: 604 Sweden: 1140 Finland: 1,4

PERSISTENCE[67]	Not Persistent Readilly biodegradable: Japanese MITI test, activated sludge: theoretical BOD was reached in 2 weeks.
BIOACCUMULATION[67]	Not Bioaccumulative Log Kow= -2,2 calculated BCF fish= 3
TOXICITY[67]	Toxic: cannot be fully assessed Toxic to aquatic organisms: cannot be assessed No data Not Toxic over prolonged exposure Studies on mammals showed no longterm adverse effects. It is not thought to be carcinogen. Reprotoxic and development studies were not found.
METABOLITES[67]	In liver: fructose and glucose
LONG-RANGE TRANSPORT[67]	Not expected to LRT Vapour pressure= 9,9X10-9 mm Hg at 25 C Volatility is low and the component is expected to exist solely in the particulate phase in the ambient atmosphere. It is unlikely to partition to the atmosphere. Water solubility= 6,9X10+5 mg/L at 20 C High solubility in water, but is expected to biodegrade readily.
ANALYTICAL METHODS[67]	Spectrophotometer or spectrum-line photometer in foodstuff and clinical chemistry. AOAC 973.28: determination of sorbitol in food by GC. A very specific and exact separation can be obtained by means of HPLC. Detection in humectants by GC with N carrier and flame ionization detection. Sorbitol, glucose, fructose and xylitol were separated without derivatization by HPLC.

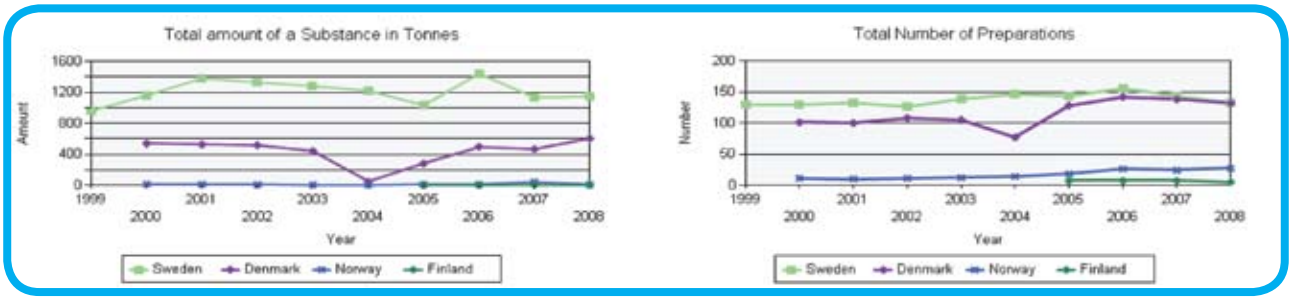
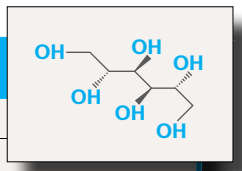


Figure 24: Tonnage of Sorbitol in the Nordic countries[7]

MANNITOL (D-MANNITOL)



IDENTIFICATION[5]

CAS nr.	69-65-8 : Wide spread in the nature (e.g. pumpkin, hedge parsley, onions, celery, etc)
EC nr	200-711-8
Chemical formula	C6H14O6
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: Stated as confidential Sweden: 88 Finland: Stated as confidential
PERSISTENCE[68]	Not Persistent Is a simple sugar alcohol and should be readily biodegraded in the environment.
BIOACCUMULATION[68]	Not Bioaccumulative Log Kow = -3,10 estimated BCF(aquatic organisms)= 1
TOXICITY	Toxic : cannot be fully assessed Toxic to aquatic organisms: cannot be assessed Only data is from a MSDS[69]: LD50 48 hr(golden orfe) > 70 000 mg/l Not Toxic over prolonged exposure.[68] Studies on mammals showed no longterm or carcinogen adverse effects. Reprotoxic and development studies were not found.
METABOLITES[68]	Fructose Glycogen
LONG-RANGE TRANSPORT[68]	No expected to LRT The component is a stereoisomer of Sorbitol, thereby the vapour pressure is expected to be identical. In this manner, Volatility is low and the component is expected to exist solely in the particulate phase in the ambient atmosphere. It is unlikely to partition to the atmosphere. Water solubility= 2,16X10+5 mg/l at 25 C High solubility in water, but is expected to biodegrade readily.
ANALYTICAL METHODS	Column chromatography developed by 85% isopropyl alcool and 15% water. Cut mannitol from column. Elute with warm water. Add sodium periodate soln and heat. Cool and add nahco3 and potassium iodide. Titrate with 0.05 n sodium arsenite. Determined by conversion to acetate and GC

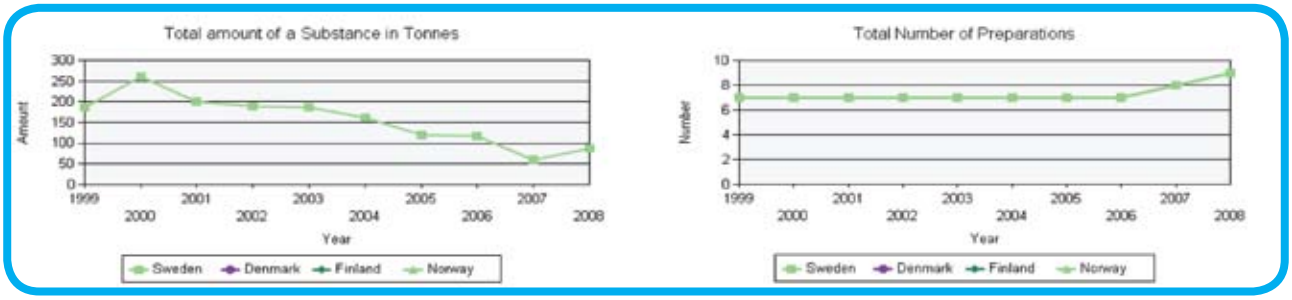
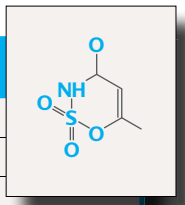


Figure 25: Tonnage of Mannitol in the Nordic countries[7]

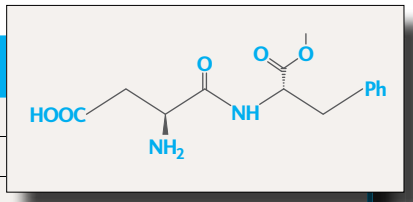
6-METHYL-1,2,3-OXATHIAZIN-4(3H)-ONE 2,2-DIOXIDE, POTASSIUM SALT (ACESULFAME K)



IDENTIFICATION[5]	
CAS nr.	55589-62-3
EC nr	259-715-3
Chemical formula	C4H5NO4S.K
EU Classification	
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: Stated as confidential Finland: no data

PERSISTENCE	Persistent: cannot be assessed No data However, the structure indicates that component should be succpetible to biodegradation.
BIOACCUMULATION[70]	Bioaccumulative: cannot be assessed Log Kow: no data No BCF Water solubility= 210 g/l at 10C The component is very soluble in water, hence its potential to bioaccumulate is not expected to be significant.
TOXICITY[70]	Potentially Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l LC50 (Golden Orfe) >1000 mg/l Potentially Toxic over prolonged exposure In one study, it was found to induce a dose-dependant clastogenic effect in bone marrow cells. Other studies show no carcinogenic effects. No reprotoxic, nor development adverse effects were observed.
METABOLITES[70]	No metabolites have been identified, only the original molecule is found in urine.
LONG-RANGE TRANSPORT[70]	LRT:Cannot be assessed No data Melting point= 225 C A high melting point indicates a low vapour pressure at ambient temperatures.However the persistence in the atmosphere is unknown. Water solubility= 210 g/l at 10C High solubility in water, but is expected to biodegrade.
ANALYTICAL METHODS[71]	BLMs composed of egg phosphatidylcholine (PC) can be used for the direct electrochemical sensing of sweeteners acesulfame-K, saccharin and cyclamate. The interactions of these compounds with lipid membranes were found to be electrochemically transduced in the form of a transient current signal. The magnitude of the transient current signal is related to the concentration of the sweetener in bulk solution in the micromolar range. The present technique can be used as a one shot sensor for the rapid detection of these sweeteners. The analyte is extracted by solid phase extraction using Bakerbond SDB 1 cartridges at pH 3 and analyzed by liquid chromatography electrospray ionization tandem mass spectrometry in negative ionization mode. Ionization is enhanced by post-column addition of the alkaline modifier.

ASPARTAME



IDENTIFICATION[5]

CAS nr.	22839-47-0
EC nr	245-261-3
Chemical formula	C14H18N2O5
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: Stated as confidential Sweden: 27 Finland: no data
PERSISTENCE[72]	Potentially Persistent Degradation in water is temperature and pH dependant: T1/2 (25C, pH 7-5)= 1 – 245 days Will be persistant in fresh waters and probably less in salt water. Expected to degrade in moist soil surfaces: T1/2 (pH 7)= 1 day Not persistant in soils.
BIOACCUMULATION[72]	Not Bioaccumulative Log Kow= -0,9 No BCF
TOXICITY[72 73]	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects. However this component is subject to a lot of public concern.
METABOLITES[72]	Degraded to: Diketopiperazine (CAS 106-57-0): 5-benzyl-3,6-dioxo-2-piperazine acetic acid Metabolised to: 50% phenylalanine, 40% aspartic acid, and 10% methanol
LONG-RANGE TRANSPORT[72]	Expected to LRT Vapour pressure< 0,0000001 hPa at 25 C Volatility is low and the component, hence it is unlikely to partition to the atmosphere. Water solubility = ca. 10 g/l at 20 C Water solubilty is very high and the component is expected to persist in freshwater.
ANALYTICAL METHODS	Purity of aspartame can be determined by: thin layer chromatography, LC, and optical rotation.[72] Aspartame can be analyzed by LC.[72] The analyte is extracted by solid phase extraction using Bakerbond SDB 1 cartridges at pH 3 and analyzed by liquid chromatography electrospray ionization tandem mass spectrometry in negative ionization mode. Ionization is enhanced by post-column addition of the alkaline modifier.[74]

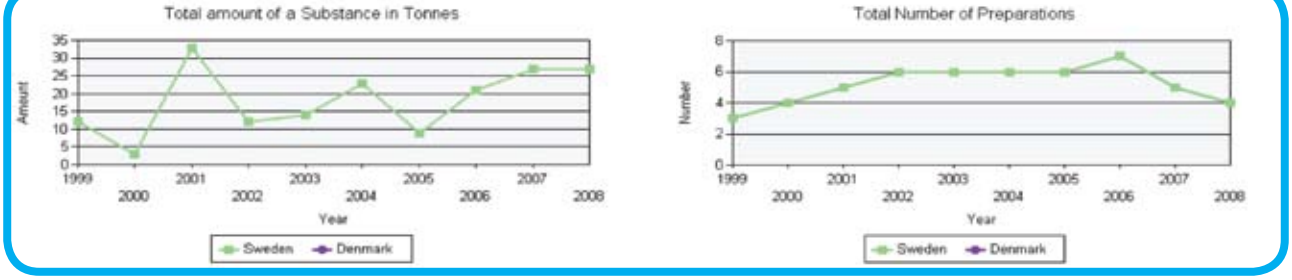
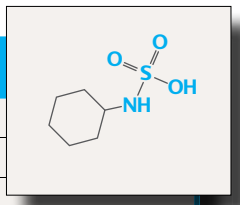


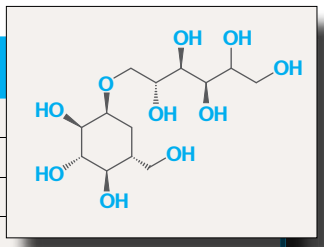
Figure 26: Tonnage of Aspartame in the Nordic countries[7]

N-CYCLOHEXYLSULPHAMIC ACID (CYCLAMATE)



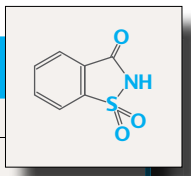
IDENTIFICATION[5]	
CAS nr.	100-88-9
EC nr	202-898-1
Chemical formula	C6H13NO3S
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: no data Finland: no data
PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow: No data No BCF
TOXICITY[75]	Toxic Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure Rats that received calcium cyclamate salt post-mating did not produce offspring. Adverse effects on offspring exposed during gestation. IARC class 3
METABOLITES[75]	Cylcohexylamine (CAS 108-91-8) (Cyclamate is incompletely absorbed from the gastrointestinal tract of mammals. Most is excreted unchanged in the urines)
LONG-RANGE TRANSPORT[75]	LRT: Cannot be assessed Water solubility= 0,133 g/cm3 Relatively soluble, its persitence in water is unknown, Melting point= 169,5 C A high melting point indicates a low vapour pressure at ambient temperatures which suggest a low potential to evaporate.
ANALYTICAL METHODS[76]	AOAC 969.28: Sodium cyclamate and calcium cyclamate in canned fruit. Colorimetric method. AOAC 971.17: Cyclohexylamine in cyclamates and artifically sweetened potatoes. Infra-red spectrophotometric method. Cyclamate in soft drinks can be determined by addition of excess nitrous acid. The unconsumed nitrous acid is determined colorimetrically from reaction with safranine. In liquid foods, determination by uv spectrophotometry as low as 0.001% Micro amounts of cyclamates can be determined by gas chromatography. The analyte is extracted by solid phase extraction using Bakerbond SDB 1 cartridges at pH 3 and analyzed by liquid chromatography electrospray ionization tandem mass spectrometry in negative ionization mode. Ionization is enhanced by post-column addition of the alkaline modifier.

ISOMALT



IDENTIFICATION[5]	
CAS nr.	64519-82-0
EC nr	Not registered in the ESIS database
Chemical formula	C12H24O11
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: Stated as confidential Finland: no data
PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : No data No BCF
TOXICITY	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed No data
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: Cannot be assessed No data
ANALYTICAL METHODS[77]	Separation and determination of alditols and sugars by high-pH anion-exchange chromatography with pulsed amperometric detection.

1,2-BENZISOTHIAZOL-3(2H)-ONE 1,1-DIOXIDE (SACCHARIN)



IDENTIFICATION[5]	
CAS nr.	81-07-2
EC nr	201-321-0
Chemical formula	C7H5NO3S
EU Classification	
Tonnage in 2008 (tonnes) [7]	Norway: Stated as confidential Denmark: 0,3 Sweden: 3 Finland: 0
PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION[78]	Not Bioaccumulative log Kow= 0,91 estimated BCF= 3
TOXICITY[78]	Toxic Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure Showed to induce urothelial and urethelial tumors. Classified in the US as carcinogen group C (reasonably anticipated to be a human carcinogen)
METABOLITES[78]	Potential metabolites (hydrolysis): o-sulfamoylbenzoic acid and ammonium o-sulfolbenzoic acid When ingested no metabolites are detected
LONG-RANGE TRANSPORT[78]	Expected to LRT Melting point= 228,8-229,7 C A high melting point indicates a low vapour pressure at ambient temperatures, which indicates it is unlikely to partition to the atmosphere. Expected to exist in both the vapor and particulate phases in the ambient atmosphere. Degraded in the atmosphere by reaction with hydroxyl radicals: T1/2= 3 days This indicates that once in the atmosphere the component will persist. Water solubility= 4300 mg/l at 25 C Soluble in water, however the persistence is unknown.
ANALYTICAL METHODS[79]	Determination of saccharin sodium by preparation of silver saccharinate. GLC determination of saccharin in pharmaceutical products. A reverse phase HPLC method for the simultaneous separation and determination of saccharin, sodium benzoate, and caffeine in drinks. Determination of saccharin in food and drugs by column chromatography. Gravimetric, differential pulse polarographic, and sublimation methods to determine saccharin in food. Thin layer chromatographic method is used to identify saccharin in nonalcoholic beverages. UV spectrometry can be used at 254 nm for determination. The analyte is extracted by solid phase extraction using Bakerbond SDB 1 cartridges at pH 3 and analyzed by liquid chromatography electrospray ionization tandem mass spectrometry in negative ionization mode. Ionization is enhanced by post-column addition of the alkaline modifier.

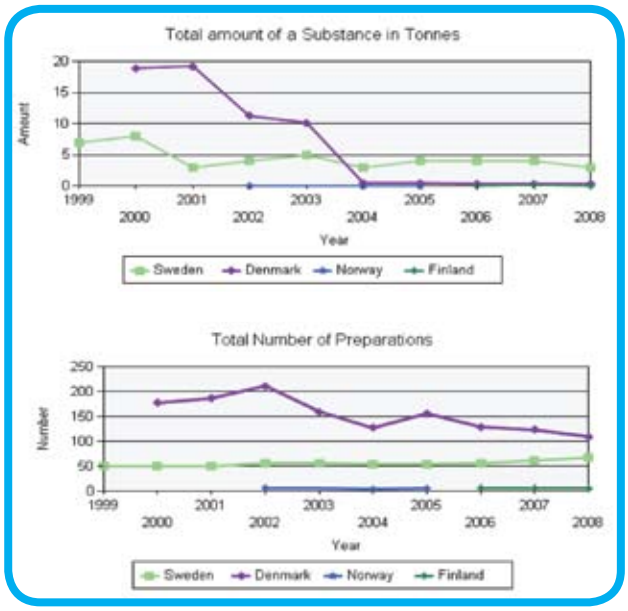
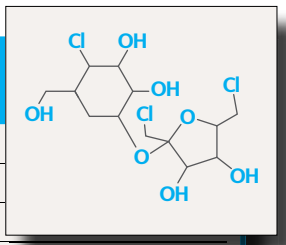


Figure 27: Tonnage of 1,2-benzisothiazol-3(2H)-one 1,1-dioxide (saccharin) in the Nordic countries[7]

1,6-DICHLORO-1,6-DIDEOXY-β-D-FRUCTOFURANOSYL 4-CHLORO-4-DEOXY-α-D-GALACTOSE (SUCRALOSE)



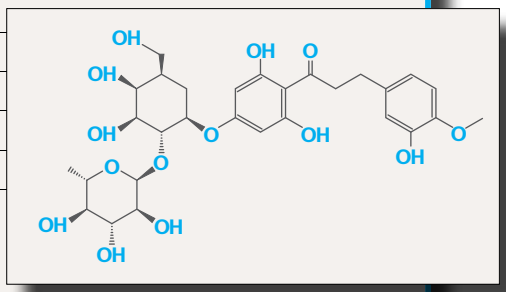
IDENTIFICATION[5]	
CAS nr.	56038-13-2
EC nr	259-952-2
Chemical formula	C12H19Cl3O8
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: Stated as confidential Finland: no data
PERSISTENCE[80]	Persistent Degradation in soil, after 69 days = 56- 60%, Degradation in lake water, 77 days = 1,7-3,6% Inherently biodegradable but not readily degradable.
BIOACCUMULATION[80]	Not Bioaccumulative Log Kow = -1 No BCF
TOXICITY[80]	Not Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC50 48 hr (Daphnia magna) >1800 mg/l Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects.
METABOLITES[80]	Hydrolysisi: 4-chloro-4-deoxygalactose (4-CG) and 1,6-dichloro-1,6-dideoxyfructose (1,6-DCF) Metabolisation: poorly absorbed, with no significant conversion.
LONG-RANGE TRANSPORT[80]	Expected to LRT Vapour pressure= 3,25E-14 mmHg Volatility is low and is thereby unlikely to partition to the atmosphere. Water solubility= 110 g/l Readily soluble in water and persistent.
ANALYTICAL METHODS	Sucralose screening in surface waters using a solid-phase extraction-liquid chromatography–triple quadrupole mass spectrometry method. [81] The analyte is extracted by solid phase extraction using Bakerbond SDB 1 cartridges at pH 3 and analyzed by liquid chromatography electrospray ionization tandem mass spectrometry in negative ionization mode. Ionization is enhanced by post-column addition of the alkaline modifier.[82]
MONITORING DATA IN THE NORDIC COUNTRIES	Detected in STPs: in influent, effluent and sludge. Detected in recipient waters (fresh and saltwaters). It is not detected in biota.

PROTEINS, THAUMATINS

IDENTIFICATION[5]	
CAS nr.	53850-34-3 :Extracted from a tropical fruit
EC nr	258-822-2
Chemical formula	
EU Classification	
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: Stated as confidential Sweden: no data Finland: no data

PERSISTENCE	Persistent: cannot be assessed No data The component is a protein (chain of amino-acids), which is expected to biodegrade.
BIOACCUMULATION	Bioaccumulative: cannot be assessed No data
TOXICITY[83]	Toxic : cannot be fully assessed Toxic to aquatic organisms: cannot be assessed No data Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, carcinogen or gentoxic adverse effects. Reprotoxic and teratogenicity was not studied in particular.
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: Cannot be assessed No data
ANALYTICAL METHODS[84]	The infrared spectrum of a potassium bromide dispersion of the sample (1-2 mg of sample ground in a mortar with 100-200 mg potassium bromide) corresponds to the infrared spectrum below. Characteristic maxima of absorption are shown at the following wavenumbers: 3300, 2960, 1650, 1529, 1452, 1395, 1237, 1103 and 612 cm-1

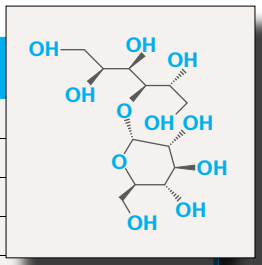
1-[4-[[2-O-(6-DEOXY-α-L-MANNOPYRANOSYL)-β-D-GLUCOPYRANOSYL]OXY]-2,6-DIHYDROXYPHENYL]-3-(3-HYDROXY-4-METHOXYPHENYL)PROPAN-1-ONE (NEOHESPERIDIN DIHYDROCHALCONE)



IDENTIFICATION[5]	
CAS nr.	20702-77-6
EC nr	243-978-6
Chemical formula	C28H36O15
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: no data Finland: no data

PERSISTENCE	Persistent: cannot be assessed No data
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : No data No BCF
TOXICITY	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed No data
METABOLITES	No data
LONG-RANGE TRANSPORT	LRT: Cannot be assessed No data
ANALYTICAL METHODS[85]	The analyte is extracted by solid phase extraction using Bakerbond SDB 1 cartridges at pH 3 and analyzed by liquid chromatography electrospray ionization tandem mass spectrometry in negative ionization mode. Ionization is enhanced by post-column addition of the alkaline modifier.

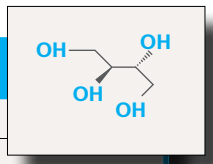
4-O-α-D-GLUCOPYRANOSYL-D-GLUCITOL (MALTITOL)



IDENTIFICATION[5]	
CAS nr.	585-88-6
EC nr	209-567-0
Chemical formula	C12H24O11
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: Stated as confidential Finland: no data

PERSISTENCE	Persistent: cannot be assessed No data By analogy with its stereoisomer lactitol, the component is expected to biodegrade but not readily. This indicates that the component is potentially persistent.
BIOACCUMULATION[86]	Bioaccumulative: cannot be assessed Log Kow : No data No BCF Water solubility= ca, 140 g/l at 20 C The component is very soluble in water. By analogy with lactitol it is not expected to bioaccumulate.
TOXICITY	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data By analogy with lactitol, the component is not expected to be toxic to aquatic organisms. Not Toxic over prolonged exposure.[87] Rats, oral (up 10% diet), one and a half years (78 weeks) Results: no unusual signs were observed among the test rats. Carcinogenit activity was also negative.
METABOLITES	No data
LONG-RANGE TRANSPORT[86]	LRT: Cannot be assessed Water solubility= ca, 140 g/l at 20 C Very soluble in water and potentially persistent. No data
ANALYTICAL METHODS	EN 15086: analytical technique for determining the content of isomalt, lactitol, maltitol, mannitol, sorbitol and xylitol in foods.

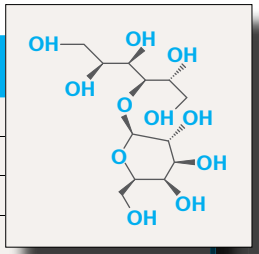
ERYTHRITOL



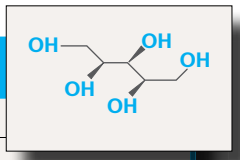
IDENTIFICATION[5]	
CAS nr.	149-32-6
EC nr	205-737-3
Chemical formula	C4H10O4
EU Classification	No classification
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: no data Finland: no data

PERSISTENCE	Persistent: cannot be assessed Based on data from a similar component (sorbitol and mannitol), the component is expected to biodegrade readily in the environment.
BIOACCUMULATION	Bioaccumulative: cannot be assessed Log Kow : No data No BCF Sorbitol: log Kow = -2,20 Based on data from a similar component (sorbitol), the component is not expected to bioaccumulate.
TOXICITY[88]	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Not Toxic over prolonged exposure Long-term studies revealed no carcinogenic, reprotoxic or teratogenic adverse effects.
METABOLITES[88]	Excreted unchanged in the urine
LONG-RANGE TRANSPORT	LRT: Cannot be assessed, but is not expected to LRT Vapour pressure of sorbitol= 9,9X10-9 mm Hg at 25 C Based on data from a similar component (sorbitol), the component is unlikely to partition to the atmosphere. Freely soluble in water[88] and expected to biodegrade readily.
ANALYTICAL METHODS[89]	Determine the erythritol content of the sample by liquid chromatography

4-O-β-D-GALACTOPYRANOSYL-D-GLUCITOL (LACTITOL)



IDENTIFICATION[5]	
CAS nr.	585-86-4 : manufactured from whey (lactose)
EC nr	209-566-5
Chemical formula	C12H24O11
EU Classification	
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: no data Sweden: Stated as confidential Finland: no data
PERSISTENCE[90]	Potentially Persistent BOD5/COD= 55,3% Biodegrades but not readily.
BIOACCUMULATION[90]	Not Bioaccumulative Log Kow = -3
TOXICITY[90]	Not Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l NOEC (Poecilia reticulate) = 10000 mg/l NOEC (Daphnia magna)= 10000 mg/l Not Toxic over prolonged exposure Studies on mammals showed no reprotoxic, teratogen, carcinogen or gentoxic adverse effects.
METABOLITES	No data
LONG-RANGE TRANSPORT[90]	Potential to LRT Water solubility:Dihydrate = 140 g/l at 25 C Monohydrate = 150 g7l at 25 C Highly soluble, and potentially persistent in water.
ANALYTICAL METHODS	EN 15086: analytical technique for determining the content of isomalt, lactitol, maltitol, mannitol, sorbitol and xylitol in foods.



XYLITOL

IDENTIFICATION[5]	
CAS nr.	87-99-0: extracted from some fruits and vegetables
EC nr	201-788-0
Chemical formula	C5H12O5
EU Classification	
Tonnage in 2008 (tonnes) [7]	Norway: no data Denmark: Stated as confidential Sweden: 1151 Finland: no data
PERSISTENCE[91]	Persistent: cannot be assessed BOD5 = 0,7 mgO2/l
BIOACCUMULATION	Bioaccumulative: cannot be assessed No data
TOXICITY	Toxic : cannot be assessed Toxic to aquatic organisms: cannot be assessed No data Toxic over prolonged exposure: cannot be assessed No data
METABOLITES	No data
LONG-RANGE TRANSPORT[91]	Cannot be assessed Water solubility= 1,6g/l at 20C, pH 5-7 No data
ANALYTICAL METHODS	EN 15086: analytical technique for determining the content of isomalt, lactitol, maltitol, mannitol, sorbitol and xylitol in foods.

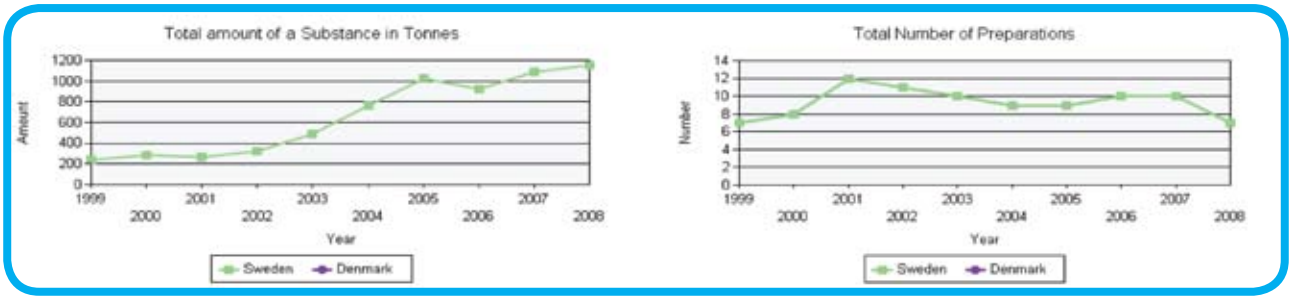


Figure 28: Tonnage of xylitol in the Nordic countries[7]

4. METABOLITES

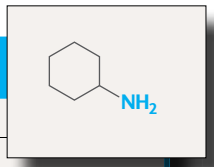
In this section the metabolites identified for the plasticizers and sweeteners selected by NSG, are assessed one by one. For each component the persistence, bioaccumulation and toxicity and long range transport is assessed, according to knowledge currently available, as described in the methodology. Only the data used for the assessment is indicated in the main report and additional data can be found in the annex.

More specific data can be found in the following annexes:

- Annex 3A: chemical and physical properties
- Annex 3B: environmental behaviour
- Annex 3C: toxicology in aquatic organisms
- Annex 3D: toxicology in mammals
- Annex 3E: toxicology in other species
- Annex 3F: spectral properties

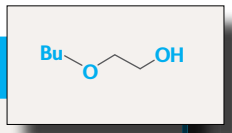
At the end of the section a matrix resuming the environmental risks associate to all the plasticizers and based on a colour code will allow the reader to compare the components between them.

CYLCOHEXYLAMINE: METABOLITE OF N-CYCLOHEXYLSULPHAMIC ACID



IDENTIFICATION[5]	
CAS nr.	108-91-8
EC nr	203-629-0
Chemical formula	C6H13N
EU Classification	Classified C Repr. Cat3, R62 (possible risk of impaired fertility) Registered as HPV in Europe
PERSISTENCE[92]	Not Persistent Biodegrades readily Incubation over 14 days: The theoretical BOD of was 79% in an acclimated sewage inoculum, 68 % in plant sludge and 0% in river mud respectively.
BIOACCUMULATION[92]	Not Bioaccumulative log Kow = 1,49 Estimated BCF= 3
TOXICITY[92]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC50 96hr (Selenastrum capricornutum)= 20 mg/l Toxic over prolonged exposure Showed to be clastogenic: Dose-dependent increase in chromosomal breaks in rats. Induced chromosome aberrations in lymphocytes of chinese hamsters. Showed to be reprotoxic: Exposure of the chemical to dogs and rats reduced counts of pachytene spermatocytes and of early and late spermatides.

2-BUTOXYETHANOL: METABOLITE OF TRIS(2-BUTOXYETHYL) PHOSPHATE



IDENTIFICATION[5]

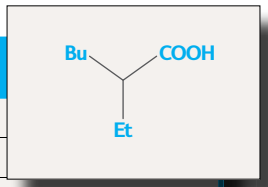
CAS nr.	111-76-2
EC nr	203-905-0
Chemical formula	C6H14O2
EU Classification	Classified: Xn; R20/21/22 Registered as HPV in Europe

PERSISTENCE[93]	Not Persistent Readily biodegradable: Studies show that after 14 days, Biodegradation >70%
BIOACCUMULATION	Not Bioaccumulative Log Kow= 0,9 at 20C[93] Estimated BCF= 3[94]
TOXICITY[93]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l Fundulus heteroclitus: LC 50 96 hr= 6,7 mg/l NOEC 96 hr = 4 mg/l All toxic values for longterm toxicity on aquatic organisms are > 0,01 mg/l NOEC 21 days (Brachydanio rario)> 100 mg/l Toxic over prolonged exposure Tumourigenicity, an increased incidence of haemangiosarcomas in males and squamous cell papillomas or carcinomas in female mice NOAEC = 125 ppm No specific effects on fertility. Foetotoxicity and embryotoxicity (lethality and resorptions) were often observed but is related to maternal toxicity.

ADIPIC ACID: METABOLITE OF BIS(2-ETHYLHEXYL) ADIPATE

IDENTIFICATION[5]	
CAS nr.	124-04-9
EC nr	204-673-3
Chemical formula	C6H10O4
EU Classification	Xi; R36 Registered HPV in Europe
PERSISTENCE[95]	Not Persistent Readily biodegradable Aerobic domestic sewage, 28 day: Degradation=100 %
BIOACCUMULATION	Not Bioaccumulative Measured log Kow= 0,08 [95] estimated BCF = 0,68 [96]
TOXICITY[95]	Not Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC5096 hr (Scenedesmus subspicatus)= 26,6mg/l Not Toxic over prolonged exposure Genotoxicity invitro showed to be negative. The chemical did not induce adverse reprotoxic or teratogenic effects.

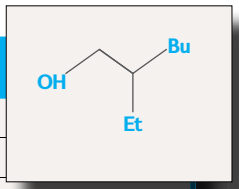
2-ETHYLHEXANOIC ACID: METABOLITE OF BIS(2-ETHYLHEXYL) ADIPATE



IDENTIFICATION[5]	
CAS nr.	149-57-5
EC nr	205-743-6
Chemical formula	C8H16O2
EU Classification	Repr. Cat. 3; R63 Registered HPV in Europe.

PERSISTENCE[97]	Potentially Persistent Biodegradation is expected to be the main degradation mechanism in the environment. Not readily biodegradable. Aerobic, activated sludge, 28 day Degradation = 39 %
BIOACCUMULATION	Bioaccumulative Log Kow= 2,64 [97] BCF (fish)= 3 [98]
TOXICITY[97]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC50 96hr (Scenedesmus subspicatus)= 41 mg/l Force feed: NOEL (Cyprinus carpio) >= 117mg/kg bw Toxic over prolonged exposure Cytogenic: Positive cytogenetic assay, CHO–Zellen Teratogenic: NOAEL Teratogen. = 100 mg/kg bw Induces malformations and increases fetal resorptions.

2-ETHYLHEXANOL: METABOLITE OF BIS(2-ETHYLHEXYL) AZELATE AND TRIS(2-ETHYLHEXYL) PHOSPHATE



IDENTIFICATION[5]

CAS nr.	104-76-7
EC nr	203-234-3
Chemical formula	C8H18O
EU Classification	Not classified

PERSISTENCE[99]	Not Persistent Readily biodegradable Activated sludge, non–adapted, 20 days In fresh water: BOD20=86% In sea water: BOD20=100%
BIOACCUMULATION[99]	Bioaccumulative Log Kow= 3,1 Calculated BCF= ca. 27
TOXICITY[99]	Toxic Not Toxic to aquatic organisms All toxic values for acute toxicity on aquatic organisms are > 0,1 mg/l EC50 72 hr(Scenedesmus subspicatus) = 11,5 mg/l NOEC 96 hr (Leuciscus idus melanotus) = 14 mg/l Toxic over prolonged exposure Teratogenic NOAEL Teratogen. = 650 mg/kg bw Increased number of resorptions.

5. CONCLUSION

The objective of this report was to document the environmental risks associated to certain plasticizers and sweeteners and accordingly prioritise the chemicals for a future environmental screening program.
Chemicals of interest for the screening program would qualify on the basis of the following:

- Chemicals of environmental concern, according to data available
- Chemicals little studied in the environment
- Increase of import/consumption

Please refer to Table 5, Table 6 and Table 7.

Data has been found for most plasticizers assessed in this report, however little or no data was found for six chemicals. Some of the plasticizers, such as DEHP, have been subject to attention in the past and are currently well documented and monitored.

According to the data retrieved in this report the following plasticizer would be good candidates for the screening program:

- bis(2-ethylhexyl) adipate and its metabolite 2-ethylhexanoic acid
- diisononyl adipate
- di-''isononyl'' phthalate
- di-''isodecyl'' phthalate
- dioctyl phthalate (DnOP)
- bis(2-ethylhexyl) sebacate
- Polydimetylsiloxan
- bis(2-ethylhexyl) azelate
- tris(2-ethylhexyl) phosphate
- Triphenyl phosphate
- Parafin waxes and Hydrocarbon waxes, chloro
- Alkanes, C14-17, chloro

Little data has been retrieved as regards to the environmental behaviour of sweeteners and only sucralose has been subject to any environmental monitoring. Furthermore based on industrial knowledge in the Nordic countries, the import data registered in the SPIN database does not appear to be representative of the real consumption in the Nordic countries. In this manner, before concluding on an environmental screening program for sweeteners, it would be an advantage to further investigate the factual imports of these compounds in the Nordic countries.

Though little data is available some sweeteners are expected to be metabolized similarly to simple sugars and are thereby of little environmental concern. Nevertheless this is not the case for all sweeteners, and according to the data available the following chemicals show to be of some concern and could be good candidates for environmental screening:

- aspratam
- cyclamate
- saccharin
- maltitol
- lactitol

The budget of this project was restricted and thereby research was limited. Before carrying out the screening project we recommend that further literature research is done to increase knowledge where it is lacking.

The following tables are summaries of the PBT and long-range transport potential of the plasticizers, sweeteners and metabolites studied in this report.

ENVIRONMENTAL RISKS OVERVIEW FOR PLASTICIZERS (p. 1/2)

CAS NR.	SUBSTANCE NAME	PERSISTENCE	BIOACCUM	TOXICITY IN AQ.ORG	TOXICITY LG TERM	LRT	MONITORING IN THE NORDIC	TONNAGE (2008)
103-23-1	bis(2-ethylhexyl) adipate	●	◆	●	◆	●	◆	Norway: 29,3 Denmark: 14,1 Sweden: 879 (increase)
3089-55-2	Benzyl octyl adipate	■	■	■	■	■	■	no data
33703-08-1	diisononyl adipate	●	◆	●	◆	■ not expected	■	Norway: 0,1 Denmark: 1,3, Sweden: 325 (Sweden increase)
141-17-3	bis(2-(2-butoxyethoxy) ethyl) adipate	▲	●	■	■	●	■	Sweden: 13 (decrease)
28553-12-0	di-"isononyl" phthalate	●	◆	●	▲	●	▲	Norway: 216,5 Denmark: 425,5 Sweden: 12 491 Finland: 25,6 (Sweden increase)
85-68-7	benzyl butyl phthalate	●	◆	◆	◆	●	◆	Norway: 8,7 Denmark: 17,5 Sweden: 20 Finalnd:.103,3 (decrease)
117-81-7	bis(2-ethylhexyl) phthalate	◆	◆	●	◆	●	◆	Norway: 5,3 Denmark: 124,1 Sweden: 1 489 Finland: 165,5 (decreased and now stable)
84-74-2	dibutyl phthalate	●	◆	◆	◆	●	▲	Norway: 6,2 Denmark: 94,3 Sweden: 69 Finland:.322,6 (Sweden unstable)
26761-40-0	di-"isodecyl" phthalate	◆	◆	●	▲	●	▲	Norway: 39,1 Denmark: 24,4 Sweden: 1064 (Sweden unstable)
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	●	◆	●	▲	●	■	no data
68515-41-3	Dialkyl(C7-C9)phthalate	●	◆	●	●	●	■	no data
27554-26-3	diisooctyl phthalate	●	◆	●	◆	●	■	Sweden: 1 (decrease in Denmark)
117-84-0	dioctyl phthalate	●	◆	◆	●	●	▲	Denmark: 72,8 (DK decrease Finland increase)
3648-20-2	Diundecyl phthalate	●	◆	●	▲	●	■	Sweden: 154 (unstable)

● The component does not qualify as P,B,T or LRT / ND in the environment/STP.

◆ The component qualifies as P, B, T or LRT/ Dectected in biota.

▲ The component is potentially P,B,T or LRT: data shows potential to qualify, but is uncertain/ detected in the environment but not in biota.

■ Data is not available to assess the P, B, T or LRT potential of the component/ no monitoring data.

Table 5.1: environmental risks overview for plasticizers: conclusion (p. 2/1)

ENVIRONMENTAL RISKS OVERVIEW FOR PLASTICIZERS (p. 2/2)

CAS NR.	SUBSTANCE NAME	PERSISTENCE	BIOACCUM.	TOXICITY IN AQ.ORG	TOXICITY LG TERM	LRT	MONITORING IN THE NORDIC	TONNAGE (2008)
122-62-3	bis(2-ethylhexyl) sebacate	◆	◆	●	●	●	▲	Norway: 7 Denmark: 0,4 Sweden: 59 (increase)
143-29-3	bis(2-(2-butoxyethoxy) ethoxy)methane	◆	◆	●	◆	●	■	No data
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	◆	◆	●	◆	●		Norway: 1016,4 Denmark: 438,5 Sweden: 93046 Finland:.184,2 (increase in 2008 for Sweden)
63148-62-9	Polydimetylsiloxan	■	■	■	◆	■	■	Norway: 72,7 Denmark: 494,5 Sweden: 3269 Finland:.43,3 (increase in 2008 for Sweden)
115-83-3	Pentaerythrityltetrastearate	■	■	■	▲	■	■	Sweden: 5 (decrease)
103-24-2	bis(2-ethylhexyl) azelate	◆	◆	■	■	●	■	Denmark: 7 Sweden: 303 (increase)
3370-35-2	N-(hydroxymethyl)stearamide	■	■	■	■	■	■	No data
25429-29-2	pentachloro[1,1'-biphenyl]	■	◆	■	◆	■	■	No data
133-49-3	pentachlorobenzenethiol	◆	◆	●	●	◆	■	No data since 2004
78-51-3	tris(2-butoxyethyl) phosphate	●	●	●	▲	●	◆	Norway: 0,1 Denmark: 12,3 Sweden: 58 (decrease)
78-42-2	tris(2-ethylhexyl) phosphate	◆	◆	■	◆	◆	◆	Denmark: 6,4 Sweden: 15 Finland: 142,7 (Finland unstable)
115-86-6	Triphenyl phosphate	●	◆	◆	◆	●	◆	Norway: 18,4 Denmark: 8,3 Sweden: 70 Finland: 57,1 (stable in tonnage but increase in number of preparations)
63449-39-8	Parafin waxes and Hydrocarbon waxes, chloro	◆	◆	●	●	●	▲	Norway: 55,7 Denmark: 23,2 Sweden: 343 (stable)
85535-85-9	Alkanes, C14-17, chloro	◆	◆	◆	◆	◆	▲	Norway: 145,1 Denmark: 100,5 Sweden: 196 Finland: 12

Table 5.2: Environmental risks overview for plasticizers: conclusion (p. 2/2)

ENVIRONMENTAL RISKS OVERVIEW FOR SWEETENERS

CAS NR.	SUBSTANCE NAME	PERSISTENCE	BIOACCUM.	TOXICITY IN AQ.ORG	TOXICITY LG TERM	LRT	MONITORING IN THE NORDIC	TONNAGE (2008)
50-70-4	Sorbitol, sorbitolsirap	●	●	■	●	●	■	Norway: 7,1 Denmark: 604 Sweden: 1140 Finland: 1,4 (increase)
69-65-8	Mannitol	●	●	■	●	●	■	Sweden: 88 (decrease in tonnage, increase in number of preparations)
55589-62-3	Acesulfame K	■ not expected	■ not expected	●	▲	■ not expected in water	■	No data
22839-47-0	Aspartam	▲	■	■	●	◆	■	Sweden: 27
100-88-9	cyclamate	■	■	■	◆	■ unlikely in air	■	No data
64519-82-0	Isomalt	■	■	■	■	■	■	No data
81-07-2	saccharin	■	●	■	◆	◆	■	Denmark: 0,3 Sweden: 3 (decrease)
56038-13-2	sucralose	◆	●	●	●	◆ in water	▲	No data
53850-34-3	Taumatin	■ expected to bio-degrade	■	■	●	■	■	No data
20702-77-6	Neohesperidindihydrochal-con/neohesperidin DC	■	■	■	■	■	■	No data
585-88-6	Maltitol, maltitolsirap	■ potentially	■ not expected	■ not expected	■ not expected	■ potentially in water	■	No data
585-86-4	Lactitol	▲	●	●	●	▲ potentially in water	■	No data
87-99-0	Xylitol	■	■	■	■	■	■	Sweden: 1151 (increase)
149-32-6	Erytritol	■ not expected	■ not expected	■	●	■ not expected	■	No data

● The component does not qualify as P,B,T or LRT / ND in the environment/STP.

◆ The component qualifies as P, B, T or LRT/ Dectected in biota.

▲ The component is potentially P,B,T or LRT: data shows potential to qualify, but is uncertain/ detected in the environment but not in biota.

■ Data is not available to assess the P, B, T or LRT potential of the component/ no monitoring data.

Table 6: Environmental risks overview for sweeteners: conclusion

ENVIRONMENTAL RISKS OVERVIEW FOR METABOLITES

CAS NR.	SUBSTANCE NAME	PERSISTENCE	BIOACCUM.	TOXICITY IN AQ.ORG	TOXICITY LG TERM
108-91-8	Cylcohexylamine	●	●	●	◆
111-76-2	2-butoxyethanol	●	●	●	◆
124-04-9	adipic acid	●	●	●	●
149-57-5	2-ethylhexanoic acid	▲	◆	●	◆
104-76-7	2-ethylhexanol	●	◆	●	◆

- ● The component does not qualify as P,B,T or LRT / ND in the environment/STP.
- ◆ The component qualifies as P, B, T or LRT/ Dectected in biota.
- ▲ The component is potentially P,B,T or LRT: data shows potential to qualify, but is uncertain/ detected in the environment but not in biota.
- ■ Data is not available to assess the P, B, T or LRT potential of the component/ no monitoring data.

Table 7: Environmental risks overview for metabolites: conclusion

ANNEX

1A. PLASTICIZERS: CHEMICAL AND PHYSICAL PROPERTIES

CAS nr.	Substance Name	Molecular weight (g/mole) ref: HSDB	melting point (degree celsius)	boiling point (degree celsius)	density (g/cm3)	Vapour pressure (hPa or mmHg)	log Kow	water solubility (mg/l or g/l)	Ref
103-23-1	bis(2-ethylhexyl) adipate	370,57	–76 C (2)	210 – 218 C at 7 hPa (2)	0,924 g/cm3 at 20 C (2)	0,021 hPa at 100C (2)	calculated: 8,114 (2)	< 0,1 g/l at 20 C 0,78 mg/l at 22 C (1)	(1) ECB[100] (2) HSDB[101]
3089-55-2	benzyl octyl adipate								
33703-08-1	diisononyl adipate		– 68 C	> 250 C at 1013 hPa	0,923 g/cm3 at 20 C	< 0,1 hPa at 20 C	9,56 – 10,4 at 25 C	< 1 mg/l at 20 C	ECB[102]
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate	434,64	-47 C	240C at 5 mm Hg		9,8.10-8 mmHg at 25C	estimated: 3,24		HSDB[103]
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro		-30 C at 42% Cl 0 C at 52% Cl	>200 C at 1013 hPa	1,055 - 1,3 g/cm3 1,1 g/cm3 at 35% Cl 1,3 g/cm3 at 52% Cl	0,00000267 hPa at 80C 2,67E-6 hPa	>6	0,005 mg/l 20C, 43% Cl 0,01 mg/l 25C, 70% Cl	ECB[104]
85535-85-9	Alkanes, C14-17, chloro	233-827	pour point: -45C to 25C	>200 C	1,095- 1,315 g/cm3 at 20C	1,3.10-4-2,7.10-4 Pa at 20C	5,47-8,21	0,005-0,027 mg/l	ECB[105]
28553-12-0	di-''isononyl'' phthalate	418,61	palitinol N: –34 C palatinol DN: - 54 C	palitinol N: 235-238C at 7hPa palatinol DN: 244-252C at 7hPa	0,97 g/cm3 at 20C	0,000021 hPa at 20C	5,42 calculated from water solubility <10,7 calculated: increment's method with several computer programs.	0,0002 g/l at 25 C	ECB[106]
85-68-7	benzyl butyl phthalate	312,35	<-35C	370C at 10.10 hPa	1,116 g/cm3 at 25C	0,00112 Pa at 20C	4,84	2,8 mg/L at 20-25C	ECB[107]

117-81-7	bis(2-ethylhexyl) phthalate	390,6	-55C or -50C	385C at 1013 hPa	0,98 g/cm3 at 20C	0,000034 Pa at 20C	7,5	3.10-6 g/l at 20C	ECB[108]
84-74-2	dibutyl phthalate	278,34	- 69 C	340C at 1,013 hPa	1,045 g/cm3 at 20C	9,7 + 3,3.10-5 hPa at 25C	4,57	10 mg/l at 20C	ECB[109]
26761-40-0	di-''isodecyl'' phthalate	Average 446,68	-53 to -39C	> 400C	0,966 at 20C	5,1.10-5 Pa at 25C	8,8	0,2 .10-6 g/l at 20C	ECB[110]
68515-51-5	1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters Dialkylphthalat C6–10		ca. –50 C	ca. 250 C at 5 hPa	ca.0,98 g/cm3 at 20 C	< 0,001 hPa at 20 C	> 3,5 at 20 C	ca. 2,8 mg/l at 24C	ECB[111]
68515-41-3	1,2-Benzenedicarboxylic acid, di-C7-9-branched and linear alkyl esters di C7–9 alkyl phthalate			226 C at 5 and 6,67 hPa	ca. 0,98	0,01 hPa at 100 C	Estimated for di C7–11 alkyl phthalate: 4,94	< 1 mg/l	ECB[112]
27554-26-3	diisooctyl phthalate	390,557	–45 C	> 250 C at 1013 hPa	986 at 20 C	1,33 at 200C	3 – 4	< 0,1 g/l at 20 C	ECB[113]
117-84-0	dioctyl phthalate all the information gathered is specific to the DOC isomer DNOP	390,56	25 C	242 C at 0,002 mm Hg	0,978 at 20 C	1,0.10-7 mmHg at 25C	8,1	0,022 mg/L at 25C	HSDB[114]
3648-20-2	Diundecyl phtalate	474,716		262 C at 13,3 hPa	0,954 at 25 C	0,00015 hPa at 25 C	4,95	0,83 - 1,39 mg/l at 25 C	ECB[115]
122-62-3	bis(2-ethylhexyl) sebacate		-67 to -48C	248C at 4mmHg 256C at 5 mmHg	0,91 g/cm3 at 25C	10-7 mmHg at 25C 1,3 E-7 hPa	10,08 (estimated)	3,5 E-7 g/l at 25C (insoluble)	MST[116]
143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane	336,53	< 0C	285,2 C at 1000 hPa	0,967 g/cm^3 at 20 C	< 0,00978 hPa at 25 C	6,2	< 0,0001 mg/l at 20 C	US EPA[117]
64742-53-6	Distillates (petroleum), hydrotreated light naphthenic belong to Group 7C substances			240–424 C	0,8973		3,9 – 6	very low solubility	ECB[118]
63148-62-9	Polydimethylsiloxane				0,940 g/cu m at 25 C	10 cu mm/S at 25 C			HSDB

115-83-3	pentaerythritol tetrastearate								
103-24-2	bis(2-ethylhexyl) azelate	412,65	-78 C	237 C at 5 mm Hg	0,915 at 25C-4 C	3,8.10-6 mm Hg at 25C	estimated: 9,6	Insoluble in water	HSDB[119]
3370-35-2	N-(hydroxymethyl)stearamide								
25429-29-2	pentachloro[1,1'-biphenyl]								
133-49-3	pentachlorobenzenethiol	282,4	> 200 C (2)		ca. 2,3 g/cm3 at 20 C	< 0,022 hPa at 100 C	6,4	4,2 mg/l	ECB[120]
78-51-3	tris(2-butoxyethyl) phosphate	398,48	< -70 C	200-230 C at 5,3 hPa	1,02 g/cm3 at 20C	2,8E-7 hPa at 25 C	measured: 3,65 calculated: 4,78	1,3 g/l at 20C	ECB[121]
78-42-2	tris(2-ethylhexyl) phosphate	434,72	-74 C	215 C at 4 mmHg	0,924 at 26 C	8,25.10-8 mmHg at 25C	estimated: 9,5	0,6 mg/l at 24C	HSDB[122]
115-86-6	Triphenyl phosphate	326,28	49 - 50 C	245 C at 11 mmHg	1,2055 at 50 C/4 C	6,28.10-6 mm Hg at 25 deg C	4,59	19 mg/l at 25 C	HSDB[123]

1B. PLASTICIZERS: ENVIRONMENTAL BEHAVIOUR

CAS nr.	Substance Name	Persitence				metabolites	Bioaccumulation		Ref
		Atmosphere	Soil	Hydrosphere	Biodegradation		log Kow	BCF (l/kg)	
103-23-1	bis(2-ethylhexyl) adipate	indirect photolysis: T 1/2= 15,7 hours Estimated environmental partitioning in air 65,4% (1)	Estimated environmental partitioning in soil 34,2% (1) Expected to be immobile in soil. (2) Dominant degradation process in the soil: biodegradation.(2)	Estimated environmental partitioning in water 0,09% Estimated environmental partitioning in sediment 0,23% (1) Expected to adsorb to suspended solids and sediment in water. Dominant degradation process in the aquatic environment: biodegradation. Estimated hydrolysis T1/2 (pH 7)= 3 years and T1/2 (pH 8) =120 days. (2)	aerobic biodegradation in activated sludge, 28 days degradation > 66% (1)	In urine: adipic acid. 2-ethylhexanol pathway showed : 2-ethylhexanoic acid (either conjugated (glucuronidation) or submitted to other pathways.) (2)	calculated : 8,114 (2)	calculated BCF= 27000 (1) Lepomis macrochirus : BCF = 27 (1)	(1) ECB[124] (2) HSDB[125]
3089-55-2	Benzyl octyl adipate								
33703-08-1	diisononyl adipate				Aerobic biodegradation, activated sludge, domestic, 28 day Degradation: = 82 %		9.56 – 10.4 at 25 degree C	BCF= 2031 (prevent.se)	ECB[126] prevent.se[127]
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate	Expected to exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase is degraded in the atmosphere by reaction with hydroxyl radicals; t1/2 = 5 hours May also undergo direct photolysis. Particulate-phase may be removed from the air by wet and dry deposition.	Expected to have low mobility in soil. Volatilization from moist or dry soil is not expected to be an important fate process. May biodegrade in soil.	Expected to adsorb to suspended solids and sediment in water. Volatilization is not expected to be an important fate process. Hydrolysis t1/2 (pH 7)= 294 days Hydrolysis t1/2 (pH 8)= 29 days May biodegrade in water.	May biodegrade in soil. May biodegrade in water.		3,24	BCF= 61,66 (prevent.se)	HSDB[128] Prevent.se[129]

63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro	Indirect photochemical degradation for C18-C30: Estimated T1/2= 30 - 112 hr (1) Photodegradation: T1/2 (35% Cl)= 0,5 days T1/2 (53% Cl)= 1,4 days (2)	Expected to be immobile in soil. Based on limited biodegradation studies chlorinated paraffins may biodegrade in soil. (2)	Long-chain chlorinated alkylchains are not expected to undergo abiotic degradation in aqueous media. (1) May biodegrade in aqueous environments.. (2)	25day biochemical oxygen demand (BOD) test, acclimatised microorganisms, C20-30 (42% chlorinated): Biodegradation = 23% The potential for biodegradation appeared to decrease with increasing chlorine content. (1)	IV exposure: Conjugates of N-acetylcysteine (mercapturic acid) and glutathione. Intermediate chain length chlorinated paraffin (2)	>6 (2)	BCF (fresh water fish)= 7800 (2)	(1) ECB[130] (2) HSDB[131]
85535-85-9	Alkanes, C14-17, chloro Chloroparaffins	atmospheric T1/2= 2 days Neither biotic nor abiotic effects are likely. Some components of the commercial medium-chain chlorinated paraffin products may have properties that mean that long-range transport via the atmosphere is a possibility.	Adsorbs strongly onto sludge and sediments. Not expected to be mobile in soil.	Not expected to hydrolyse in water. Expected to adsorbe to sediments.	Not readily or inherently biodegradable.		5,78-8	BCF (rainbow trout)= 1087 l/kg BCF (worms)= 5,6	ECB[132]
28553-12-0	di-''isononyl'' phthalate	Vapor-phase: degraded by reaction with photochemically-produced hydroxyl radicals: T 1/2 = 16 hours Particulate-phase removed from the air by wet or dry deposition. (2)	Expected to be immobile in soil. Volatilization from moist soil surfaces is expected to be an important. (2)	Expected to adsorb to suspended solids and sediment. (2) Volatilization from water surfaces is expected. Volatilization T1/2 (model river)= 50days Volatilization T1/2(model lake)= 370 days (2) Hydrolysis is not expected to be an important process. Estimated hydrolysis T 1/2 (pH 7)= 3.4 years Estimated hydrolysis T 1/2 (pH 8)= 125 days (2) Primary degradation in fresh wate >95% in 12 days , 1ppm saring conc. Ultimate degradation in fresh water <1 to 8% in 28 days with starting concns of 0.02 to 10 ppm. (2) Estimated environmental partitioning in sediment: 47% (1)	A shake flask CO_2 evolution test (soil and sewage showed): biodegradation T 1/2 =5.31 days with a 7.1 day lag time (2)	Urine: phthalic acid or side-chain oxidation products of the monoester (MINP). In the liver: MINP and its side-chain oxidation products. Fat: MINP and its oxidation products. (2)	5,52 (1)	Arca zebra, sea mollusc, (24hours exposure) BCF = 183.8 (1) Diploria strigosa, coral, (24hours exposure) BCF = 0,46 (1)	(1) ECB[133] (2) HSDB[134]

85-68-7	benzyl butyl phthalate	OH radicals contributes to the elimination of BBP from the atmosphere. photo-oxidation reaction T1/2= 1.5 days Long distance transport is unlikely due to low volatility and short half life in the atmosphere	Preference for soil and sediment.		BBP is ready biodegradable under aerobic conditions fulfilling the 10-day window criterion. Anaerobic test indicate that biodegradation of BBP is slower in the anaerobic environment.	MBuP and MBeP	4,84	BCF(only the parent compound)= 12 l/kg measured BCF(BBP+metabolites) = 135-663 l/kg.	ECB[135]
117-81-7	bis(2-ethylhexyl) phthalate	T½ = 1 day Photodegradation of DEHP is important in the atmosphere. Low evaporation rate The large amount of DEHP accumulates in the technosphere.	Studies in agricultural soil indicate moderate to low biodegradation rates. Expected to strongly adsorbe to organic matter.	biodegradation in surface water T1/2= 50 day aerobic biodegradation in sediment T1/2= 300 day Expected to strongly adsorbe to organic matter.		MEHP MEHP causes reproductive toxicity in studies on mammals.		Monitoring data for different trophic levels, indicate that DEHP does not bio-magnify. BCF Gammarus = 2 700 BCF (plantes) = 0.01 - 5.9 BCF (earthworms) = 1 BCF fish= 840	ECB[136]
84-74-2	dibutyl phthalate	Exists as particulate and as a vapour in the atmosphere. Particulate is transported and removed by both wet and dry deposition. Vapour undergoes photo-oxidation by OH radicals: atmospheric T1/2= 1,8 days (1)	The equilibrium between water and organic carbon in soil or sediment will be very much in favour of the soil or sediment (1)	Contribution of hydrolysis to its degradation is expected to be low. Hydrolysis T1/2 = 22 years at pH 7 and 25 deg C (2) biodegradation in natural waters, aerobic T 1/2= 1 day anaerobic T1/2= 2 days, (2)	DBP is ready biodegradable under aerobic conditions. Is much slower in anaerobic conditions. (1)	Urine: MBP and its glucuronide (mono-(3-hydroxy-butyl) phthalate, and mono-(4-hydroxy butyl) phthalate).(2)	4,57	experimental BCF = 1.8 l/kg calculated BCF worm= 13 kg/kg (1) fathead minnows BCF= 12, 167 and 172 8 (reported) Cyprinus carpio BCF= 3,6 Bluegill fish BCF= 117 Oysters BCF=22 and 42 (reported) (1) Crusteacean BCF= 662 Insects BCF=624 algae BCF= 3399 (2)	(1) ECB[137] (2) HSDB[138]

26761-40-0	di-"isodecyl" phthalate	estimated atmospheric T1/2= 0,6 day	T1/2 soil= 300 days	no hydrolysis in water T1/2 surface water= 50 days T1/2 sediment= 3000 days	readily degradable but failing the 10-day	urine: phthalic acid and oxidized monoisodecyl phthalate (MIDP). in feces: MIDP oxidative derivative, . HSDB Besides the parent compound, the major metabolite found in the fish tissues was MEHP, accounting for 12-50% of the recovered residues after the exposure period. The proportion of MEHP increased with the exposure concentration.	8,8	Daphnids BCF = 90 - 147 Mytilus edulis:measured BCF = 3000-4000 Sediment organisms BCF = 0,6 Cyprinus carpio BCF < 14.4	ECB[139]
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	reaction with OH radicals T1/2= 0,8 day Direct photolysis of DNOP in the atmosphere is not expected to occur to any significant extent.	Adsorbs strongly to particulates. Expected to have very little mobility in soil. Not expected to evaporate rapidly from dry or wet soils.	Volatilization from water is not expected.	Aerobic, activated sludge, domestic, non adapted, 28 day test Degradation: = 87 %		3,5	terrestrial–aquatic ecosystem: Log BCF = 3.41 - 4.45 at 33 days. BCF= 2570 - 28183 aquatic ecosystem: Log BCF = 0.067 - 3.97 at 3 days BCF= 1,16- 9332,5	ECB[140]
68515-41-3	Dialkyl(C7-C9)phthalate	Vapour pressure measurements indicate that phthalates, as a class, are practically non–volatile.	Not expected to vaporize from dry or moist soils. Expected to adsobe strongly to soil.	Vapour pressure measurements indicate that phthalates, as a class, are practically non–volatile. As lipophilic materials, phthalates partition on to organic rich particulate matter in water. Not expected to vaporize from water. Expected to adsorbe to sediments and particulates in water.	Activated sludge, 24 hour(s) Degradation = 65 % Ultimate degradation to carbon dioxide and water, 5 day Degradation = 50 %		4,94	Lepomis macrochirus (Fish, fresh water) BCF= 27 (tested for Di C7–11 alkyl phthalate) aquatic organisms estimated BCF = 630 (for di C7–11 alkyl phthalate)	ECB[141]

27554-26-3	diisooctyl phthalate	Will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase is degraded by reaction with hydroxyl radicals: estimated T1/2= 19 hours Particulate-phase may be removed from the air by wet or dry deposition. Can be susceptible to direct photolysis by sunlight.	Expected to be immobile in soil. Volatilization from moist soil surfaces is expected to be an important fate process but not dry. Adsorption to soil is expected to attenuate volatilization. Expected to biodegrade in soils.	Expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected: volatilization T1/2(model river)= 2.5 days and T1/2(model lake)= 25 days Volatilization from water is expected to be attenuated by adsorption to suspended solids and sediment. Estimated volatilization T1/2(model pond)= 4.3 years if adsorption is considered. Hydrolysis is not expected to be an important process. estimated hydrolysis T1/2(pH 7)= 3.4 years and T1/2(pH 8)= 130 days	Enriched microbial cultures obtained from sewage, 96 hours: degradation = 75% A shake flask experiment employing an acclimated inoculum of soil, sewage and activated sludge 28 day incubation: degradation = 99% In a semi-continuous activated sludge test (Soap and Detergent Association procedure), 24 hours: mean degradation = 84.5%	not identified	3 – 4	measured BCF (Mosquito fish)= 207 BCF= 640 (prevent.se)	HSDB[142] Prevent.se[143]
117-84-0	dioctyl phthalate	As regards to the specific isomer DNOP (di-n-octyl phthalate): Will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase is degraded by reaction with hydroxyl radicals; t1/2 = 19 hours Particulate-phase may be removed from the air by wet or dry deposition. DNOP is susceptible to direct photolysis.	As regards to the specific isomer DNOP (di-n-octyl phthalate): Expected to be immobile in soil. Volatilization is expected to be important from moist soil but not dry. Adsorption to soil is expected to attenuate volatilization. In a model terrestrial-aquatic ecosystem, DNOP was rapidly degraded by organisms: t1/2 = 5 days	As regards to the specific isomer DNOP (di-n-octyl phthalate): Volatilization from water surfaces is expected, volatilization t1/2 (model river)= 28 days and volatilization t1/2 (model lake)= 210 days Expected to adsorb to suspended solids and sediment which will attenuate volatilization. Hydrolysis is not expected to be an important process, estimated hydrolysis t1/2 (pH 7)= 7.7 years and hydrolysis t1/2 (pH 7)= 280 days. 10 days incubation in Rhine river water at 20 deg C was biodegraded 85%; at 4 deg C, biodegradation was negligible.	In a model terrestrial-aquatic ecosystem, DNOP t1/2= 5 days DNOP anaerobic t1/2= 513.4 hours	DNOP is metabolized to, mono-n-octyl phthalate (MnOP), and other oxidative products mono-carboxymethyl phthalate (MCMP), mono-(5-carboxy-n-pentyl) phthalate (MCPeP), mono-(7-carboxy-n-heptyl) phthalate (MCHpP), and isomers of mono-hydroxy-n-octyl phthalate (MHOP) (e.g., mono-(7-hydroxy-n-octyl) phthalate) and of mono-oxo-n-octyl phthalate (MOOP) (e.g., mono-(7-oxo-n-octyl) phthalate). In urine main metabolite: mono-(3-carboxypropyl) phthalate (MCPP). n-Octanol is a metabolite of DnOP	log Kow = 8.10	BCF (Oedogonium cardiacum), 33 days = 28500 BCF (Oedogonium cardiacum), 3 days = 6800 BCF (brine shrimp), 33 days = 9300 BCF (brine shrimp), 3 days= 2600	HSDB[144]

3648-20-2	Diundecyl phtalate	Expected to exist solely in the particulate phase in the ambient atmosphere, which may be removed from the air by wet or dry deposition. T1/2= 10,2 hours (IUCLID)	Expected to be immobile in soil. Volatilization from moist soil surfaces is expected to be an important fate process, but not from dry soil. Adsorption to soil is expected to attenuate volatilization.	Expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected. volatilization T ½(model river)= 1.7 days volatilization T ½(model lake)= 19 days Volatilization from water surfaces is expected to be attenuated by adsorption. Volatilization + adsorption T ½(model pond)= 1320 years Hydrolysis is not expected to be an important process. hydrolysis T1/2 (ph 7)= 7.7 years hydrolysis T1/2 (ph 8)= 280 days River die-away tests: T1/2= 6 days-2.5 weeks (biodegadation may occur in the aquatic environment)	Acclimated shake flask CO2 evolution test, using an inoculum prepared from soil and sewage, 28 days: Degradation > 99% Biodegradation T1/2= 6.17 days with a 2.7 day lag.	no data	4,95	BCF (fish) = 640	ECB[145]
122-62-3	bis(2-ethylhexyl) sebacate				Activated sludge, 28 days Biodegradation = 65% Did not meet the 10 days criterion of the test. (2)		(estimated) 10,08 (1)		(1)MST[146] (2) US EPA[147]
143-29-3	bis(2-(2-butoxyethoxy)ethoxy) methane	Model estimation of oxidation in the atmosphere (software: AOPWIN) T1/2= 1,5 hr Fugacity model level III estimates: Partition to air= 0,325% T1/2 air= 3,05 days	Fugacity model level III estimates: Partition to soil= 38,5% T1/2 soil= 360 days	Not expected to undergo hydrolysis in aquatic environments. Fugacity model level III estimates: Partition to water= 11% T1/2 water= 360 days Partition to sediment= 50,2% T1/2 sediment= 1440 days	activated sludge,28 days Degradation = 51,3 – 55,5 %		6,2		US EPA[148]

64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	Expected to have little or no tendency to partition to air. Reaction with hydroxyl radicals in troposphere: T1/2 < 1 day.	Will distribute principally to soil and sediment.	Not susceptible to hydrolysis under environmental conditions. Expected to adsorb to particulate matter, and will be ultimately biodegraded by micro–organisms. Expected to be inherently biodegradable in water under aerobic conditions, but not readily so. Will distribute principally to sediment.	Aerobic biodegradation 28 days test in domestic sewage: Degradation = 6 %		3.9 – 6		ECB[149]
63148-62-9	Polydimetylsiloxan		In the soil: Undergoes siloxane bond redistribution and hydrolysis, resulting in the formation of low molecular weight cyclic and linear oligomers: Low molecular weight hydroxyfunctional hydrolysis products are water soluble Cyclic and trimethylsiloxy-end-bloked oligomers are volatile			low molecular weight cyclic and linear oligomers			HSDB
115-83-3	Pentaerythrityltetrastearate								
103-24-2	bis(2-ethylhexyl) azelate	Will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase is degraded by reaction with hydroxyl radicals: t1/2= 13 hours Particulate-phase may be removed from the air by wet and dry deposition. Expected to undergo direct photolysis. (1)	Expected to be immobile in soil. Volatilization from moist soil surfaces is expected to be an important fate process but is expected to be attenuated by adsorption. Not expected to volatilize from dry soil surfaces. (1)	Expected to adsorb to suspended solids and sediment in water. Volatilization from water surfaces is expected. Volatilization from water surfaces is expected to be attenuated by adsorption to suspended solids and sediment in the water column. Estimated volatilization without adsorption t1/2 river= 22 hours, t1/2 lake = 17 days. Estimated volatilization considering adsorption t1/2 pond= 27 years Expected to undergo hydrolysis. Estimated hydrolysis t1/2 = 3.2 years at pH 7 and 120 days at pH 8. (1)	Activated sludge, 28 days Biodegradation = 81% Did not met the 10-day window criterion for readily biodegradability. (2)	Degradation products from hydrolysis: 2-ethylhexanol and nonanedioic acid. (1)	9,6 (1)	BCF= 3,2 (1)	(1)HSDB[150] (2) US EPA[151]

3370-35-2	N-(hydroxymethyl)stearamide								
25429-29-2	Pentachlorobiphenyl	Not found in ESIS or HSDB						BCF= 7501	prevent.se[152]
133-49-3	pentachlorobenzenethiol	Photodegradation T1/2= 115 days. Not expected to be susceptible to direct photolysis by sunlight. (2)	Volatilization from moist soil surfaces is expected to be an important fate process, but not from dry soil surfaces. (2)	Not expected to undergo hydrolysis. volatilization T1/2(model river)= 15 hours volatilization T1/2(model lake)= 10 days Volatilization from water surfaces is expected to be attenuated by adsorption, volatilization when adsorption is considered T1/2(model pond)= 150 days (2)	Domestic sweage, 30days: Biodegradation= 0% (1)	No data found	6,4	estimated BCF(aquatic organisms)= 3700 (2) BCF= 7079 (prevent.se)	(1) ECB[153] (2) HSDB prevent.se
78-51-3	tris(2-butoxyethyl) phosphate	Photochemical processes are probably not important. Degrade by reaction with photochemicaly produced hydroxyl radicals. T 1/2 air = 3hours (1) Expected to exist in particulate phase only in the ambient atmosphere. Particulate-phase TBEP may be removed from the air by wet and dry deposition. (2)	Expected to adsorbe to soil. Slightly mobile in soil. Biodegradation may be ann important removal process in soil and water, depending on the bacteria present. (1)	Expected to adsorb to suspended solids and sediment. (2) May hydrolyse in alkalin conditions (pH 9). Data suggests that TBEP in the environement will be mainly found in surface water and sediments. (1) t 1/2 in estuarine water= 50days (1) Variability in results regarding the degradation in fresh water. Several showed full degradation within 30 days, others no degradation at all. (1)	Aerobic biodegradation in sea water: 1mg/l 100% degraded after 14days. It was suggested that degradation in polluted seawater was faster than in clean seawater, were the degradation is similar to river water. (1)	Suggested metabolite: 2-butoxyethanol (2)	4,78 (calculated) 3,65 (measured) (1)	BCF= 25,7	(1) ECB[154] (2) HSDB[155]

78-42-2	tris(2-ethylhexyl) phosphate	Expected to exist almost entirely in the particulate phase in the ambient atmosphere. Particulate-phase may be removed from the air by wet and dry deposition.	Expected to have no mobility in soil. Volatilization from moist or dry soil surfaces is not expected. From its biodegradation in water suggests that biodegradation in soil may be important	Expected to adsorb to suspended solids and sediment in water. Not expected to volatilize from water surfaces. May biodegrade.	Incubation in Mino River water, 3 days, degradation= 26% Incubation in seawater, 3 days, degradation= 24% after incubation in seawater(2). 30 days incubation in 3 river waters (Japan), Degradation = 53 – 75% In a semi-continuous activated sludge study, 34 weeks, degradation = 20%. Biodegradation on activated sludge seed, 4 weeks, 100 mg/l: biodegradation= 0% Semi-continuous activated sludge study, 3 mg/l per 24 hours, 34 weeks Biodegradation= 20% In a screening test, on activated sludge seed, 48 hours: Biodegradation= 40-60%	potential metabolite: 2-ethylhexanol	9,8	BCF (carp) = 2.4 - 6.5 at 2 mg/l BCF (carp) = 9.2 - 22 at 0.2 mg/l	HSDB[156]
115-86-6	**Triphenyl phosphate**	T1/2= 35 hours at 25 C	Not expected to volatilize from dry soil Biodegradation is expected to be an important environmental fate process in soils. Hydrolysis may also occur in moist soils.	Expected to Hydrolyse: T1/2= 19 days at pH 7 T1/2= 3 days at pH 9 at 25 deg C. Biodegradation is also expected to be an important environmental fate. River die-away tests using water from the Mississippi T1/2= 2-4 days Expected to adsorb to suspended solids and sediment.	Freshwater grab sample studies (pH 7.8 to 8.2), 7 to 8 day incubation, 2 day lag period Biodegradation: 100% Japanese MITI test, activated sludge, 28 days: biodegradation= 83-94%	Invivo (observed in houseflies): diphenyl p-hydroxyphenol phosphate	4,59	measured BCF (rainbow trout), 90days= 132 – 364 measured BCF (rainbow trout)= 573 measured BCF (Pimephales promelas)= 561 BCF = 1743 (www.prevent.se)	HSDB[157]

1C. PLASTICIZERS: TOXICOLOGY IN AQUATIC ORGANISMS

CAS nr.	Substance Name	Toxicity in fresh water species		Toxicity in marine species (species, time)		Ref
		acute	chronic	acute	chronic	
103-23-1	bis(2-ethylhexyl) adipate	Salmo gairdneri (estuary): LC50 96 = 54-150 mg/l Lepomis macrochirus: LC50 96 > water solubility mg/l Pimephales promelas: LC50 96 > water solubility mg/l Daphnia magna: EC50 24>500mg/l EC50 48>500mg/l Daphnia magna: NOEC 96 <0,32mg/l LC50 96= 0,66mg/l	Daphnia magna: NOEC 21days >0,77mg/l LOEC 21days >=0,77mg/l MATC = 0,024-0,052 mg/l	Crustacea: Nitocra spinipes: LC100 96< 100mg/l Chaetogammarus marinus: EC0 90=100mg/l EC50 96>100mg/l Algae: Scenedesmus subspicatus NOEC 72 >=1,4mg/l EC50 72>1,4mg/l above WS Selenastrum capricornutum: LC50 96> WS		ECB[158]
33703-08-1	diisononyl adipate	Leuciscus idus: LC5096 hour(s) > 500 mg/l	Daphnia magna, 21 day NOEC > 100 mg/l			ECB
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate					
3089-55-2	Benzyl octyl adipate					

49-39-8	Paraffin waxes and Hydrocarbon waxes, chloro	Alburnus Alburnus, (estuary fish): LC50 96h>5000mg/l (42% Cl) salmo gairdneri(estuary fish): LC50 96 >300mg/l SG 96> 770 mg/l (39 - 50% Cl) Ictalurus puntactus: LC50 96 >300mg/l Lepomis macrochirus: LC50 96 >300mg/l (40 - 70% Cl) Leuciscus idus: SG48 and 96 = 400 mg/l (35% cl) SG48 and 96 = 500 mg/l (44% cl) SG48 and 96 > 500 mg/l (49 - 52% cl) Oncorhynchus mykiss: LC50 96> 300mg/l Daphnia magna: (60% Cl, with emulsifier) NOEC 24 =23 mg/l EC 50 24= 100 mg/l (60% Cl, with acetone as solubilizing agent) NOEC 24 =100mg/l EC 50 24= 553 - 1024 mg/l	Pimephales promelas: LC50 82 days > 100mg/l salmo gairdneri(estuary fish): NOEC 60days>4mg/l (43% Cl) NOEC 60days >3,8mg/l (70% Cl) Daphnia magna: NOEC 21days = 4,2mg/l EC 50 21 days= 40,8mg/l (60% Cl)			ECB[159]
35-85-9	Alkanes, C14-17, chloro Chloroparaffins	PNECwater of 1 µg/l for surface water	21-day multigenerational study, Daphnia Magna: NOEC = 0,010 mg/l	PNECwater of 1 µg/l for surface water		

26761-40-0	di-''isodecyl'' phthalate	It was shown that DIDP does not have adverse effects towards aquatic or benthic organisms at the limit of water solubility in laboratory tests.	Multigeneration study, Oryzias latipes: Results: no statistically significant changes in mortality or fecundity and normal development of embryos in F1 and F2.	It was shown that DIDP does not have adverse effects towards aquatic or benthic organisms at the limit of water solubility in laboratory tests.		ECB[160]
84-74-2	dibutyl phthalate	PNECaquatic= 10 µg/l	Onchorhynchus mykiss NOEC 99days= 100 µg/l Gammarus pulex NOEC = ca 100 µg/l, decrease in the locomotor activity.			ECB[161]
85-68-7	benzyl butyl phthalate	PNECsurface water is 7,5 µg/l PNECfreshwater-sediment= 1,72 mg/kgwwt Suspected to cause endocrine disruption in wildlife: has been shown in experimental systems. Suspicion about estrogenic and anti-androgenic effects in fish.		PNECmarine= 0.75 µg/l PNEC marine-sediment = 0.17 mg/kg wwt	Mysidopsis bahia: 28-day NOEC of 75 µg/l Suspected to cause endocrine disruption in wildlife: has been shown in experimental systems. Suspicion about estrogenic and anti-androgenic effects in fish.	ECB[162]
117-81-7	bis(2-ethylhexyl) phthalate	Rainbow trout: LC50= 540 mg/l NOEC fish= 160 mg/kgfood			Exposure of 0,554 mg DEHP/l for 168 days, caused slight effects on growth but no mortality in Japanese medaka	ECB[163]

28553-12-0	di-''isononyl'' phthalate	Lepomis macrochirus: LC50 96>0,14 mg/l Pimephales promelas: NOEC = 0,19mg/l LC50 96>0,19 mg/l Salmo gairdneri (estuary): NOEC = 0,16mg/l LC50 96>0,16mg/l Salmo mykiss: LC50 96>0,16mg/l Brachydanio rerio: LC50 96>100mg/l Ictalurus punctatus: LC50 96>0,42mg/l Leuciscus idus: NOEC = 500mg/l LC50 96>500mg/l Daphnia magna: EC50 24>500mg/l EC50 48>500mg/l	Ictalurus punctatus: LC50 7 days= 0,42mg/l	Cyprinodon variegatus (estuary marine): NOEC 90= 0,52 mg/l LC50 96> 0,52 Algae: Scenedesmus subspicatus: NOEC 72= 100mg/l EC50 > 100 mg/l Scenedesmus subspicatus: NOEC 72> 500mg/l EC50 > 500 mg/l		ECB[164]

68515-41-3	Dialkyl(C7-C9)phthalate	Cyprinodon variegatus (estuary) NOEC96 hour(s) > 1000 mg/l Pimephales promelas NOEC96 hour(s) > 1,8 mg/l Salmo gairdneri (estuary) NOEC96 hour(s) > 0,21 mg/l Lepomis macrochirus NOEC96 hour(s) > 0,18 mg/l Freshwater algae NOEC96 hour(s) > 2,6 mg/l	Daphnia magna, 21 day EC50 > 0,5 mg/l	Mysid shrimp NOEC48 hour(s) > 1000 mg/l		ECB[165]
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	Leuciscus idus LC0 48 hour(s): >= 1000 mg/l LC50 48 hour(s): > 1000 mg/l Daphnia magna EC5048 hour(s): > 1,7 mg/l EC10 48 hour(s): > 1,7 mg/l Freshhwater green alga, 6 day NOEC: 0,1 mg/l EC50: > 0,1 mg/l	Pimephales promelas, 28 day: NOEC: 3200 µg/l Oncorhynchus mykiss(Eggs and larvae were exposed until 4–d beyond hatching): LC50 : 139 - 149 mg/l Micropterus salmoides (eggs and larvae until 4–day post hatch): LC50 : 45 - 56 mg/l Ictalurus punctatus (conducted at tge embryo–larval stage of development): LC50 : 0,69 mg/l Daphnia magna, 16 day: LD50 = ca. 3,2 mg/l Daphnia magna , 16 day LOEC = 1,0 mg/l	Scenedesmus subspicatus (Algae) NOEC72 hour(s): >= 2,8 mg/l EC5072 hour(s): > 2,8 mg/l		ECB[166]

3648-20-2	Diundecyl phtalate	Pimphales promelas, NOEC 96 hr = 1,3 mg/l, LC50 96 hr > 1,3 mg/l, Salmo gairdneri, NOEC96 hr = 1,4 mg/l, LC50 96 hr > 1,4 mg/l Lepomis macrochirus, NOEC 96 hr= 1 mg/l, LC50 96 hr> 1 mg/l Pimephales promelas, NOEC 96 hr = 0,96 mg/l, LC50 96 hr > 0,96 mg/l, Daphnia magna, EC50 48 hr < 3,2 mg/l, NOEC 48 hr= 15 mg/l.	Daphnia magna, 21 days: NOEC= 7,6 mg/l, EFE= 11,96 mg/l. Daphnia magna, 21 days: NOEC= 0,35 - 0,7 mg/l EC50= 12,4 mg/l.	Cyprinodon variegatus: NOEC 96 hours= 0,22 mg/l, LC50 96 hours > 0,22 mg/l Selenastrum capricornutum (Algae): NOEC 96 hours < 360 mg/l, EC50 96 hours > 1000 mg/l		ECB[167]
27554-26-3	diisooctyl phthalate	Cyprinodon variegates: LC50 96 hr >480 ug/L Lepomis macrochirus: LC50 96 hr >130 ug/L Oncorhynchus mykiss: LC50 96 hr >230 ug/L Pimephales promelas: LC50 96 hr >290 ug/l Pimephales promelas LC50 96 hr >140 ug/L Daphnia magna EC50 48 hr >160 ug/L LC50 48 hr >0,16 mg/L Algae: Paratanytarsus parthenogeneticus: EC50 96 hr >120 ug/L Pseudokirchneriella subcapitata: EC50 96 hr>130 ug/L Selenastrum capricornutum: EC50 6 days >1,3 mg/L		Americamysis bahia: EC50 96 hr >550 ug/L		HSDB[168]

117-84-0	dioctyl phthalate	Micropterus salmoides, 7- 8 days: LC50 = 32,900 ug/l= 4,7 mg/l/day Ictalurus punctatus, 7 days LC50 = 690 ug/l = 0,1 mg/l/day			Americamysis bahia, 28 days: LC50 = 125000 ug/L = 4,46 mg/l/day	HSDB[169]
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	Oncorhynchus mykiss LC50 96: > 5000 mg/l Salmo gairdneri (estuary) LC50 96: > 1000 mg/l Daphnia magna EC50 48: > 1000 mg/l	Daphnia magna, reproduction rate NOEC 21 day: > 1 mg/l			ECB[170]
133-49-3	pentachlorobenzenethiol	Daphnia magna EC100 24 hour= 22 mg/l EC0 24 hour= 2,8 mg/l (NOEC) Brachydanio rerio: LC100 96 hour= 2,8 mg/l LC0 96 hour= 2 mg/l Leuciscus idus LC100 48 hour= 1 mg/l LC0 48 hour= 0,1 mg/l				ECB[171]
122-62-3	bis(2-ethylhexyl) sebacate	Leuciscus idus: LD 50 96hr> 1000 mg/l Daphnia magna: EC50 48hr> 1000 mg/l Scenedesmus subspicatus: EC50 72hr> 1000 mg/l				US EPA[17]

143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane	Oncorhynchus mykiss: NOEC 96hr = 43 mg/l LC50 96hr = 491 mg/l Daphnia magna: NOEC 48hr < 24 mg/l EC50 48hr = 87 mg/l Selenastrum capricornutum: NOEC 96hr = 11.4 mg/l LOEC 96hr = 22,9 mg/l EC50 96hr = 53 mg/l				US EPA[173]
63148-62-9	Polydimetylsiloxan					
115-83-3	Pentaerythrityltetrastearate					
103-24-2	bis(2-ethylhexyl) azelate					
3370-35-2	N-(hydroxymethyl)stearamide					
25429-29-2	Pentachlorobiphenyl					
78-42-2	tris(2-ethylhexyl) phosphate					
78-51-3	tris(2-butoxyethyl) phosphate	Pimephales promelas: LC50 96= 11,2 mg/l Oryzias latipes: LC50 48= 6,8 mg/l Oryzias latipes: LC50 48= 27 mg/l, 20C LC50 48= 44 mg/l, 10C Daphnia magna: LC50 24= 84mg/l EC50 48= 75mg/l				ECB[174]

115-86-6	Triphenyl phosphate	Carassius auratus: LC50 96 hours= 0,7 mg/l. Lepomis macrochirus: LC50 96 hours= 0,78 mg/l. Daphnia magna: EC50 48 hours= 1 mg/l Rainbow trout fingerlings: EC50 24hours= 0,37 mg/l Rainbow trout fingerlings: EC50 96 hours= 0,27 mg/l Rainbow trout sac-fry: EC50 24 hours= 0,295 mg/l.	Pimephales promelas, 30 or 90 days NOEC: 0,087 - 0,23 mg/l Salmo gairdneri, 90 days NOEC: 0,0014 mg/l	Ankistrodesmus falcatus (Algae), 4 hours EC50= 0,26		HSDB[175]

1D: PLASTICIZERS: TOXICOLOGY IN MAMMALS

CAS nr.	Substance Name	Acute	chronic	Mutagenicity	Carcinogenicity	Reprotoxicity/ development	Ref
103-23-1	bis(2-ethylhexyl) adipate	Oral (mg/kgbw) rat: LD50 >=7392 mouse: LD50 >=15000 guinea pig: LD50 =12900 Dermal: Rabbit: LD50 =8410 slight irritation (1)	Oral, rats and mouse, 13 weeks: NOAEL= 2500- 3750 mg/kgbw (increase in relative liver weight) (1)		Study on mice Results:Increased incidence of liver tumors in female mice. (1) Except for a positive dominant lethal assay, there was no evidence of genotoxicity. This compound does, however, exhibit structural relationships to other nongenotoxic compounds classified as probable and possible human carcinogens.(2)	Rat, oral adm, over 10weeks, dose up to 12000ppm. Results: No adverse effects relative to fertility was observed. NOAEL parental 10weeks =1800ppm NOAEL F1 offspring, 10weeks =1800ppm (1) Rats, oral adm, 1-22 gestations. Results: At doses >1800ppm, minor squeleton effects were observed in foestus (reduced ossification). (2) **Considered as dosedependant foetotox but not teratogen. (2)**	(1)ECB[176] (2) HSDB[177]
3089-55-2	Benzyl octyl adipate	Oral, rat: LD 50= 5000 mg/kg bw					prevent.se
33703-08-1	diisononyl adipate	Rat , oral LD50 > 5000 mg/kg bw	Rat, oral adm, 13 weeks NOAEL: 500 mg/kg bw NOEL (males): 500 mg/kg/day NOEL (females): 150 mg/kg/day Results: Relative kidney weight elevated.	Ames test, Salmonella typhimurium Result: negative Mouse lymphoma assay, Result: negative SHE–Zelltransformations–Test Result: negative Zell–Transformations–Test Result: negative Cell transformation assay, Syrian hamster embryo cells Result: negative		Dog, oral adm, 13 weeks Results: Hepatocytic hypertrophy and aspermatogenesis in top dose animals.	ECB[178]

141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate	Rat, oral: LD50 = 6000 mg/l					prevent.se
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro	Oral (mg/kgbw) rat: LD50 >11700 (40%Cl) LD50 >50000 (69-72%Cl) mouse: LD50 >23400 (40%Cl) LD50 >27200 (60%Cl) guinea pig: LD50 >25000 (70%Cl)	Oral administration to rats in studies from 5 days to 13 weeks, resulted in no toxicologically relevant findings.				ECB[179]
85535-85-9	Alkanes, C14-17, chloro Chloroparaffins	PNECoral = 0,17 mg/kg food	Rat, oral, 90 day NOAEL= 5 mg/kg food Dog, oral, 90 day NOAEL= 10 mg/kgbw Main effects of repeated doses: Effect on the liver thyroid and kidney Shallow dose-response curve.			Rat, oral NOAEL= 100 mg/kg food Result: effects on neonatal offspring exposed via lactation	ECB[180]

28553-12-0	di-''isononyl'' phthalate	oral (mg/kgbw): rat: LD50 7days > 9750 Inhalation: rat: LD50 4h > 4,4 (1)	Rat, oral adm, 28 days, doses up to 2000mg/kgbw/day Results: Reduced weight gain, dose-dependent increase in absolute and relative liver weights , dose-dependent increase in Liver catalase activity, increase in Cornitin-Acetyltransferase activity. (1) Rat, oral adm, lifetime exposure to 200mg/kgbw/day. Resuls: Growth and survival times were unchanged. (1) Dog, oral adm, 13 weeks, up to 1330mg/kgbw/day in last 4weeks. Results: No observable effect. (1) Rabbit, dermal expo, 6weeks, 5 apllications/week. Results: No evidence of toxicity, slight irritation. (1)			Mice, oral, 13 weeks (DINP up to 20000 ppm) Results: changes which occurred in high-dose mice were tubular nephrosis in the kidneys, immature/abnormal sperm forms in the epididymides, lymphoid depletion in the spleen and thymus, hypoplasia in the uterus, and absence of corpora lutea in the ovaries. (2) Has or may have endocrine disrupting effects. (prevent.se)	(1) ECB[181] (2) HSDB[182] prevent.se

85-68-7	benzyl butyl phthalate					Rat reproduction toxicity study: NOAEL= 50 mg/kgbw For predators: PNECoral = 33 mg/kgbw Has or may have endocrine disrupting effects (prevent.se)	ECB[183] prevent.se[184]
117-81-7	bis(2-ethylhexyl) phthalate					Reprotox study, mammalian predators, oral adm: NOEC= 33 mg/kgfood Has or may have endocrine disrupting effects (prevent.se)	ECB[185] prevent.se[186]
84-74-2	dibutyl phthalate	Lab animals, oral adm: LOAEL= 52 mg/kg bw Predators: PNECoral= 104 mg/kg in food		Invitro studies: Results: considered as a non-genotoxic substance.	No adequate long-term toxicity and/or carcinogenicity studies in animals or man are available. Phtalates are known to induce peroxisomal proliferation in liver.	Mice, oral adm, for teratogenicity, embryotoxicity and maternal toxicity NOAEL = 100 mg/kg bw, Rats, Developmental studies during gestation or gestation and lactation, Results: preputial separation and reproductive tract malformations in male offspring: NOAEL= 50mg/kgbw/day oral LOAEL = 52 mg/kg Has or may have endocrine disrupting effects (prevent.se)	ECB[187] prevent.se[188]

26761-40-0	di-''isodecyl'' phthalate		PNEC predators oral =50 mg/kg Rat, oral, 90 days NOAEL= 60 mg/kgbw Dog, 13 weeks NOAEL= 15 mg/kgbw Effect: Increased liver weight and peroxisomal proliferation Rat, oral, 12weeks Result: renal damages in males.	Mouse lymphoma assay Result: negative Mouse micronucleus assay Result: negative		Rat, two- generation study, Result: no changes in reproductive indices and no adverse effects on fertility may be anticipated. Dams, from day 6-15 gestation Results: skeletal variation but no malformations and slight signs of maternal toxicity. NOAEL= 500 mg/kg Two- generation study, Result: decrease in survival indices. NOAEL= 33 mg/kg DIDP is devoid of estrogenic activity in vitro.	ECB[189][190]
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	Rat, oral LD50> 2000 mg/kg bw rabbit, inhalation LD50 > 20000 mg/kg bw	Rats, oral, 28 days Results: induce peroxisome proliferation		Ames test Salmonella typhimurium, di-n-Octylphthalate (DNOP) Result: negative Bacterial gene mutation assay, di-n-Octylphthalate (DNOP) Result: negative Cytogenetic assay Human lymphocytes, di-n-Octylphthalate (DNOP) Result: negative Mouse lymphoma assay Result: Increases in the mutant frequencies were seen in some of the experiments but did not show any dose-dependend relationships. The erratic results may be related to the insoluble nature of the test material.	Mouse, oral feed, 7 days prior and during a 98day cohabitation period Results: Dose–related decrease in the proportion of pairs able to produce even a single litter during the continuous breeding phase of the study. Sperm assessment showed that the percentage of motile sperm and the sperm concentration in the cauda epididymis were significantly diminished in the 1.2 % DnHP treated males. Similar studies show no significant effects. Teratogenicity studies of DNOP in mouse by gavage and rat by IP showed no significant effect. DNOP did not appear to be embryotoxic even at the highest dose.	ECB[191]

68515-41-3	Dialkyl(C7-C9)phthalate	Rat, oral LD50 > 15000 mg/kg bw Mouse, oral LD50 > 15000 mg/kg bw Guinea-pig, oral LD50 > 15000 mg/kg bw Rat, dermal LD50> 6000 mg/kg bw Mouse, dermal LD50> 6000 mg/kg bw	rat , oral feed, 90 days NOAEL = 0.125 % LOAEL = 0.25 % Results: Adverse effects observed increased with the dosage. Adverse effects: anemia, relative liver and kidney weight increase. At 1.0% males grew more slowly and were unable to concentrate urine normally, while two males produced renal casts. Relative weights of the brain and gonads were increased in males, and both sexes had increased haemosiderin in the spleen. Similar studies showed a adverse effect on the liver. Guinea pig, dermal, 3 weeks, (0.5 ml neat material) Result: The skin became coarse, slightly thickened and some sloughing of the surface layers was apparent.				ECB[192]
27554-26-3	diisooctyl phthalate		Rats and dogs, 4 weeks: NOEL = 100 mg/kg bw	Genotoxicity tests in Ames Salmonella/ mammalian microsome / BALB/c 3T3 cells Results: negative		Mice, exposure during gestation: Results: significant adverse effects in the fetuses (increase in death and malformation). Mice, oral adm, 2 generation study: Results: Exposure pre-mating lead to a significant decrease in the number of litters/pair, live pups/litter, mean live pup weight and proportion of live pups was observed at 140 mg/kg/day. Exposure to 420 mg/kg/day resulted in significant infertility for both sexes.	HSDB[193]

117-84-0	dioctyl phthalate	Rat (male) oral: LD50 = 53700 mg/kg Mouse (male) oral: LD50 = 13000 mg/kg Guinea pig dermal: LD50 = 5.0 mL/kg /4,900 mg/kg/	DNOP shows effects on the liver, including elicited hepatic effects at doses that correlated with the tumorigenic response DnOP-treatment was related to a decrease in serum thyroxine (T4) No clinical signs of neurotoxicity were observed in the mice following exposure to DNOP for 105 days, nor in the offspring.	DNOP did not induce any genotoxicity activity in in vitro test in MCF-7 cells. DNOP was not mutagenic in Salmonella typhimurium		Studies of exposure prior to matting and during gestation showed no significant effect on reproductive function nor on the offspring. In vitro studies showed that DNOP was not estrogenic.	HSDB[194]
3648-20-2	Diundecyl phtalate	LD50 Rabbit dermal >7,9 g/kg LC50 Rat inhalation >1,8 mg/L/6hr LD50 Rat oral >15 g/kg	Rats, oral adm, 21 days Results: liver and kidney weight increases, increased ativity of liver enzymes (incl. palmitoyl-CoA, indicator of peroxisome proliferation). Testis weights also were increased. NOEL= 0,3% (diet) = ca. 280 mg/kg/day LOEL= 1,2% (diet)= ca. 1100 mg/kg/day	Tested for mutagenicity in Salmonella typhimurium strains TA 98, TA 100, TA 1535, and TA 1537 Result: negative		Showed to be reprotoxic in rats (prevent.se)	HSDB[195] prevent.se[196]
122-62-3	bis(2-ethylhexyl) sebacate	Oral (mg/kgbw) rat: LD50 = 1280 LD50 = 1700 mouse: LD50 = 9500 Exposure to DOS may produce reduced coordination,laboured breathing and diarrhoea, with tissue damage in the liver, spleen, brain and heart.	Rats, oral adm, 1g/kgbw/day, 3 weeks: Results: increased liver weight, per-oxisome proliferation, increased levels of peroxisome enzymes.	Salmonella typhimurium, Test strains: TA100, TA 1535, TA1537, TA98. (Pre-incubation with and without metabolic activation system.) Results: No mutagenicity were observed.	Rats feed 200 mg/kg bw for19 months. No observed effect.	Rats, 4 generation study oral adm ca. 10 mg/kg bw. Results: Reproduction was normal.	MST[197]

143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane	Oral: Rat LD50 > 2000 mg/kg bw Dermal Rat LD50 > 2000 mg/kg bw	Rat, oral, 9 weeks (up to 800 mg/kg/day) NOAEL = 100 mg/kg bw Result: signs indicating effects on the central nervous system in males and females; Decreased body weight and body weight gain in females; increased liver weight	Ames test, Salmonella typhimurium Result: negative Micronucleus assay,mouse, oral Result: negative (No increases in the numbers of micronucleated PCE's)		Rat, oral, 9 weeks,(once per day, 7 days per week up to 800 mg/kg/day) Premating exposure period: 2 weeks NOAEL Parental: = 100 mg/kg bw NOAEL F1 Offspring: = 100 mg/kg bw Results: Fertility effects: a treatment-related decrease in the fertility index and an increased incidence in the number and percentage of pre-birth loss (not statistically significant). A decrease in mean pup weight and the average number of pups per litter was observed at birth, Significant increase in pup mortality. Developmental effects: fore/hindlimb digits missing, agenesis and/or microdactily.	US EPA
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	Rat, oral adm LD50 > 5000 mg/kg bw Rabbit, dermal LD50 > 2000 mg/kg bw	Rabbit, dermal, 28 days NOAEL: 200 mg/kg Results:no deaths, erythema and flaky skin, oedema in medium and high doses, lower overall bodyweight gain for medium and high doses.	Mouse lymphoma assay, Forward mutation assay using cell line L5178Y, Concentration: 250 to 1600 nl/ml Results: Positive Treatments above 1000 nl/ml produced repeatable increases in the mutant frequency.	Mouse, male, dermal, 80 weeks minimum Results: 64742–53–6 was carcinogenic. Mouse, female, dermal, 78 weeks Result: Some solitary benign tumours were recorded in a few cases. Mouse, dermal, two years Result: The test substance was a dermal carcinogen, inducing malignant tumours within mean latency = 94 weeks.		ECB[198]

63148-62-9	Polydimetylsiloxan		Rats, oral adm, (0.28 percent PDMS), 2 years: Results:no evidence of adverse effects.	In vitro assays for genotoxic potential of 12 organosilicons Results: No evidence of gene mutation . 6 compounds showed to be potentially clastogenic.		Developmental and reproductive toxicity studies: ISC, pregnant rabbits and a parallel dermal, pregnant rabbits. Results: At intermediate dose: 3.8% of the fetuses had gross abnormalities. No adverse effects were observed at the highest doses on mother and child. ISC, Pregnant rats. Results: slight increase in delayed ossification at the high dose only.	HSDB
115-83-3	Pentaerythrityltetrastearate				One case of long-term exposure was reported to cause pulmonary fibrosis.		prevent.se
103-24-2	bis(2-ethylhexyl) azelate	Expected to have very low order of toxicity.					HSDB[199]
3370-35-2	N-(hydroxymethyl)stearamide						
25429-29-2	Pentachlorobiphenyl				Carcinogenic	Reprotoxic	prevent.se[200]
133-49-3	pentachlorobenzenethiol	Rat, oral: LD50 = 11900 mg/kg bw Mouse, oral: LD50 = 1000 – 4000 mg/kg bw	Rat, female, oral adm, 7weeks, (every other day: adm 113 mg/kg bw) Results: no adverse effects observed.	Genotoxicity Ames test Result: negative			ECB[201]

78-51-3	tris(2-butoxyethyl) phosphate	Oral (mg/kgbw) rat: LD50= 3000- 9490 LD50 >50000 (69-72%Cl) chicken: LD50 >5000 guinea pig: LD50 =3000 Dermal: rabbit: LD 50 >5000 - 10000	Rats, gavage, 14 days to 18 weeks, at different doses. Results: Significant changes in ectrophysicological parameters of the caudal nerve. Is neurotoxic but at high doses.				ECB[202]
78-42-2	tris(2-ethylhexyl) phosphate	Rat, oral: LD50 >36.8 g/kg bw Rabbit, oral: LD50 = ca. 46.0 g/kg bw Rabbit, dermal: LD50 =20 g/kg bw Guinea pig, inhalation: LC50 = 450 mg/cu m/30 min	Neurotoxicity studies Results: no significant concern.	In vivo and in vitro tests for mutagenicity. Results: negative.	There was some evidence of carcinogenicity based on an increased incidence of hepatocellular carcinomas in female mice and equivocal evidence of carcinogenicity based on the increased incidence of adrenal pheochromocytomas in male rats, both at a low incidence.		HSDB[203]

115-86-6	**Triphenyl phosphate**	One monkey being administered 1000 mg TPP /kg bw died after one day. Another monkey being administered 500 mg TPP /kg bw, was observed for 10 days without death occuring. oral LD50 Rat=10,8 g/kg LD50 Rat = 3,8 g/kg (in oil) LD50 Mouse =1,3 g/kg (in oil) LD50 Guinea pig >4000 mg/kg dermal LD50 Rabbit > 7,9 g/kg When injected in cats it caused delayed paralysis. It is a **neurotoxin in animals**.	Rats, oral, 3 months, No cumulative toxicity was observed.			Rats, oral adm, from 4 weeks post weaning for 91 days, through mating and gestation. Results: no toxic effects on mothers or offspring at these dosages.	HSDB[204]

1E: PLASTICIZERS: TOXICOLOGY IN OTHER SPECIES

CAS nr.	Substance Name	acute	chronic	Reprotoxicity	Ref
103-23-1	bis(2-ethylhexyl) adipate				
3089-55-2	Benzyl octyl adipate				
33703-08-1	diisononyl adipate	Pseudomonas putida (Bacteria), 30 minute(s) EC50 > 10000 mg/l activated sludge, 30 minute(s) EC20> 1000 mg/l			ECB[205]
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate				
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro				ECB[206]
85535-85-9	Alkanes, C14-17, chloro Chloroparaffins		Lumbriculus variegatus and Hyalella azteca, prolonged studies: NOEC= 50 mg/kg wet wt. PNECsediment of 5 mg/kg wet wt Eisenia fetida (earthworm), prolonged studies: NOEC = 248 mg/kg wet wt. PNECsoil(standard) = 10,6 mg/kg wet wt.		ECB[207]
28553-12-0	di-''isononyl'' phthalate	Bufo fowleri (amphibien): LC50 96= 2,95 mg/l Rana pipiens (amphibien): LC50 96= 3,63 mg/l Pseudomonas putida (Bacteria): EC10>25000 mg/l			ECB[208]
85-68-7	benzyl butyl phthalate	Eisenia foetida (earthworm), acute toxicity test: Results: No negative effects	21 days phytotoxicity tests on Sinapsis alba, Brassica chinesis and Trifolium repens, exposed to a max 5.7 µg/m3. Results: No effects were observed.		ECB[209]

117-81-7	bis(2-ethylhexyl) phthalate	NOEC sediment organisms= 1000 mg/kg dwt NOEC activated sludge in STPs =2,007 mg/L		Reprotoxicity in birds: NOEC = 1700 mg/kgfood	ECB[210]
84-74-2	dibutyl phthalate	PNEC sediment = 1.2 mg/kg wwt PNECmicroorganisms= 0,22mg/l Zea mays, plant soil NOEC = 200 mg /kg plant air: NOEC = 0,1µg/m3 PNECplant-air= 0.01 µg/m3 PNECterrestrial = 2 mg/kg dw			ECB[211]
26761-40-0	di-''isodecyl'' phthalate	Plant-air toxicity studies: Results: no significant adverse effects. Abs of tox cannot be concluded due to experimental shortcommings. Earthworms, toxicity studies: Results: No effect was observed at 10 000mg/kgdw. PNEC soil= 100 000 µg/kgdw			ECB[212]
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	Eisenia foetida (Worm), 14 day LC50 > 1000 mg/kg soil dw Brassica alba (Dicotyledon), 14 day EC50 > 100 mg/kg soil dw Bufo Fowleri (Flowlerstoad) eggs LC50 72 hour= 1,21 mg/l			ECB[213]

68515-41-3	Dialkyl(C7-C9)phthalate	Paratanytarsus parthenogenica (midges): NOEC48 hour(s) > 10 mg/l			ECB[214]
27554-26-3	diisooctyl phthalate				
117-84-0	dioctyl phthalate	Phasianus colchicus, (age 10 days) oral: LC50 >5000 ppm/5 days =1000ppm/day Eisenia fetida (earthworm), dermal: LC50 = 3140 (2270-4330) ug/sq cm/48 hr			HSDB[215]
3648-20-2	Diundecyl phtalate				
122-62-3	bis(2-ethylhexyl) sebacate				
143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane				
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)				
63148-62-9	Polydimetylsiloxan				
115-83-3	Pentaerythrityltetrastearate				
103-24-2	bis(2-ethylhexyl) azelate				
3370-35-2	N-(hydroxymethyl)stearamide				
25429-29-2	Pentachlorobiphenyl				
133-49-3	pentachlorobenzenethiol				
78-51-3	tris(2-butoxyethyl) phosphate				
78-42-2	tris(2-ethylhexyl) phosphate				
115-86-6	Triphenyl phosphate				

1F: PLASTICIZERS: SPECTRAL PROPERTIES

(Source: HSDB)

CAS nr.	Substance Name	index of reflection	Mass	IR	UV	1H NMR
78-51-3	tris(2-butoxyethyl) phosphate	1.434 at 25 C				
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro					
122-62-3	bis(2-ethylhexyl) sebacate	1.451 at 25 C	Intense mass spectral peaks: 185 m/z (100%), 57 m/z (49%), 71 m/z (36%), 70 m/z (35%)	3345		
143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane					
103-23-1	bis(2-ethylhexyl) adipate	1.4474 at 20C	Intense mass spectral peaks: 41 m/z (100%), 57 m/z (90%), 55 m/z (73%), 43 m/z (62%) Mass: 2-710	8003		
28553-12-0	di-''isononyl'' phthalate	1.486 at 20 C	Intense mass spectral peaks: 149 m/z, 293 m/z, 362 m/z, 418 m/z			
85-68-7	benzyl butyl phthalate	1.535-1.540 at 25C				
117-81-7	bis(2-ethylhexyl) phthalate	1.486 at 20 C	Intense mass spectral peaks: 149 m/z (100%), 57 m/z (32%), 167 m/z (29%), 71 m/z (21%) MASS: 15518	2526		9392
84-74-2	dibutyl phthalate	1.4900 at 20 C	Intense mass spectral peaks: 149 m/z (100%), 86 m/z (18%), 57 m/z (18%), 223 m/z (17%) Mass: 26524	1902	529	721
26761-40-0	di-''isodecyl'' phthalate	1.483 at 25 C			band at 275 nm, the tail of which extends somewhat beyond 290 nm	
64742-53-6	Distillates (petroleum), hydrotreated light naphthenic belong to Group 7C substances					
63148-62-9	Polydimethylsiloxane	1.399 at 20 C				
115-83-3	pentaerythritol tetrastearate					

68515-51-5	1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters Dialkylphthalat C6–10					
103-24-2	bis(2-ethylhexyl) azelate	1.446 at 25 C				
68515-41-3	1,2-Benzenedicarboxylic acid, di-C7-9-branched and linear alkyl esters di C7–9 alkyl phthalate					
3089-55-2	benzyl octyl adipate					
33703-08-1	diisononyl adipate					
85535-85-9	Alkanes, C14-17, chloro					
27554-26-3	diisooctyl phthalate		Intense mass spectral peaks: 149 m/z, 167 m/z, 279 m/z, 390 m/z			
3370-35-2	N-(hydroxymethyl)stearamide					
117-84-0	dioctyl phthalate all the information gathered is specific to the DOC isomer DNOP	1.485 at 20 C/D	23605 (NIST/EPA/MSDC Mass Spectral database, 1990 version); 1917 (Atlas of Mass Spectral Data, John Wiley & Sons, New York)	2215	226	10218
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate					
78-42-2	tris(2-ethylhexyl) phosphate	1.441 at 25 C				
25429-29-2	pentachloro[1,1'-biphenyl]					
133-49-3	pentachlorobenzenethiol	52546 (NIST/EPA/MSDC Mass Spectral database, 1990 version); 1174 (National Bureau of Standards)	611	7857		HSDB
115-86-6	Triphenyl phosphate	26529	18528	3-682	10231	
3648-20-2	Diundecyl phtalate	1.482 at 20 C				

1G:STANDARDISED ANALYSIS METHODOLOGIES FOR PLASTICIZERS

US National Environment Method Index (NEMI): standardised methodologies [216]

Method: EPA-EAD 1625;	Procedure: gas chromatography/mass spectrometry; Analyte: butyl benzyl phthalate; Matrix: water; Detection Limit: not provided.
Method: EPA-EAD 606	Procedure: gas chromatography with electron capture detector; Analyte: butyl benzyl phthalate; Matrix: wastewater and other waters; Detection Limit: 0.34 ug/L.
Method: EPA-NERL 506;	Procedure: gas chromatography with photoionization detection; Analyte: butyl benzyl phthalate; Matrix: drinking water; Detection Limit: 2.67 ug/L.
Method: EPA-NERL 525.2;	Procedure: gas chromatography/mass spectrometry; Analyte: butyl benzyl phthalate; Matrix: finished drinking water, source water, or drinking water in any treatment stage; Detection Limit: 0.025 ug/L.
Method: EPA-NERL 625;.	Procedure: gas chromatography/mass spectrometry; Analyte: butyl benzyl phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L
Method: EPA-OSW 8061A	Procedure: gas chromatography with electron capture detection; Analyte: butyl benzyl phthalate; Matrix: groundwater, leachate, soil, sludge, and sediment; Detection Limit: 0.042 ug/L.
Method: EPA-OSW 8270D;	Procedure: gas chromatography/mass spectrometry; Analyte: butyl benzyl phthalate; Matrix: solid waste matrices, soils, air sampling media and water samples; Detection Limit: 10 ug/L.
EPA Method 8060:	Phthalate Esters. This method provides gas chromatographic conditions for the detection of ppb levels. For di-n-octyl phthalate the method detection limit for electron capture detector is 3.0 ug/l and for the average recovery range for four measurements is D50.0 ug/l, and the limit for the standard deviation is 13.4 ug/l.
EPA Method 8250	Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Packed Column Technique. This gas chromatography/mass spectrometry method is used to determine the concentration of semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soils, and ground water. The practical quantitation limit for determining an individual compound is approximately 1 mg/kg (wet weight) for soil/sediment samples, 1-200 mg/kg for wastes, and 10 ug/l for ground water samples. Under the prescribed conditions, di-n-octyl phthalate has a range for the average recovery of four measurements of 18.6-131.8 ug/l, and a limit for the standard deviation of 31.4 ug/l.
Method: EPA-EAD 1625	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-octyl phthalate; Matrix: water; Detection Limit: 10 ug/L.
Method: EPA-EAD 606	Procedure: gas chromatography with electron capture detector; Analyte: di-n-octyl phthalate phthalate; Matrix: wastewater and other waters; Detection Limit: 3 ug/L.
Method: EPA-NERL 506	Procedure: gas chromatography with photoionization detection; Analyte: di-n-octyl phthalate; Matrix: drinking water; Detection Limit: 6.42 ug/L.
Method: EPA-NERL 625;	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-octyl phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.
Method: EPA-OSW 8061A	Procedure: gas chromatography with electron capture detection; Analyte: di-n-octyl phthalate; Matrix: groundwater, leachate, soil, sludge, and sediment; Detection Limit: 0.049 ug/L.
Method: EPA-OSW 8270D;	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-octyl phthalate; Matrix: solid waste matrices, soils, air sampling media and water samples; Detection Limit: 10 ug/L.
EPA: EMSLC Method 506.	Determination of Phthalate and Adipate Esters in Drinking Water by Liquid-Liquid Extraction or Liquid-Solid Extraction and Gas Chromatography with Photoionization Detection. Detection limit= 12.000 ug/l
EPA: EMSLC Method 525.1.	Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography and Mass Spectrometry. Revision 2.2. Detection limit= 0.60 ug/l.
EPA: EMSLC Method 525.2.	Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography and Mass Spectrometry. Revision 1.0.
EPA: Method 8060:	Phthalate Esters This method provides gas chromatographic conditions for the Phthalate Esters This method provides gas chromatographic conditions for the detection of ppb levels. For Butyl benzyl phthalate, the method detection limit for ECD is 0.34 ug/l and for FID is 15 ug/l, the average recovery range for four measurements is 5.7-11.0 ug/l, and the limit for the standard deviation is 4.2 ug/l.
EPA: Method 8250:	Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Packed Column Technique. This gas chromatography/mass spectrometry method is used to determine the concentration of semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soils, and ground water. The practical quantitation limit for determining an individual compound is

	approximately 1 mg/kg (wet weight) for soil/sediment samples, 1-200 mg/kg for wastes, and 10 ug/l for ground water samples. Under the prescribed conditions, Butyl benzyl phthalate has a detection limit of 2.5 ug/l, a range for the average recovery of four measurements of >0-139.9 ug/l, and a limit for the standard deviation of 23.4 ug/l.
EPA Method 8250	Packed Column Gas Chromatography/Mass Spectrometry Technique for the determination of semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soil, and groundwater. This method is applicable to quantify most neutral, acidic, and basic organic compounds that are soluble in methylene chloride and capable of being eluted with derivatization as sharp peaks from a gas chromatographic packed column. Under the prescribed conditions, pentachlorophenol has a detection limit of 3.6 ug/l. Precision and method accuracy were found to be directly related to the concentration of the analyte and essentially independent of the sample matrix.
EPA: EMSLC Method 506	Determination of Phthalate and Adipate Esters in Drinking Water by Liquid-Liquid Extraction or Liquid-Solid Extraction and Gas Chromatography with Photoionization Detection. Detection limit= 12.000 ug/l.
EPA: EMSLC Method 525.1.	Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography and Mass Spectrometry. Revision 2.2. Detection limit= 0.60 ug/l.
EPA: EMSLC Method 525.2.	Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography and Mass Spectrometry. Revision 1.0
EPA: Method 8060	Phthalate Esters This method provides gas chromatographic conditions for the Phthalate Esters This method provides gas chromatographic conditions for the detection of ppb levels. For Butyl benzyl phthalate, the method detection limit for ECD is 0.34 ug/l and for FID is 15 ug/l, the average recovery range for four measurements is 5.7-11.0 ug/l, and the limit for the standard deviation is 4.2 ug/l.
EPA: Method 8250:	Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Packed Column Technique. This gas chromatography/mass spectrometry method is used to determine the concentration of semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soils, and ground water. The practical quantitation limit for determining an individual compound is approximately 1 mg/kg (wet weight) for soil/sediment samples, 1-200 mg/kg for wastes, and 10 ug/l for ground water samples. Under the prescribed conditions, Butyl benzyl phthalate has a detection limit of 2.5 ug/l, a range for the average recovery of four measurements of >0-139.9 ug/l, and a limit for the standard deviation of 23.4 ug/l.
EPA Method 8060	Gas Chromatography using solvent flush technique and a electron capture detector or a flame ionization detector for the detection of ppb levels of phthalate esters in solid waste. Ground water samples should be determined by electron capture detector.
EPA Method 8250.	Packed Column Gas Chromatography/Mass Spectrometry Technique for the determination of semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soil, and groundwater. This method is applicable to quantify most neutral, acidic, and basic organic compounds that are soluble in methylene chloride.
Method: EPA-EAD 1625;	Procedure: gas chromatography/mass spectrometry; Analyte: bis(2-ethylhexyl) phthalate; Matrix: water; Detection Limit: 10 ug/L.
Method: EPA-EAD 606	Procedure: gas chromatography with electron capture detector; Analyte: bis(2-Ethylhexyl) phthalate; Matrix: wastewater and other waters; Detection Limit: 2 ug/L.
Method: EPA-NERL 506	Procedure: gas chromatography with photoionization detection; Analyte: bis(2-ethylhexyl) phthalate; Matrix: drinking water; Detection Limit: 2.25 ug/L.
Method: EPA-NERL 525.2;	Procedure: gas chromatography/mass spectrometry; Analyte: bis(2-ethylhexyl) phthalate; Matrix: finished drinking water, source water, or drinking water in any treatment stage; Detection Limit: 0.46 ug/L.
Method: EPA-NERL 625	Procedure: gas chromatography/mass spectrometry; Analyte: bis(2-ethylhexyl) phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.
Method: EPA-OSW 8061A;	Procedure: gas chromatography with electron capture detection; Analyte: bis(2-ethylhexyl) phthalate; Matrix: groundwater, leachate, soil, sludge, and sediment; Detection Limit: 0.27 ug/L.
Method: EPA-OSW 8270D;	Procedure: gas chromatography/mass spectrometry; Analyte: bis(2-ethylhexyl) phthalate; Matrix: solid waste matrices, soils, air sampling media and water samples; Detection Limit: not provided.
EPA Method 8060	Phthalate Esters This method provides gas chromatographic conditions for the detection of ppb levels. A 2 to 5 ug aliquot of the extract is injected into a gas chromatograph using the solvent flush technique, and compounds in the gas chromatograph effluent are detected by an electron capture detector or a flame ionization detector. Ground water samples should be determined by electron

	capture detector.
EPA Method 8250	Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Packed Column Technique
Method: EPA-EAD 1625;	Procedure: gas chromatography/mass spectrometry;
Method: EPA-EAD 606	Procedure: gas chromatography with electron capture detector; Analyte: di-n-butyl phthalate phthalate; Matrix: wastewater and other waters; Detection Limit: 0.36 ug/L.
Method: EPA-NERL 506;	Procedure: gas chromatography with photoionization detection; Analyte: di-n-butyl phthalate; Matrix: drinking water; Detection Limit: 1.23 ug/L.
Method: EPA-NERL 525.2;	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-butyl phthalate; Matrix: finished drinking water, source water, or drinking water in any treatment stage; Detection Limit: 0.59 ug/L.
Method: EPA-NERL 625	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-butyl phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.
Method: EPA-OSW 8061A	Procedure: gas chromatography with electron capture detection; Analyte: di-n-butyl phthalate; Matrix: groundwater, leachate, soil, sludge, and sediment; Detection Limit: 0.33 ug/L.
Method: EPA-OSW 8270D	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-butyl phthalate; Matrix: solid waste matrices, soils, air sampling media and water samples; Detection Limit: 10 ug/L.
Method: Standard Methods 6410 B	Procedure: gas chromatography/mass spectrometry; Analyte: butyl benzyl phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.
Method: USGS-NWQL O-3118-83;	Procedure: gas chromatography using a flame-ionization detector or a mass spectrometric detector; Analyte: butyl benzyl phthalate; Matrix: water and water-suspended-sediment mixtures; Detection Limit: not provided.
Method: USGS-NWQL O-5130-95;.	Procedure: high-performance gel permeation chromatography, capillary-column GC/MS; Analyte: butyl benzyl phthalate; Matrix: soils and sediment; Detection Limit: 33.2 ug/kg
Method: USGS-NWQL O-3118-83	Procedure: gas chromatography using a flame-ionization detector or a mass spectrometric detector; Analyte: di-n-butyl phthalate; Matrix: water and water-suspended-sediment mixtures; Detection Limit: not provided.
Method: USGS-NWQL O-5130-95	Procedure: high-performance gel permeation chromatography, capillary-column GC/MS; Analyte: di-n-butyl phthalate; Matrix: soils and sediment; Detection Limit: 31.6 ug/kg.
Method: USGS-NWQL O-3118-83;	Procedure: gas chromatography using a flame-ionization detector or a mass spectrometric detector; Analyte: bis(2-ethylhexyl) phthalate; Matrix: water and water-suspended-sediment mixtures; Detection Limit: not provided.
Method: USGS-NWQL O-5130-95;	Procedure: high-performance gel permeation chromatography, capillary-column GC/MS; Analyte: bis(2-ethylhexyl) phthalate; Matrix: soils and sediment; Detection Limit: 41.4 ug/kg.
Method: USGS-NWQL O-5130-95;	Procedure: high-performance gel permeation chromatography, capillary-column GC/MS; Analyte: di-n-octyl phthalate; Matrix: soils and sediment; Detection Limit: 22 ug/kg.
Method: DOE OM100R;	Procedure: gas chromatography with mass spectrometer ion trap detector; Analyte: di-n-octyl phthalate; Matrix: solid waste matrices, soils, and groundwater; Detection Limit: 160 ug/L.
Method: Standard Methods 6410 B;	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-octyl phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.
Method: DOE OM100R;	Procedure: gas chromatography with mass spectrometer ion trap detector; Analyte: butyl benzyl phthalate; Matrix: solid waste matrices, soils, and groundwater; Detection Limit: 76 ug/L.
Method: DOE OM100R;	Procedure: gas chromatography with mass spectrometer ion trap detector; Analyte: bis(2-ethylhexyl) phthalate; Matrix: solid waste matrices, soils, and groundwater; Detection Limit: 260 ug/L.
Method: Standard Methods 6410 B;	Procedure: gas chromatography/mass spectrometry; Analyte: bis(2-ethylhexyl) phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.
Method: DOE OM100R;	Procedure: gas chromatography with mass spectrometer ion trap detector; Analyte: di-n-butyl phthalate; Matrix: solid waste matrices, soils, and groundwater; Detection Limit: 44 ug/L.
Method: Standard Methods 6410 B;	Procedure: gas chromatography/mass spectrometry; Analyte: di-n-butyl phthalate; Matrix: municipal and industrial discharges; Detection Limit: 2.5 ug/L.

US OSHA standardised methodologies[217]

Method: OSHA 104;	Procedure: gas chromatography with flame ionization detector; Analyte: di(2-

	ethylhexyl) phthalate; Matrix: air; Detection Limit: 0.09 ng.
Method: OSHA 48;	Procedure: gas chromatography using flame ionization detector; Analyte: petroleum distillate fractions; Matrix: air; Detection Limit: 0.77 mg/sample (260 mg/cu m). /Petroleum distillate fractions/
Method: OSHA 104	Procedure: gas chromatography with flame ionization detector; Analyte: dibutyl phthalate; Matrix: air; Detection Limit: 0.10 ng.
Method: OSHA 104;	Procedure: gas chromatography with flame ionization detector; Analyte: di-n-octyl phthalate; Matrix: air; Detection Limit: 0.10 ng.

US CDC: standardised methodologies [218]

Method: NIOSH 5020, Issue 2;	Procedure: gas chromatography with flame ionization detector; Analyte: di(2-ethylhexyl) phthalate; Matrix: air; Detection Limit: 10 ug per sample.
Method: NIOSH 5020, Issue 2;	Procedure: gas chromatography with flame ionization detector; Analyte: dibutyl phthalate; Matrix: air;
NIOSH Method: 227.:	Analyte: Polymethylsiloxane mist in air. Matrix: Air. Procedure: Flameless atomic absorption analysis. Method Evaluation
Method: NIOSH 1550, Issue 2,	Naphthas using Gas Chromatography and Flame Ionization Detection; Analyte: naphtha hydrocarbons; Matrix: air; Estimated Level of Detection: 0.1 mg per air sample. /Naphthas/

2A: SWEETENERS: CHEMICAL AND PHYSICAL PROPERTIES

CAS nr.	**Substance Name**	**Molecular weight (g/mole) ref: HSDB**	**melting point (degree celsius)**	**boiling point (degree celsius)**	**density (g/cm3)**	**Vapour pressure (hPa or mmHg)**	**log Kow**	**water solubility (mg/l or g/l)**	**Ref**
50-70-4	Sorbitol, sorbitolsirap D-glucitol, D-sorbitol	182,17	111 C	295 C at 3,5 mmHg	1,489 g/cm3 20 C	9,9X10-9 mm Hg at 25 C	-2,20	6,9.10+5 mg/l at 20C 2,75.10+6 mg/l at 25C	HSDB[219]
69-65-8	Mannitol D-mannitol	182,17	166-168 C	290-295 C at 3,5 mmHg	1,52 at 20 C	NA	-3,10	2,16.10+5 mg/l at 25 C	HSDB[220]
55589-62-3	6-methyl-1,2,3-oxathiazin-4(3H)-one 2,2-dioxide, potassium salt Acesulfamkalium/acesulfam-KE	201,24	225 C		1,83 g/cm3			210 g/l at 10C 270 g/l at 20C	HSDB[221]
22839-47-0	Aspartame	294,3	> 246 C	> 300 C at 1013,25 hPa	150 – 600 kg/m3 *	< 0,0000001 hPa at 25 C	ca –0,9 at 25 C	ca. 10 g/l at 20 C	ECB[222]
100-88-9	N-cyclohexylsulphamic acid	179,24	169,5 C					0,133 g/cm3	HSDB[223]
64519-82-0	Isomalt								
81-07-2	1,2-benzisothiazol-3(2H)-one 1,1-dioxide saccharin	183,19	228,8-229,7 C		0,828		0,91	4300 mg/l at 25 C	HSDB[224]
56038-13-2	1,6-dichloro-1,6-dideoxy-β-D-fructofuranosyl 4-chloro-4-deoxy-α-D-galactose	397,64	130 C	3 C		3,25E-14 mmHg	-1	110 g/l	IVL[225]
53850-34-3	Proteins, thaumatins								

*This value appears to be very high. Other internet sources define a density of: 1,347g/cm^3

20702-77-6	1-[4-[[2-O-(6-deoxy-α-L-mannopyranosyl)-β-D-glucopyranosyl]oxy]-2,6-dihydroxyphenyl]-3-(3-hydroxy-4-methoxyphenyl)propan-1-one Neohesperidin Dihydrochalcone								
585-88-6	4-O-α-D-glucopyranosyl-D-glucitol Maltitol, maltitolsirap	344,31	148 – 151 C		0,6 –0 ,7 g/cm3			Ca. 140 g/l at 20 C	ECB[226]
585-86-4	4-O-β-D-galactopyranosyl-D-glucitol Lactitol	362	76 – 78 C		Monohydrate = 1,44 g/cm3 Dihydrate = 1,52 g/cm3		< –3 at 20 C	Dihydrate = 140 g/l at 25 C Monohydrate = 150 g7l at 25 C	ECB[227]
87-99-0	xylitol	152,15	92-96 C		bulk density = 720-830 kg/m3 at 25 C			1,6g/l at 20C, pH 5-7	ECB[228]
149-32-6	erythritol	119 - 123						Freely soluble in water	EU food comitee[229]

2B: SWEETENERS: ENVIRONMENTAL BEHAVIOUR

CAS nr.	Substance Name	Persitence				Bioaccumulation	Natural occurrence	Metabolites	Ref
		Atmosphere	Soil	Hydrosphere	Biodegradation				
50-70-4	Sorbitol, sorbitolsirap	Expected to exist solely in the particulate phase in the ambient atmosphere. Particulate-phase may be removed from the air by wet or dry deposition. Not expected to be susceptible to direct photolysis by sunlight.	Expected to have very high mobility in soil. Volatilization of D-sorbitol from moist or dry soil surfaces is not expected to be an important. Theoretical BOD was reached in 2 weeks indicating that biodegradation is an important environmental fate process in soil.	In water it is not expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is not expected. Not expected to undergo hydrolysis. Theoretical BOD was reached in 2 weeks.	Theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L and the Japanese MITI test.	fish: calculated BCF = 3	does not occur naturally	In the liver: fructose and glucose 70% of orally ingested sorbitol is converted to carbon dioxide without appearing as glucose in the blood	HSDB[230]
69-65-8	Mannitol	Will exist in the particulate phase and removed by wet and dry deposition.	Expected to have very high mobility.	Not expected to adsorb to suspended solids and sediment in the water.	Is a simple sugar alcohol and should be readily biodegraded in the environment.	aquatic organisms: estimated BCF= 1	Widespread in nature. Found in the exudates of trees and shrubs (e.g. plane tree, manna ash and olive tree). Also occurs in pumpkin, hedge parsley, onions, celery, strawberries, the genus Euonymus, the genus Hebe, cocoa bean, grasses, lilac, digitalis purpurea, mistletoe and lichens.	In spores of aspergillus oryzae : fructose In the liver: glycogen	HSDB[231]
55589-62-3	6-methyl-1,2,3-oxathiazin-4(3H)-one 2,2-dioxide, potassium salt (Acesulfame K)							In urine: No metabolites have been determined, only the original molecule is found.	HSDB[232]

22839-47-0	Aspartam	Particulate-phase aspartame will be removed by wet and dry deposition. (2)	Expected to have high mobility. Volatilization from moist and dry soil is not expected to be important. Expected to degrade in moist soil surfaces to diketopiperazine: T1/2 (pH 7)= 1 day (2) Aspartame is fast degraded in soil. Aspartame in the environment is hydrolysed by microbial activity in soil. (1)	Not expected to adsorb to suspended solids and sediment in the water. Not expected to volatize from water. Aspartame is expected to degrade in water to diketopiperazine: T1/2 (pH 7)= 1 day The rate of decomposition is temperature and pH dependent: T1/2(25 deg C, pH 5) = 245 days, T1/2(25 deg C, pH 6) = 120 days T1/2(25 deg C, pH 7) =1 day Abiotic degradation in water: T1/2 pH 3 = ca. 300 day (2)		estimated BCF = 1 (2)	Not present in nature.	Metabolite: diketopiperazine (5-benzyl-3,6-dioxo-2-piperazine acetic acid) Upon ingestion: approximately 50% phenylalanine, 40% aspartic acid, and 10% methanol (2)	(1) ECB[233] (2)HSDB[234]
100-88-9	cyclamate						Not present in nature.	Metabolite: cyclohexylamine, which can be metabolised to cis- and trans- 3-amino and 4-aminocyclohexanol. (e.g.Human, rat)	HSDB[235]
64519-82-0	Isomalt						Not present in nature.		
81-07-2	saccharin	Expected to exist in both the vapor and particulate phases in the ambient atmosphere. Degraded in the atmosphere by reaction with hydroxyl radicals: T1/2= 3 days	Expected to have high mobility in soil. Not expected to volatilize from moist or dry soil surfaces.	Not expected to adsorb to suspended solids and sediment in water. Not expected to volatise. Potential to chemically hydrolyze in aqueous environments.	Biodegradation is not known, but amides are usually susceptible to microbial metabolism.	estimated BCF = 3	Not present in nature.	Potential metabbolites (hydrolysis): o-sulfamoylbenzoic acid and ammonium o-sulfolbenzoic acid When ingested no metabolites are detected.	HSDB[236]

56038-13-2	Sucralose		After 69 days, Degradation= 56- 60%	Readily soluble in water. Not likely to vaporize. Hydrolysis is dependant on temperature and pH and is not expected in environmental conditions. In lake water, 77 days: Degradation= 1,7-3,6%	In sweage, 123 days: Degradation= 23% Inherently biodegradable but not readily degradable.			Hydrolysis: 4-chloro-4-deoxygalactose (4-CG) and 1,6-dichloro-1,6-dideoxyfructose (1,6-DCF) Metabolisation: poorly absorbed, with no significant conversion.	IVL[237]
53850-34-3	Taumatin						Extratcted from a tropical fruit: thaumatococcus danielli benth		
20702-77-6	Neohesperidindihydrochalcon/ neohesperidin DC								
585-88-6	Maltitol, maltitolsirap								
585-86-4	Lactitol				BOD5: = 550 mgO2/l COD: = 955 mg/g substance BOD5/COD= 55,3%		Lactitol is manufactured from whey, the lactose (milk sugar).		ECB[238]
87-99-0	Xylitol				BOD5: = 0,7 mgO2/l		Naturaly found and extracted from some fruits and vergetables e.g. Plums and corn.		ECB[239]
149-32-6	Erytritol						It occurs naturally in fruits and fermented foods.	In animals and human 60 to more than 90 % of ingested erythritol is rapidly absorbed from the small intestine and excreted unchanged in the urine.	EU food comitee [240]

2C: SWEETENERS: TOXICOLOGY IN AQUATIC ORGANISMS

CAS nr.	Substance Name	Toxicity in marine species (species, time)		Toxicity in fresh water species (species, time)		Ref
		acute	chronic	acute	chronic	
50-70-4	Sorbitol, sorbitolsirap					
69-65-8	Mannitol					
55589-62-3	6-methyl-1,2,3-oxathiazin-4(3H)-one 2,2-dioxide, potassium salt (Acesulfame K)			Zebra Fish: LC50 48 hr = 2500 mg/l LC50 96 hr 1800- 2500 mg/l Golden Orfe: LC50 >1000 mg/l		HSDB[241]
22839-47-0	Aspartam	Aspartame lacks specific toxicity since it consists of amino acids. When aspartame enters the aquatic environment in high amounts due to an accident, it may cause oxygen deficiency due to fast oxygen consumption by microbial biodegradation like any other food component.				HSDB[242]
100-88-9	cyclamate					
64519-82-0	Isomalt					
81-07-2	saccharin					
56038-13-2	Sucralose			Bluegill sunfish: LC50 96 hr>3200 mg/l Daphnia magna: EC50 48 hr >1800 mg/l Green Algae: EC50 96 hr >1800 mg/l		IVL[243]

53850-34-3	Taumatin					
20702-77-6	Neohesperidindihydrochalcon/neo hesperidin DC					
585-88-6	Maltitol, maltitolsirap					
585-86-4	Lactitol			Poecilia reticulata NOEC = 10000 mg/l Daphnia magna NOEC= 10000 mg/l		ECB[244]
87-99-0	Xylitol					
149-32-6	Erytritol					

2D: SWEETENERS: TOXICOLOGY IN MAMMALS

CAS nr.	Substance Name	acute	chronic	Mutagenicity	Carcinogenicity	Reprotoxicity	Ref
50-70-4	Sorbitol, sorbitolsirap	Oral: LD50 Rat= 15900 mg/kg LD50 Mouse = 17800 mg/kg Human: Reports of adverse reactions are largely due to its action as an osmotic laxative when ingested orally. Very rare reports of induced severe hypernatremia.			Has been found to be an effective inducer of apoptosis in HEp-2 cells, in vitro. Therefore, its effect on gastric cancer cells was examined and showed to induce apoptosis in these cells. Sorbitol is not readily fermented by oral microorganisms and has little effect on dental plaque pH. Hence it is generally considered to be noncarcinogenic.	Rats, oral, three successive generations (up to 10% of diet) Results: no adverse effect on growth or reproductive performance in either sex.	HSDB[245]
69-65-8	Mannitol	Oral: LD50 Rat= 13500 mg/kg LD50 Mouse = 22 g/kg Human: Too rapid administration of large amounts will cause cellular dehydration, overexpansion of intravascular space with congestive heart faillure, pulmonary edema. Hyponatremia is a common prolem. May increase cerebral blood flow and thus the risk of postoperative bleeding in neurosurgical patients.	Repeated large doses in experimental animals: resulsts: no significant alteration of renal tubular functions. Nephropathy appeared to be temporary and similar to that produced by glucose.		Mice and rat, gavage, 103 weeks. Results: no statistical increases in tumor incidence.		HSDB[246]

55589-62-3	6-methyl-1,2,3-oxathiazin-4(3H)-one 2,2-dioxide, potassium salt (Acesulfame K)	Oral: LD50 Rat= 7430 mg/kg	No adverse effect was observe on tests carried out on rats and guinea pigs.	Genotoxicity studies carried out on different species, e.g. Chromosome aberration test in Chinese hamster bone marrow. Results: negative Mice, oral: Results: dose-dependent significant clastogenicity in bone marrow cells. In view of the present significant in vivo mammalian genotoxicity data, acesulfame-K should be used with caution.	Mice, oral (up to 3% of diet), 80 weeks Results: No indication that the test compound was carcinogenic. Dogs, over 2 days Results: No indication that the test compound was carcinogenic.	Rats, males and females, oral, three generations: Results: did not reveal any treatment-related pathological changes. Rats, male and female , oral, 12 weeks prior to mating: Results: No dose-related effects were seen in any of the observations made on the offspring, and there were no indications of increased mortality in utero.	HSDB[247]
22839-47-0	Aspartam	Oral: LD50 rat= > 4000 mg/kg bw. 90days study, no adverse effects were observed. (1) Human: some concern phenylalanine is release during metabolisation. (2) Adverse effects in human: urticaria, angiodema, granulomatous panniculitis, cross-reactivity with sulfonamides, renal tubular acidosis (with large amounts). (1) Numerous consumer complaints associated with aspartame, including seizure, but studies do not coorborate the latter. (1)	rat, oral, 104 weeks Results: no adverse effects were observed. NOAEL = 4 g/kg/day (1) Neurotox study in rats, 104 weeks, oral: Result: does not increase the incidence of brain tumors. (2) Aspartame does not alter maximal electroshock seizures in normal rats or in rats predisposed to seizures. (2)	Mice, 4 days Results: No clastogenic activity was found. (2)		Two generation study on rat. Reults: No adverse effects were observed: NOAEL =4g/kg/day (1) Embryotox study on rabbit during gestation: Results: no adverse effects were observed: NOAEL = 2g/kg/day Same was observed with rats: NOAEL = 4g/kg/day (1) These results indicate that perinatal exposure to aspartame, when voluntarily consumed by mothers and later directly by the rat pups does not affect reflex development, morphological development or spatial memory. (2)	(1) ECB[248] (2)HSDB[249]

100-88-9	cyclamate	Oral: LD50 Rat = 12 g/kg LD50 Mouse = 10 g/kg Probable oral lethal dose (Human)= 5-15 g/kg	Sodium cyclamate, has shown to retard growth of rats at very high dosages (5% diet) Guinea pigs, oral Results: changes in liver, pancreatic cells.		Classified group 3 by IARC	Rats that recieved calcium cyclamate salt did not conceive. Pregnants rat, oral, sodium and calcium cyclamate. Results: increased motor activity in behavioral tests in offspring's, effects persisted.	HSDB[250]
64519-82-0	Isomalt						
81-07-2	saccharin		Lethal dose (rabbits)= 8 - 10 g/kg , presumably results of gastroenteritis. Oral: LD50 Mouse= 17 g/kg	Tested for mutagenicity in the Salmonella/microsome preincubation assay Results: negative.	rats, oral, 87 weeks Results: Urothelial and urethelial tumors were observed Considered to be possibly carcinogenic to humans, group C by the US	Mice, 180 days, oral (194 mg/kg) Results: no reproduction effects were observed. Pregnant mice, rats and rabbits (during organogenesis), oral (up to 0,6g/kg) Result:no feototoxic or teratogenic effects	HSDB[251]
56038-13-2	Sucralose		rat, oral: NOEL of 1500 mg/kg bw In a study on rats it was concluded that the animals avoided food with high concentrations of sucralose. No other adverse effects were observed in this study	Neither sucralose nor its chlorine containing primary degradation products, 4-CG and 1,6-DCF, were found to be mutagenic.		Teratology studies with rats and rabbits showed no adverse developmental effects.	IVL[252]
53850-34-3	Taumatin		Rat and dog, oral, 13 weeks Results: Readily digested prior to absorption in rats and no adverse effects.	The lack of mutagenic potential was confirmed in bacterial mutagenic assays with Salmonella typhimurium TA1535, TA1537, TA98 & TA100 and Escherichia coli WP			HSDB[253]

20702-77-6	Neohesperidindihydrochalcon/neohesperidin DC						
585-88-6	Maltitol, maltitolsirap						
585-86-4	Lactitol	rat LD50> 10000 mg/kg bw rabbit LD50> 4500 mg/kg bw	rat, oral,90 days NOAEL = 2500 mg/kg bw	Mammalian cell gene mutation assay, tested on human lymphocytes, Result: negative. It was concluded that Lactitol did not show any clastogenic activity in human lymphocytes treated in vitro.	rat, oral , 130 weeks The results indicate that feeding lactitol may result in changes similar to those obtained on feeding lactose. Mouse, oral , 2 years Showed neither carcinogenic nor toxic properties.	Rat, oral feed, three successive generations It was concluded that lactitol administered in the diet to rats at levels of up to 10%,has no adverse effects on reproductive performance in either sex. Rat,female, oral feed,21 days of gestation. Results showed no adverse effects. NOAEL Maternalt. > 10 % NOAEL Teratogen. > 10 %	ECB[254]
87-99-0	Xylitol						
149-32-6	Erytritol	Oral Dog LD 50 > 5g/kg bw Rat, male LD 50 = 13.1 g/kg bw Rat, female LD 50 = 13.5 g/kg bw	Rat, oral, 28-day Result: evidence of a diuretic effect Dog, oral, 1year (10% diet) Result: did not cause any overt signs of toxicity	Rat, oral, 2 year (10% diet) Result: Increased nephrocalcinosis, and pelvic nephrocalcinosis (pelvic epithelial mineralisation) in females. Did not affect survival and had no carcinogenic effect.	Ames test, Salmonella typhimurium Result: negative Chromosome aberration assay, Chinese hamster fibroblast cells Result: negative	Results of three studies indicate that erythritol even at high doses has no adverse effects on fertility or on the developing foetus.	EU food comitee [255]

2E: SWEETENERS: SPECTRAL PROPERTIES

(Source: HSDB)

CAS nr.	Substance Name	index of reflection	Mass	IR	UV	1H NMR	other
50-70-4	Sorbitol, sorbitolsirap D-glucitol, D-sorbitol	1.3330 at 20 deg C		200		9664	Max absorption (water): less than 220 nm; Sadtler ref number: 991 (IR, Prism)
69-65-8	Mannitol D-mannitol	1,3330		6403		8046	Specific optical rotation: -0.49 deg at 25 deg C/D (water)
55589-62-3	6-methyl-1,2,3-oxathiazin-4(3H)-one 2,2-dioxide, potassium salt Acesulfamkalium/acesulfam-KE						
22839-47-0	Aspartame						Specific optical rotation: -2.3 deg at 22 deg C/D (1 N HCl)
100-88-9	N-cyclohexylsulphamic acid	1.548 (monoclinic) 1.550 (triclinic), 1.559 (orthotroombic at 20C)		889			
64519-82-0	Isomalt						

81-07-2	1,2-benzisothiazol-3(2H)-one 1,1-dioxide saccharin		4335	5038	15734	6667	Max absorption (0.1 N NAOH): broad peak at 267.3 NM (E= 1570) Sadler reference number: 322 (IR, prism); 110 (IR, grating)
56038-13-2	1,6-dichloro-1,6-dideoxy-β-D-fructofuranosyl 4-chloro-4-deoxy-α-D-galactose						
53850-34-3	Proteins, thaumatins						Max absorption: 278 nm (ph 5.6); 283, 290 nm (ph 13.0)
20702-77-6	1-[4-[[2-O-(6-deoxy-α-L-mannopyranosyl)-β-D-glucopyranosyl]oxy]-2,6-dihydroxyphenyl]-3-(3-hydroxy-4-methoxyphenyl)propan-1-one Neohesperidin Dihydrochalcone						
585-88-6	4-O-α-D-glucopyranosyl-D-glucitol Maltitol, maltitolsirap						
585-86-4	4-O-β-D-galactopyranosyl-D-glucitol Lactitol						
87-99-0	xylitol						
149-32-6	erythritol						

3A: METABOLITES: PHYSICO-CHEMICAL PROPERTIES

Cas nr	**Substance Name**	**Molecular weight (g/mole)**	**melting point (ree celsius)**	**boiling point (ree celsius)**	**density (g/cm3)**	**Vapour pressure (hPa or mmHg)**	**log Kow**	**water solubility (mg/l or g/l)**	**ref**
108-91-8	cylcohexylamine	99,18	(-17.7 C	134.5 C at 760 mm Hg	0.8647 at 25 C	10,1 mm Hg at 25 C	log Kow = 1,49	Miscible with water	HSDB[256]
111-76-2	2-butoxyethanol		-74.8°C	171°C	0.9 at 20°C	0.9 at 20°C	0.9 at 20°C	measured: 1.106 mg/L	ECB[257]
124-04-9	adipic acid	146,14	152 C	330.5 C at 1013 hPa	1.34 g/cm3 at 15 C	0,097 hPa at 18,5 C 0,00056 hPa at 85 C	Measured= 0,08 Estimated (software)= –0,104	15 g/l at 20 C 24 g/l at 25 C	ECB[258]
149-57-5	2-ethylhexanoic acid	144,22	ca. –59 C	228 C at 1013 hPa	0,906 g/cm3 at 20 C	0,04 hPa at 20 C	2,64	2 g/l at 20 C	ECB[259]
104-76-7	2-ethylhexanol	130,22	–76 – 70 C	183,5 – 185 C at 1013 hPa	0,83 g/cm3 at 20 C	0,4 hPa at 20 C 2,9 hPa at 50 C	3,1	1 g/l at 20 C	ECB[260]

3B: METABOLITES: ENVIRONMENTAL FATE

Cas nr	Substance Name	Persistence				Bioaccumulation	ref
		Atmosphere	Soil	Hydrosphere	Biodegradation		
108-91-8	cylcohexylamine	Expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase is degraded by reaction with photochemically-produced hydroxyl radicals: T1/2= 7 hr	Expected to have high mobility in soil. Protonated form of cyclohexylamine will be the dominant species in moist soil surfaces and cations generally adsorb more strongly to soils than their neutral counterparts. Volatilization from moist soil surfaces is not an important fate process. Volatilization from dry soil surfaces may exist. Biodegradation is expected to occur in soils.	Cyclohexylamine as the free base is not expected to adsorb to suspended solids and sediment. The protonated form of cyclohexylamine will be the predominant species in water and cations generally adsorb more strongly than their neutral counterparts. Volatilization from water surfaces is not an important fate process. Biodegradation is expected to occur.	Incubation in acclimated sewage inoculum, plant sludge and river mud, over 14 days (10 mg/l): Degradation= 100% theoretical BOD Incubation over 14 days: The theoretical BOD of cyclohexylamine (50 mg/l) was 79%, 68 % and 0% in an acclimated sewage inoculum, plant sludge and river mud respectively. A 200 mg/l sample of cyclohexylamine could not be biodegraded by an activated sludge and was assumed to be toxic to the microflora.	Estimated BCF= 3	HSDB[261]

111-76-2	2-butoxyethanol	Expected to exist almost entirely in the vapour phase Reactions with photochemically produced hydroxyl radicals: Estimated T1/2= 16,7 hr Photooxydation: Estimated T1/2= 3,3-32,8 hr Direct photolysis in the atmosphere is not expected to occur. Estimated T1/2 air= 13 hr Predicted distribution in air: 0,24%	Biodegradation in soil: Estimated T1/2=30 days Predicted distribution in soil: 0,55% (1) Expected to have high mobility in soil (2) Volatilization from moist soil surfaces may occur and is expected to be slow from dry soil surfaces. (2)	Alcohols and ethers are generally resistant to hydrolysis. Biodegradation in marine water: Estimated T1/2= 50 days Biodegradation in freshwater: Estimated T1/2= 15 days Biodegradation in sediment: Estimated T1/2= 300 days (1) May volatilize from water surfaces. T1/2 (model river)= 25 -185 days(depending on the flow and wind velocity). (2) Predicted distribution in water: 99,20% Predicted distribution in sediment: 0,01% (1)	Biodegradation: Studies show that after 14 days, Biodegradation >70% Readibly biodegradable (1) Biodegradation in activated sludge: Estimated T1/2= 0,7 hours (1)	Estimated BCF= 3 (2) BCF fish = very low (1)	(1) ECB[262] (2) HSDB[263]
124-04-9	adipic acid	Will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals. T1/2= 2,9 days Particulate-phase may be physically removed from the air by wet and dry deposition. (2)	Expected to have very high mobility in soil. Volatilization from moist or dry soil is not expected to be important. Is readily biodegradable. (2)	Not expected to adsorb to suspended solids and sediment in water. Nnot expected to volatilize from water surfaces. Volatilization of the ionized form from water surfaces is not expected to be an important fate process. Is readily biodegradable. (2)	Aerobic activated sludge, 5 day, Degradation > 90 % Aerobic domestic sewage, 28 day Degradation=100 % (1)	estimated BCF = 0,68 (2)	(1) ECB[264] (2) HSDB[265]

149-57-5	2-ethylhexanoic acid	Expected to exist solely as a vapor in the ambient atmosphere, degraded by reaction with photochemically-produced hydroxyl radicals: T1/2= 2 days (2)	Expected to have low mobility in soil. Volatilization from moist soil surfaces is expected to be a slow fate process and not expected from dry soil. Biodegradation in river sediment: T1/2= 5 days (2)	Expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is not expected. Biodegradation in river sediment: T1/2= 5 days Biodegradation may be an important environmental fate process in water (2)	Aerobic, activated sludge, 28 day (EEC Directive 79–831, Annex V) Degradation = 39 % Aerobic, activated sludge, 5 day Degradation > 95 % after (1)	BCF (fish)= 3 (2)	(1) ECB[266] (2) HSDB[267]
104-76-7	2-ethylhexanol	Will occur in the atmosphere primarily as a vapor. Reacts with photochemically-produced hydroxyl radicals: T1/2= 1,2 days May also be washed out of the atmosphere by rain. (2)	Highly mobile in soil. Some volatilization may occur from both dry and moist soil. Expected to biodegrade in soil. (2)	Volatilization may be significant: T1/2 (model river)= 1,7 days Adsorption to sediment will not be an important fate process. Expected to biodegrade in water. (2)	aerobic activated sludge, 17 day Degradation = 55 % activated sludge, industrial, non–adapted, 5 day Degradation > 95 % activated sludge, non–adapted, BOD5–20 fresh and sea water. Results: Fresh water Sea water BOD5=26% BOD5=58% BOD10=75% BOD10=64% BOD15=78% BOD15=84% BOD20=86% BOD20=100% (1)	Calculated BCF= ca. 27 (1)	(1) ECB[268] (2) HSDB[269]

3C: METABOLITES: TOXICITY IN AQUATIC ORGANISMS

Cas nr	Substance Name	Toxicity in fresh water species		Toxicity in marine species (species, time)		Ref
		acute	chronic	acute	chronic	
108-91-8	cylcohexylamine	Fish: Brachydanio rerio: LC50 96hr= 470 mg/l Leuciscus idus: LC50 48hr= 58 mg/l Oncorhynchus mykiss LC50 96hr= 44 – 90 mg/l Oryzias latipes: LC50 48hr= 54 mg/l Daphnia magna: EC50 24hr= 49 mg/l Algae: Microcystis aeruginosa : TT (toxic threshold)8 day = 0,02 mg/l Scenedesmus quadricauda: TT (toxic threshold)8 day = 0,51 mg/l Selenastrum capricornutum: EC50 96hr= 20 mg/l				ECB

111-76-2	2-butoxyethanol	Poecilia reticulate: LC 50 7 days= 983 mg/l Lebistes reticulatus: LC 50 96 hr = 1400 mg/l Oncorhynchus mykiss: LC 50 96 hr = 1474 mg/l Lepomis macrochirus: LC 50 96 hr = 1490 mg/l Leuciscus idus melanotus: LC 50 48 hr = 1395-1575 mg/l Carassius auratus: 24 hours LC 50 7 days= 1700 mg/l Leuciscus idus: LC 50 48 hr = 1880 mg/l Pimephales promelas: LC 50 96 hr = 1880 mg/l Lepomis macrochirus: LC 50 96 hr= 127 mg/l Crassostrea virginica (oyster) LC50 96 hr = 80,5 mg/l	Brachydanio rario NOEC 21 days > 100 mg/l Neither mortality nor endocrine disruption effect was observed Daphnia magna EC50 21 days= 297 mg/l Ceriodaphnia dubia EC10 7 days= 134,.9 mg/l	Menidia beryllina: LC 50 96 hr= 1125 mg/l Fundulus heteroclitus: LC 50 96 hr= 6,7 mg/l NOEC 96 hr = 4 mg/l Cyprinodon variegatus: LC 50 96 hr= 116 mg/l		ECB[270]

124-04-9	adipic acid	Brachydanio rerio: LC096 hour >= 1000 mg/l Leuciscus idus LC5096 hr= 230 mg/l NOEC= 147 mg/l Pimephales promelas LC5096 hr= 97 mg/l Salmo gairdneri LC5096 hr= 11976 mg/l Pimephales pomoxis LC5096 hr= 10287mg/l Daphnia magna EC024 hr= 62,5 EC50 24hr= 85,7 Scenedesmus subspicatus EC5096 hr= 26,6mg/l				ECB[271]
149-57-5	2-ethylhexanoic acid	Cyprinus carpio (force feed) NOEL >= 117mg/kg bw Lepomis gibbosus LC0 48 and 96hr = 160 mg/l LC50 48 and 96hr = 270 mg/l Salmo gairdneri LC048 and 96hr = 125 mg/l LC5048 and 96hr = 180 mg/l Daphnia magna EC048hr = 62,5 mg/l EC5048hr = 85,4 mg/l Scenedesmus subspicatus EC50 96hr = 41 mg/l				ECB[272]

104-76-7	2-ethylhexanol	Cyprinus carpio LC043hr= 96 – 144 mg/l Pimephales promelas LC5096hr= 27 – 29,5 mg/l Oncorhynchus mykiss LC50 5days = 24 mg/l Oncorhynchus mykiss LC5096 hr > 7,5 mg/l Cyprinus carpio LC0 43 hr= 96 – 144 mg/l Leuciscus idus melanotus NOEC 96 hr = 14 mg/l LC5096 hr = 17,1 mg/l Salmo gairdneri LC5096 hr= 32 – 37 mg/l Daphnia magna EC5048 hr= 39 mg/l Daphnia magna EC5024 hr= 26 mg/l Artemia salina EC5024 hr = 19 mg/l Scenedesmus subspicatus (Algae) EC50 72 hr= 11,5 mg/l				ECB[273]

3D: METABOLITES: TOXICITY IN MAMMALS

Cas nr	Substance Name	acute	chronic	Mutagenicity	Carcinogenicity	Reprotoxicity	Ref
108-91-8	cylcohexylamine	Oral: Rat, male: LD50= 278 mg/kg Rat,female: LD50= 156 mg/kg Rat, female,pregnant: LD50= 180 mg/kg Mouse: LD50= 224 mg/kg bw Rat,14 or 21 days: LD50= 11 mg/kg symptoms of toxicity: reduced appetite and activity, increasing weakness, collapse, death; liver and/or lung hyperemia, acute gastrointestinal inflammation Inhalation: Rat,4 hours LD50>0,7 mg/l Rat: LD50= 7.5 mg/l Mouse: LD50= 1,07 mg/l Rabbit,4 hours LD50>0,7 mg/l Guinea pig,1 hour: LD50> 1,5 mg/l Dermal: Rabbit: LD50= 208 – 372	Rabbits, guinea pigs, and rats, inhallation, 7 hr/day, 5 days/wk Inhalation. Results: At 1200 ppm, all animals except one rat showed extreme irritation and died after a single exposure. Fractional mortality occurred after repeated exposure at 800 ppm. At 150 ppm, four of five rats & two guinea pigs survived 70 hr of exposure, but one rabbit died after 7 hr. The chief effects were irritation of the respiratory tract and eye irritation with the development of corneal opacities. rabbits, guinea pigs, & rats, 82 days in drinking water results: pathological findings or weight loss (2)	Rats, IP Results: Dose-dependent increase in chromosomal breaks. Authors considered this indicative of potential carcinogenic, mutagenic or teratogenic activity. Induced chromosome aberrations in lymphocytes of chinese hamsters. Mutagenicity tests in Salmonella typhimurium strains (TA1535, TA1537, TA97, TA98, & TA100) Results: negative (2)	Not classifiable as a human carcinogen (2)	Mice, multigenerational study, oral: Results: significant decrease in the number of implantation sites and in the number of liveborn fetuses as well as an increased perinatal mortality and a significant reduction in weight. Monkeys, 4 days during the phase of organigenesis Results: No significant teratogenic or embryotoxic effects. Mice, female, pregnant, 5 days: Results: no substance-related teratogenic effects other than growth retardation. Dog and rat: Results: reduced counts of pachytene spermatocytes and of early and late spermatides. Reversible effect in dogs but not rats Rat, oral, 2years: Results: testicular atrophy & tubules with fewer spermatids. Rats and mice, 13 weeks, oral: Results: testicular atrophy in rats but not in mice. (2)	(1) ECB (2) HSDB[274]

		mg/kg bw (1)					
111-76-2	2-butoxyethanol	Oral Rat LD50 = 1,48 g/kg Mouse LD50= 1,2 g/kg Rabbit LD50 = 0,32 g/kg Guinea pig LD50 = 1,2 g/kg Dermal: Rabbit LD50 = 400 mg/kg Inhalation: Rat, male, 4 hr LC50= 486 ppm Rat, female, 4 hr LC50= 450 ppm Mouse, 7hr LC50 = 700 ppm	Rat, Mouse Haemolysis sometimes associated with hepatic effects. Inhalation NOAEC = 121 mg/m3 Slight effects on the immune system were seen in rats, mice and humans. Rats, oral, 13 week LOAEL male = 69 mg/kg/day LOAEL female = 82 mg/kg/day	Ames test, Salmonella typhimurium Results: positive in one strain (TA97a) Test Escerichia coli WP2uvrA Results:negative Chinese hamster ovary, CHO cells Result: negative Gene mutation, Chinese hamster lung V79 cells, Results: positive Sister chromatid exchange, human lymphocytes Result: positive Cell transformation, Syrian hamster embryocells, focus assay Result: positive	Mouse: Result: tumourigenicity, an increased incidence of haemangiosarcomas in males and squamous cell papillomas or carcinomas in females NOAEC = 125 ppm	No specific effects on fertility. NOAEL = 720 mg/kg (continuous breeding, effects seen at the higher dose tested are certainly due to general toxicity) Developmental toxicity: studies did not demonstrate any teratogenic potential, but foetotoxicity and embryotoxicity (lethality and resorptions) were often observed in relation with maternal toxicity (regenerative haemolytic anaemia). Other effects seen on foetuses were an increase in the incidence of skeletal variations. *In vitro* studies showed some adverse effects on development Effects seen in foetuses are certainly related to maternal toxicity.	ECB[275]
124-04-9	adipic acid	Oral: Rat: LD50= 940 mg/kg bw Mouse: LD50= 1900 mg/kg bw Inhalation: Rat, 4 hours: LD50 > 7,7 mg/l		Ames test (Salmonella typhimurium) Result: negative Cytogenetic assay, human fibroblasts (WI–38) Result: negative Escherichia coli reverse mutation assay Result: negative Yeast gene mutation assay, Saccharomyces cerevisiae D–3 Result: negative		rat,female, esposure 6.–15. day of gestation, oral, (up to 288 mg/kg) Result: No clearly discernible effect on nidation or on maternal or fetal survival, the number of abnormalities in soft and skeletal tissues did not differ from the number occurring in the controls.	ECB[276]

149-57-5	2-ethylhexanoic acid	Oral: Rat LD50= 2043 mg/kg bw Inhalation: Rat, 6 hr LD50= 2,36 mg/l Guinea pig, 6 hr LD50 > 2,39 mg/l Dermal: Rat LD50 > 2000 mg/kg bw Rabbit LD50= 1260 mg/kg bw Guinea pig LD50= 4550 mg/kg bw	Rat, male, oral, 3 weeks (dose:1000 mg/kgbw) Result: highly increased liver weights and highly increased peroxisome proliferation and activities of liver catalase and carnitine acetyltransferase.	Ames test, Salmonella typhimurium Result: negative Gene mutation assay, Echerischia coli (WP2uvrA) Result: negative Cytogenetic assay, CHO–Zellen **Result: positive** Sister chromatid exchange assay, human lymphocytes **Result: ambiguous, considered positive by the author**		Rat, female, oral, day 6–19 of gestation (up to 600 mg/kg bw) NOAEL Maternalt. = 300 mg/kg bw NOAEL Teratogen. = 100 mg/kg bw Results: Slightly fetotoxic as indicated by a 5–8% decrease in the mean fetal body weight at the higher doses. No treatment related effects were observed in the number of implantations or live fetuses. At a dose of 100 mg/kg and above: skeletal malformations), while the development of visceral tissue was less affected. The number of affected fetuses increased in a dose dependent way. Rat, female, oral, day 6 – 15 of gestation (up to 500 mg/kgbw/day NOAEL Maternalt.: = 250 mg/kg bw NOAEL Teratogen.: = 500 mg/kg bw Result: In mothers symptoms such as hypoactivity, ataxia, irritating effects to the eyes were observed at the highest dose. Fetal toxicity occured as reduced fetal weights and increased resorptions at the highest dose level. At 250 mg/kg or higher slight, fetal toxicity was seen as reduced skeletal ossification. No significant increase in malformations or variations was seen at any dose level. Rabbit, female, oral, day 6 – 18 of	ECB[277]

						gestation (up to 250 mg/kgbw) NOAEL Maternalt.: = 25 mg/kg bw NOAEL Teratogen.: = 250 mg/kg bw Result: In each of the two high dose groups, one animal died. At 125 mg/kg one animal had an abortion. In addition, slight maternal toxicity was seen at 250 mg/kg as reduced weight gain, food consumption and hypoactivity. There were no adverse effects on fetal viability, growth or morphology at any dose level.	

						gestation (up to 250 mg/kgbw) NOAEL Maternalt.: = 25 mg/kg bw NOAEL Teratogen.: = 250 mg/kg bw Result: In each of the two high dose groups, one animal died. At 125 mg/kg one animal had an abortion. In addition, slight maternal toxicity was seen at 250 mg/kg as reduced weight gain, food consumption and hypoactivity. There were no adverse effects on fetal viability, growth or morphology at any dose level.	

3E: METABOLITES: TOXICITY IN OTHER SPECIES

Cas nr	Substance Name	acute	chronic	Reprotoxicity	Ref
108-91-8	cylcohexylamine	Bacteria: activated sludge: EC50 3hr= 2152 mg/l Escherichia coli: EC0 24hr= 500 mg/l Pseudomonas fluorescens: EC0 24hr= 500 mg/l Pseudomonas putida: TT 16hr= 420 mg/l Protozoa: Entosiphon sulcatum: TT 72hr = 0,69 mg/l Uronema parduczi: TT 20hr > 200 mg/l Chilomonas paramecium: TT 48hr > 400 mg/l (, 48 h) Tetrahymena pyriformis: EC50 24hr = 210 mg/l			ECB
111-76-2	2-butoxyethanol				
124-04-9	adipic acid	Pseudomonas putida (aquatic Bacteria) EC50 17hr= 91,9 mg/l			ECB[279]
149-57-5	2-ethylhexanoic acid	Pseudomonas putida (Bacteria) EC10 17hr = 72 mg/l EC50 17hr = 110 mg/l			ECB[280]
104-76-7	2-ethylhexanol	Pseudomonas putida (aquatic Bacteria) EC10 18 hr = 540 mg/l			ECB[281]

3F: METABOLITES: SPECTRAL PROPERTIES

(Source: HSDB)

Cas nr	**Substance Name**	**index of reflection**	**Mass**	**IR**	**UV**	**NMR**	**other**
108-91-8	cylcohexylamine	1,4565 at 25 C	NIST 27855	SAD 845		SAD 6937	
111-76-2	2-butoxyethanol	1,4198 at 20C		1052		4023	Intense mass spectral peaks: 57 e/m (100%), 45 e/m (38%), 29 e/m (35%) 41 m/z (31%), 87 m/z (16%) Sadtler ref nr.: 2292 (IR, PRISM); 10979 (IR, GRATING
124-04-9	adipic acid		821	281			Intense mass spectral peaks: 55 m/z (100%), 41 m/z (55%), 100 m/z (46%), 45 m/z (37%)
149-57-5	2-ethylhexanoic acid	1,4241 at 20C	46659	4826		7293317	
104-76-7	2-ethylhexanol	1,4300 at 20C	271	10974	98		INDEX OF REFRACTION: 1,4300 at 20 C Intense mass spectral peaks: 57 m/z (100%), 43 m/z (41%), 41 m/z (40%), 55 m/z (28%)

H: MONITORING DATA IN THE NORDIC COUNTRIES

Nordic Study	Country	Location of sampling	Matrix	Results	unit
Swedish Environmental Research institute, 2007, Results from the national screening programme 2006, subreport 1: phtalates	Sweden	Råø, Gislavad, Stenungsund, Stockholm	air	factor 2-20 lower than DEHP	
		Øvre skærsjøoen, Lilla Øresjøen, Krageholmsjøen, Stora essingen, Årstaviken, Riddarfjorden, Stenungsund A5, Stenungsund, A8, Stenungsund F2, Stenungsund A1, Stenungsund D7, Stenungsund E1	sediment	ND	
			biota	ND	
		Askersund, Skebäck, Llindesberg, Aggerud, Tivoliverket, Bodum, Vik, Säffle, Fiskartorpet, Sjöstad, Ellinge, Bollebygd, Henriksdal, Nolhaga, Floda, Ryaverket	sludge	N/A	
Swedish Environmental Research institute, 2005, Results from the national screening programme 2004, subreport 1: adiapates	Sweden	Högbytorp	freshwater	370	µg/l
		Gislavad	sludge	300	µg/kg dw
		Gotlandsdj., Ö Öland, Norrköpingsdj., Landsortdj., Gälnan, Stenungsund 1-3, Gislavad downst., Gislavad upst, Gislavad eff. Sicklasj@ën, Laduviken, Drevviken, Strömmen, Riddarfjärden, Fjäderholmarna	sediment	ND-5000	µg/g dw
		Fladen, Ängsskärsklubb, Landsort, Utlängen, Väderöerna, Storöfjärden, Gislavad 1-3, Stenungsund F,M and J	biota	ND-33	ng/g fw
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005	Denmark	STP, inlet, medium values	freshwater	0,59	µg/l
		STP, outlet, medium values	freshwater	0,02	µg/l
		STP, sludge, medium values	sludge	0,2	µg/kg TS

Monitoring of paraffin waxes and Hydrocarbon waxes, chloro (LCCP), CAS: 63449-39-8

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	7,8-32	µg/g dw

Monitoring of alkanes, C14-17, chloro (MCCP) , CAS:85535-85-9

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	1,4-9,3	µg/g dw
NIVA, 2006, Kartlegging av utvalgte nye organiske miljøgifter -bromerte flammehemmere, klorerte parafiner, bisfenol A og triclosan	Norway	Okstadbrinken, Røyken, Gålås, Bladdastjernet, Støleheia, Hunnselva, Tangen	sediment	9,9-47000	ng/g dw
		Losna, Mjøsa, Drammenselva, Indre Drammensfjord	sediment	0,8-7500	ng/g dw
		Mjøsa, Vorma, Øyeren, Drammensfjorden	biota	ND	
		Mjøsa, Vorma, Øyeren, Drammensfjorden	biota	ND	
		Drammensfjorden 1-4, Tønsberg, Lista, Trondheim, Tromsø	sediment	2,1-7500	ng/g dw
		Færder 1-2, Lisa 1-2, Sotra 1-2, Svolvær 2, Varangerfjorden	biota	ND	
		Færder 1-2, Lisa 1-2, Sotra 1-2, Svolvær 2, Varangerfjorden	biota	ND	
		Færder, Drammensfjorden, Lista, Svolvær, Varangerfjorden	biota	ND in ww	
		Færder, Drammensfjorden, Lista, Svolvær, Varangerfjorden	biota	ND in lipid	
NGI, 2005, Contaminants in the Drammen waterway 2005, ISBN 82-7655-271-4	Norway	Jernbanebru, Vektergården, Solbergelva, Mjøndalsbrua, Solberg spinneri, Miletjern, Loselva, Åmot, Skreiner, Aass bryggeri, Brakerøya, Hansteins gate, Tollbodkaia, Kanalen	sediment	ND	
		Miletjern, utløp fragmenteringsanlegg	freshwater	49,7 - 1490	ng/l
NILU, 2002, Kartlegging av bromerte flammehemmere og klorerte parafiner, ISBN 82-425-1411-9	Norway	STP: Støleheia, Heftingsdalen, Grinda, Lindum, Grønmo, Øra	sediment	2700 11400	ng/g ww
NIVA, 2009, Kartelegging av miljøgifter i Alna og Akerselva	Norway	Alna, Akerselva	sediment	1-830	ng/g dw

Monitoring of bis(2-ethylhexyl) phthalate, CAS:117-81-7

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	40-250	mg/kg dw
Swedish Environmental Research institute, 2007, Results from the national screening programme 2006, subreport 1: phtalates	Sweden	Råø, Gislavad, Stenungsund, Stockholm	air	0,5-3	ng/m3
		Øvre skærsjøoen, Lilla Øresjøen, Krageholmsjøen, Stora essingen, Årstaviken, Riddarfjorden, Stenungsund A5, Stenungsund, A8, Stenungsund F2, Stenungsund A1, Stenungsund D7, Stenungsund E1	sediment	ND-2800	µg/kg dw
		N/A	biota	ND-26	µg/kg fw
		Askersund, Skebäck, Llindesberg, Aggerud, Tivoliverket, Bodum, Vik, Säffle, Fiskartorpet, Sjöstad, Ellinge, Bollebygd, Henriksdal, Nolhaga, Floda, Ryaverket	sludge	35000-80000	µg/kg dw
Screening of priority substances in finland (veska-project)	Finland	Espoo, Helsinki, Hyvinkää, Joensuu, Jyväskylä, Kemi, Kotka, Lahti, Lappeenranta, Lohja, Oulu, Pori, Porvoo, Tampere, Äänekoski	sediment	ND - 1861	µg/kg dw
			biota	ND - 40	µg/kg fw
Havnarvág 2002 – ein kanning av dálkingarstøðuni á Havnarvág og Yviri við Strond á sumri 2003	Faraoe Islands	Fjallavatn, fjallavatn, Sørvágs Leitisvatn,	freshwater	0,061-2,2	mg/kg

University of Jyväskylä, 2008, Monitoring of phthalates in surface waters, Finland 2006-2008	Finland	SAIMAA HAUKISELKÄ, KYMIJOKI AHVENKOSKI, Kymij Huruksel, VUOKSI VASTUUPUOMI, Vantaa, Mustionjoki, Porvoonjoki, AURA, OHIKULKU, KOJO, Vatianjärvi, Kapeenkoski, OULUJOKI, OULUJOKI, NOKIANKOSKI, ALAVIRT, Pyhäjä, Lehtisaari	freshwater	ND-180	µg/l
Bioforsk 2009. Bestemmelse av utvalgte tradisjonelle og nye organiske miljøproblemstoffer i sigevann fra ISI avfallsfylling og i innløpsvann til VEAS, Eggen, T., Møder, M.	Norway	MSWD leachate, ISI, Bærum, waterphase	freshwater	150,1	ng/l
		MSWD leachate, ISI, Bærum, particlephase	freshwater	103	ng/l
		STP, VEAS, inlet, waterphase	freshwater	228,3-1477,3	ng/l
		STP, VEAS, inlet, particle phase	freshwater	2499,4-3413,9	ng/l
Stockholm Stad 2007. Bjørklund, K., Malmqvist, P., Strømvall, A. Kallor till och fløden av ftalater och nonylfenoler i Stockholms dagvatten.	Sweden	Urban runoff, Skarpnack,	freshwater	ND-1,7	µg/l
		Urban runoff, Nybohov	freshwater	ND	
		Urban runoff, Gårda, Inlet	freshwater	ND-5	µg/l
		Urban runoff, Gårda, outlet	freshwater	ND	
SFT, 2009, Screening of new contaminants in samples from the Norwegian Arctic: Silver, Platinum, Sucralose, Bisphenol A, Tetrabrombisphenol A, Siloxanes, Phtalates (DEHP), Phosphororganic flame retardants, TA-2510/2009, ISBN 978-82-449-0065-2	Norway	Fjord sediment Kongsfjorden, Liefdefjorden,	sediment	ND	
		Atlantic cod and Polar cod (liver and whole body) Kongsfjorden, Liefdefjorden, Moffen, Billefjorden	biota	ND - 293	ng/g ww
		Seabirds: Kittiwake and Eider Kongsfjorden, Liefdefjorden,	biota	ND-155	ng/sample
Danmarks Miljøundersøgelser (DMU), 2007, Vandløb 2006: NOVANA, Faglig rapport fra DMU nr. 642, 2007, ISSN (elektronisk): 1600-0048	Denmark	STP: Gudenå Skjern Å Bygholm å Odense å Tryggevælde å	freshwater	0,5	µg/l

Danmarks Miljøundersøgelser (DMU),2006, Miljøfremmede stoffer og tungmetaller i vandmiljøet: Tilstand og udvikling, 1998-2003., Faglig rapport fra DMU nr. 585, ISSN (elektronisk): 1600-0048	Denmark	STP: average concentration between 1998-2003	freshwater	1,8	µg/l
SFT, 2009, Screening of selected priority substances of the Water Framework Directive in marine samples 2004 - 2008	Norway	Steilene, Færder, Lista, Sotra, Skrova, Varangerfjorden	Saltwater	ND	
SFT, 2007, Kartlegging av metaller og utvalgte nye organiske miljøgifter 2006 (TA-2284/2007).	Norway	Mårvatn, Dargesjå, Mjøsa, Randsfjorden, Austdalsvatn, Storefjord, Vanemfjorden	sediment	94,4 - 353	ng/g dw
		Mårvatn, Dargesjå, Mjøsa, Randsfjorden, Austdalsvatn, Storefjord, Vanemfjorden	biota	61,2 - 4483	ng/g ww
SFT, 2007, Kartlegging av metaller og utvalgte nye organiske miljøgifter 2006 (TA-2284/2007).	Norway	Bekkelagsbassenget, Eidangerfjorden, Frierfjorden, Indre Oslofjord, Kristiandsandsfjorden, Lofoten, Malangen, Sognefjorden, Varangerfjorden, Langesundsfjorden, Gangstøvika	sediment	73,5 - 339	ng/g dw
		Croftholmen, Gjemesholmen, Helgeroa, Risøyodden, Strømtangen, Ormøya, Eiterheimsnesset, Færder, Espevær	biota	71,9 - 16940	ng/g ww
		Kristiansand, Lofoten, Indre Oslofjord, Sognefjorden, Tromsø, Varanger, Åleseund	biota	197 - 55724	ng/g ww
NIVA, 2009, Kartelegging av miljøgifter i Alna og Akerselva	Norway	Alna, Akerselva	sediment	182-862	ng/g dw
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005 http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-865-3/pdf/87-7614-866-1.pdf	Denmark	STP, inlet, medium values	freshwater	9,03	µg/l
		STP, outlet, medium values	freshwater	1,93	µg/l
		STP, sludge, medium values	sludge	20,97	µg/kg TS

Monitoring of dioctyl phthalate, CAS:117-84-0

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	ND - 1	mg/kg dw
Havnarvág 2002 – ein kanning av dálkingarstøðuni á Havnarvág og Yviri við Strond á sumri 2004	Faraoe Islands	Fjallavatn, fjallavatn, Sørvágs Leitisvatn,	freshwater	ND - 0,22	mg/kg
Stockholm Stad 2007. Bjørklund, K., Malmqvist, P., Strømvall, A. Kallor till och fløden av ftalater och nonylfenoler i Stockholms dagvatten.	Sweden	Urban runoff, Skarpnack,	freshwater	ND-0,16	µg/l
		Urban runoff, Nybohov	freshwater	ND	
		Urban runoff, Gårda, Inlet	freshwater	ND	
		Urban runoff, Gårda, outlet	freshwater	ND	
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005 http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-865-3/pdf/87-7614-866-1.pdf	Denmark	STP, inlet, medium values	freshwater	0,19	µg/l
		STP, outlet, medium values	freshwater	ND	µg/l
		STP, sludge, medium values	sludge	0,15	µg/kg TS

Monitoring of benzyl butyl phthalate, CAS:122-62-3

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	ND- 0,39	mg/kg dw

Monitoring of di-"isodecyl" phthalate, CAS:26761-40-0

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	ND	
Swedish Environmental Research institute, 2007, Results from the national screening programme 2006, subreport 1: phtalates	Sweden	Råø, Gislavad, Stenungsund, Stockholm	air	0,3-5,5	ng/m3
		Øvre skærsjøoen, Lilla Øresjøen, Krageholmsjøen, Stora essingen, Årstaviken, Riddarfjorden, Stenungsund A5, Stenungsund, A8, Stenungsund F2, Stenungsund A1, Stenungsund D7, Stenungsund E1	sediment	ND-3400	µg/kg dw
		N/A	biota	ND	
		Askersund, Skebäck, Llindesberg, Aggerud, Tivoliverket, Bodum, Vik, Säffle, Fiskartorpet, Sjöstad, Ellinge, Bollebygd, Henriksdal, Nolhaga, Floda, Ryaverket	sludge	15000-50000	µg/kg dw
Stockholm Stad 2007. Bjørklund, K., Malmqvist, P., Strømvall, A. Kallor till och fløden av ftalater och nonylfenoler i Stockholms dagvatten.	Sweden	Urban runoff, Skarpnack,	freshwater	ND-0,84	µg/l
		Urban runoff, Nybohov	freshwater	0,77-3,0	µg/l
		Urban runoff, Gårda, Inlet	freshwater	ND-17	µg/l
		Urban runoff, Gårda, outlet	freshwater	ND-1,9	µg/l

Monitoring of di-"isononyl" phthalate, CAS:28553-12-0

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	ND	
Swedish Environmental Research institute, 2007, Results from the national screening programme 2006, subreport 1: phtalates	Sweden	Råø, Gislavad, Stenungsund, Stockholm	air	0,3-1,1	ng/m3
		Øvre skærsjøoen, Lilla Øresjøen, Krageholmsjøen, Stora essingen, Årstaviken, Riddarfjorden, Stenungsund A5, Stenungsund, A8, Stenungsund F2, Stenungsund A1, Stenungsund D7, Stenungsund E1	sediment	ND - 3200	µg/kg dw
		N/A	biota	ND	
		Askersund, Skebäck, Llindesberg, Aggerud, Tivoliverket, Bodum, Vik, Säffle, Fiskartorpet, Sjöstad, Ellinge, Bollebygd, Henriksdal, Nolhaga, Floda, Ryaverket	sludge	35000-65000	µg/kg dw
Stockholm Stad 2007. Bjørklund, K., Malmqvist, P., Strømvall, A. Kallor till och fløden av ftalater och nonylfenoler i Stockholms dagvatten.	Sweden	Urban runoff, Skarpnack,	freshwater	ND-0,67	µg/l
		Urban runoff, Nybohov	freshwater	ND-1,3	µg/l
		Urban runoff, Gårda, Inlet	freshwater	0,24-85	µg/l
		Urban runoff, Gårda, outlet	freshwater	0,16-2,4	µg/l
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005 http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-865-3/pdf/87-7614-866-1.pdf	Denmark	STP, inlet, medium values	freshwater	5,75	µg/l
		STP, outlet, medium values	freshwater	1,26	µg/l
		STP, sludge, medium values	sludge	16,81	µg/kg TS

Monitoring of dibutyl phthalate, CAS: 84-74-2

Nordic Study	Country	Location of sampling	Matrix	Results	unit
SCREENING OF PRIORITY SUBSTANCES IN FINLAND (VESKA-project)	Finland	Espoo, Helsinki, Hyvinkää, Joensuu, Jyväskylä, Kemi, Kotka, Lahti, Lappeenranta, Lohja, Oulu, Pori, Porvoo, Tampere, Äänekoski	sediment	ND-4600	µg/kg dw
			biota	ND	
Havnarvág 2002 – ein kanning av dálkingarstøðuni á Havnarvág og Yviri við Strond á sumri 2002	Faraoe Islands	Fjallavatn, fjallavatn, Sørvágs Leitisvatn,	freshwater	0,042 - 0,39	mg/kg
University of Jyväskylä, 2008, Monitoring of phthalates in surface waters, Finland 2006-2009	Finland	SAIMAA HAUKISELKÄ, KYMIJOKI AHVENKOSKI, Kymij Huruksel, VUOKSI VASTUUPUOMI, Vantaa, Mustionjoki, Porvoonjoki, AURA, OHIKULKU, KOJO, Vatianjärvi, Kapeenkoski, OULUJOKI, OULUJOKI, NOKIANKOSKI, ALAVIRT, Pyhäjä, Lehtisaari	freshwater	ND-2,7	µg/l
Danmarks Miljøundersøgelser (DMU),2006, Miljøfremmede stoffer og tungmetaller i vandmiljøet: Tilstand og udvikling, 1998-2003., Faglig rapport fra DMU nr. 585, ISSN (elektronisk): 1600-0048	Denmark	STP: average concentration between 1998-2003	freshwater	0,1	µg/l
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005 http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-865-3/pdf/87-7614-866-1.pdf	Denmark	STP, inlet, medium values	freshwater	0,73	µg/l
		STP, outlet, medium values	freshwater	0,14	µg/l
		STP, sludge, medium values	sludge	0,22	µg/kg TS

Monitoring of benzyl butyl phthalate, CAS:85-68-7

Nordic Study	Country	Location of sampling	Matrix	Results	unit
SCREENING OF PRIORITY SUBSTANCES IN FINLAND (VESKA-project)	Finland	Espoo, Helsinki, Hyvinkää, Joensuu, Jyväskylä, Kemi, Kotka, Lahti, Lappeenranta, Lohja, Oulu, Pori, Porvoo, Tampere, Äänekoski	sediment	ND-45	µg/kg dw
		Espoo, Helsinki, Hyvinkää, Joensuu, Jyväskylä, Kemi, Kotka, Lahti, Lappeenranta, Lohja, Oulu, Pori, Porvoo, Tampere, Äänekoski	biota	ND-90	µg/kg fw
Havnarvág 2002 – ein kanning av dálkingarstøðuni á Havnarvág og Yviri við Strond á sumri 2005	Faraoe Islands	Fjallavatn, fjallavatn, Sørvágs Leitisvatn,	freshwater	0,037 - 1,6	mg/kg
University of Jyväskylä, 2008, Monitoring of phthalates in surface waters, Finland 2006-2010	Finland	SAIMAA HAUKISELKÄ, KYMIJOKI AHVENKOSKI, Kymij Huruksel, VUOKSI VASTUUPUOMI, Vantaa, Mustionjoki, Porvoonjoki, AURA, OHIKULKU, KOJO, Vatianjärvi, Kapeenkoski, OULUJOKI, OULUJOKI, NOKIANKOSKI, ALAVIRT, Pyhäjä, Lehtisaari	freshwater	ND-11	µg/l
Stockholm Stad 2007. Bjørklund, K., Malmqvist, P., Strømvall, A. Kallor till och fløden av ftalater och nonylfenoler i Stockholms dagvatten.	Sweden	Urban runoff, Skarpnack,	freshwater	ND-0,15	µg/l
		Urban runoff, Nybohov	freshwater	ND	
		Urban runoff, Gårda, Inlet	freshwater	ND-0,1	µg/l
		Urban runoff, Gårda, outlet	freshwater	ND	
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005	Denmark	STP, inlet, medium values	freshwater	0,17	µg/l
		STP, outlet, medium values	freshwater	ND	µg/l
		STP, sludge, medium values	sludge	0,57	µg/kg TS

Monitoring of triphenyl phosphate, CAS:115-86-6

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	22-213	ng/g dw
Umeå universitet, Organofosfater i svensk miljö	Sweden	Sorsäle, ystad, Trelleborg, gässlösa, bogryd, Bromma 1, Bromma 2, Henriksdal 1, Henriksdal 2	sludge	0,04-0,29	µg/l
Umeå universitet, kemiska institutionen, Organofosfatestrar i humanmjölk och fisk från svenska sjöar och kustnära områden, (Projekt 219 0714; dnr 721-4070-07Mm)	Sweden	Holmön, Kvädöfjärden, fjällbacka, Väderöerna, Remmarsjöen, Stensöen, Hjärtsjöen, Stora Envättern, Krageholmsjön, Bysjön, Ôresjön, Djupasjön, Guttasjön, Märstaån,Bottenv Piteå sk, Ôstersjön, Strömstad, Upssala, Lycksele, Lund, Umeå	biota	3,2-810	ng/g fw
SFT, 2008, Screening of selected metals and new organic contaminants 2007, TA-2367/2008, ISBN 978-82-577-5304-7	Norway	Indoor/outdoor air sampling Alnabru, Birkenes, New-Ålesund	air	6	ng/m3
		STP Influent water Bekkelaget, Solumstrand and Saulekilen,	water	3100-14000	ng/l

		STP effluent water Bekkelaget, Solumstrand and Saulekilen,	water	1700-3500	ng/l
		STP sludge Bekkelaget, Solumstrand	sludge	13-1100	µg/kg LOI w
		landfill site, Lindum	sediment	1000-5000	µg/kg LOI w
		car demolishing site, Hellik	sediment	900-1600	µg/kg LOI w
		recipient waters: Bekkelaget Drammen, Teigen Drammen, Lierterminalen Loselva Arendal	sediment	140-680	µg/kg LOI w
		Mussel	biota	ND	
		cod liver	biota	ND	
SFT, 2009, Screening of new contaminants in samples from the Norwegian Arctic: Silver, Platinum, Sucralose, Bisphenol A, Tetrabrombisphenol A, Siloxanes, Phtalates (DEHP), Phosphororganic flame retardants, TA-2510/2009, ISBN 978-82-449-0065-2	Norway	Atlantic cod and Polar cod (liver and whole body and muscle) Kongsfjorden, Liefdefjorden, Moffen, Billefjorden	biota	0,3-13 DF= 100%	ng/g ww
		Seabirds: Kittiwake and Eider Kongsfjorden, Liefdefjorden,	biota	0,6-3,3 DF= 100%	ng/g ww
Miljøstyrelsen, 2005, Punktkilder 2004,Det nationale program for overvågning af vandmiljøet; fagdatacenterrapport, Orientering fra Miljøstyrelsen Nr. 9 2005 http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-865-3/pdf/87-7614-866-1.pdf	Denmark	STP, inlet, medium values	freshwater	0,15	µg/l
		STP, sludge, medium values	sludge	0,12	µg/kg TS
		STP, outlet, medium values	freshwater	0,03	µg/l

Monitoring of tris(2-ethylhexyl) phospha, CAS: 78-42-2

Nordic Study	Country	Location of sampling	Matrix	Results	unit

Umeå universitet, Organofosfater i svensk miljö	Sweden	Sorsäle, ystad, Trelleborg, gässlösa, bogryd, Bromma 1, Bromma 2, Henriksdal 1, Henriksdal 2	sludge	0,06-0,13	µg/l
SFT, 2009, Screening of new contaminants in samples from the Norwegian Arctic: Silver, Platinum, Sucralose, Bisphenol A, Tetrabrombisphenol A, Siloxanes, Phtalates (DEHP), Phosphororganic flame retardants, TA-2510/2009, ISBN 978-82-449-0065-2	Norway	Atlantic cod and Polar cod (liver and whole body and muscle) Kongsfjorden, Liefdefjorden, Moffen, Billefjorden	biota	ND-4,6 DF= 1/45	ng/g ww
		Seabirds: Kittiwake and Eider Kongsfjorden, Liefdefjorden,	biota	ND	

Monitoring of tris(2-butoxyethyl) phosphate, CAS:78-51-3

Nordic Study	Country	Location of sampling	Matrix	Results	unit
UMEA University, 2008, Miljöövervakning av slam Redovisning av resultat från 2008 års provtagning (inklusive en sammanfattning av åren 2004-2008)	Sweden	STP Stockholm (Henriksdal), Göteborg (Ryaverket), Umeå (Öhn), Borås (Gässlösa), Eslöv (Ellinge), Alingsås (Nolhaga), Floda och Bollebygd	sludge	49-412	ng/g dw
Umeå universitet, Organofosfater i svensk miljö	Sweden	Sorsäle, ystad, Trelleborg, gässlösa, bogryd, Bromma 1, Bromma 2, Henriksdal 1, Henriksdal 2	sludge	3,1-35	µg/l
Umeå universitet, kemiska institutionen, Organofosfatestrar i humanmjölk och fisk från svenska sjöar och kustnära områden, (Projekt 219 0714; dnr 721-4070-07Mm)	Sweden	Holmön, Kvädöfjärden, fjällbacka, Väderöerna, Remmarsjöen, Stensöen, Hjärtsjöen, Stora Envättern, Krageholmsjön, Bysjön, Ôresjön, Djupasjön, Guttasjön, Märstaån,Bottenv Piteå sk, Ôstersjön, Strömstad, Upssala, Lycksele, Lund, Umeå	biota	ND-1000	ng/g fw

SFT, 2008, Screening of selected metals and new organic contaminants 2007, TA-2367/2008, ISBN 978-82-577-5304-7	Norway	Indoor/outdoor air sampling Alnabru, Birkenes, New-Ålesund	air	8 DF= 49%	ng/m3
		STP Influent water Bekkelaget, Solumstrand and Saulekilen,	water	5600-9200	ng/l
		STP effluent water Bekkelaget, Solumstrand and Saulekilen,	water	1600-3300	ng/l
		STP sludge Bekkelaget, Solumstrand	sludge	1200-2200	µg/kg LOI w
		landfill site, Lindum	sediment	540-1000	µg/kg LOI w
		car demolishing site, Hellik	sediment	1600-2900	µg/kg LOI w
		recipient waters: Bekkelaget Drammen, Teigen Drammen, Lierterminalen Loselva Arendal	sediment	ND - 3100	µg/kg LOI w
		Mussel	biota	ND	
		cod liver	biota	ND	
SFT, 2009, Screening of new contaminants in samples from the Norwegian Arctic: Silver, Platinum, Sucralose, Bisphenol A, Tetrabrombisphenol A, Siloxanes, Phtalates (DEHP), Phosphororganic flame retardants, TA-2510/2009, ISBN 978-82-449-0065-2	Norway	Atlantic cod and Polar cod (liver and whole body and muscle) Kongsfjorden, Liefdefjorden, Moffen, Billefjorden	biota	ND	
		Seabirds: Kittiwake and Eider Kongsfjorden, Liefdefjorden,	biota	ND	
NIVA, 2009, Kartelegging av miljøgifter i Alna og Akerselva	Norway	Alna, Akerselva	sediment	9	ng/g dw

Monitoring of sucralose, CAS: 56038-13-2

Nordic Study	Country	Location of sampling	Matrix	Results	unit
IVL, 2008, Measurements of Sucralose in the Swedish Screening program 2007 PART II; Sucralose in Biota samples and regional STP samples, IVL Report B1795	sweden	STP Influent waters, 9 samples	water	1700-4100 DF= 100%	ng/l
		STP Effluent waters, 36 samples	water	710-4900 DF= 100%	ng/l
		Surface waters detected in recipient waters	water	ND - 470 DF= 23%	ng/l
		Sewage Sludge	sludge	ND-19 DF= 36%	ng/g ww
		Fish	biota	ND	
		Mussels	biota	ND	
IVL, 2008, Measurements of Sucralose in the Swedish Screening Program 2007 -PART I; Sucralose in surface waters and STP samples, IVL Report B1769	sweden	STP Influent waters Henriksdal STP, Stockholm Nykvarnsverket STP, Linköping	water	3 530-7 920 DF= 100%	ng/l
		STP Effluent waters Henriksdal STP, Stockholm Nykvarnsverket STP, Linköping	water	1 790-10 800 DF= 100%	ng/l

		Receiving STP water effluents waters Henriksdal STP Lake Roxen, Tributaries Svartån, Göta Canal and Stångån	water	ND-3 560 DF= 73%	ng/l
		Sewage Sludge Henriksdal STP, Stockholm Nykvarnsverket STP, Linköping	sludge	ND-15 DF= 83%	ng/g ww
SFT, 2009, Screening of new contaminants in samples from the Norwegian Arctic: Silver, Platinum, Sucralose, Bisphenol A, Tetrabrombisphenol A, Siloxanes, Phtalates (DEHP), Phosphororganic flame retardants, TA-2510/2009, ISBN 978-82-449-0065-2	Norway	Seawater from Kongsfjorden, Liefdefjorden, Moffen	saltwater	ND	
SFT, 2008, Screening of selected metals and new organic contaminants 2007, TA-2367/2008, ISBN 978-82-577-5304-7	Norway	STP Influent water Bekkelaget, Solumstrand and Saulekilen	water	1940- 5520	ng/l
		STP effluent water Bekkelaget, Solumstrand and Saulekilen	water	2176-5876	ng/l
		STP sludge Bekkelaget, Solumstrand and Saulekilen	sludge	ND- 22	µg/kg ww
		Seawater recipient Arendal, Bekkelaget	saltwater	ND-30	ng/l
Institutionen för tillämpad miljövetenskap, ITM, Undersökning av det syntetiska sötningsmedlet sukralos med avseende på eventuella ekotoxikologiska effecter, ITM-rapport 181, ISSN 1103-341	Sweden	STP effluent Henriksdalsverket, Käppalaverket, Tjustviks reningsverk	water	ND- 0,18	µg/l
Institutionen för tillämpad miljövetenskap, ITM, Undersökning av det syntetiska sötningsmedlet sukralos med avseende på eventuella ekotoxikologiska effecter, ITM-rapport 181, ISSN 1103-341	Sweden	Recipient waters: Waldemarsudde, Halvkaksundet, Baggensfjärden	water	0,11-0,18	µg/l

Overwiev of monitoring studies in Norway

Cas nr	Substance Name	Monitoring in Norway								
		TA 2564/2009	TA 2006-2004	TA 2284/2007	TA 2120/2005	TA 1924/2002	TA 2495/2009	TA-2510/2009	TA-2367/2008	Bioforsk 2009
103-23-1	bis(2-ethylhexyl) adipate	no	no	no	no	no	no	no	no	no
3089-55-2	Benzyl octyl adipate	no	no	no	no	no	no	no	no	no
33703-08-1	diisononyl adipate	no	no	no	no	no	no	no	no	no
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate	no	no	no	no	no	no	no	no	no
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro	no	no (SCCP)	no	no (SCCP)	no (SCCP)	no (SCCP)	no	no	no
85535-85-9	Alkanes, C14-17, chloro	no	yes MCCP	no	yes MCCP	yes MCCP	yes MCCP	no	no	no
28553-12-0	di-''isononyl'' phthalate	no	no	no	no	no	no	no	no	no
117-81-7	bis(2-ethylhexyl) phthalate	yes	no	yes	no	no	yes	yes	no	yes
84-74-2	dibutyl phthalate	no	no	no	no	no	no	no	no	yes
26761-40-0	di-''isodecyl'' phthalate	no	no	no	no	no	no	no	no	no
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	no	no	no	no	no	no	no	no	no
68515-41-3	Dialkyl(C7-C9)phthalate	no	no	no	no	no	no	no	no	no
27554-26-3	diisooctyl phthalate	no	no	no	no	no	no	no	no	no
117-84-0	dioctyl phthalate	no	no	no	no	no	no	no	no	no
3648-20-2	Diundecyl Phthalate	no	no	no	no	no	no	no	no	no
85-68-7	benzyl butyl phthalate	no	no	no	no	no	no	no	no	no
122-62-3	bis(2-ethylhexyl) sebacate	no	no	no	no	no	no	no	no	no
143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane	no	no	no	no	no	no	no	no	no
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	no	no	no	no	no	no	no	no	no
63148-62-9	Polydimetylsiloxan	no	no	no	no	no	no	no	no	no
115-83-3	Pentaerythrityltetrastearate	no	no	no	no	no	no	no	no	no
103-24-2	bis(2-ethylhexyl) azelate	no	no	no	no	no	no	no	no	no
3370-35-2	N-(hydroxymethyl)stearamide	no	no	no	no	no	no	no	no	no
25429-29-2	pentachloro[1,1'-biphenyl]	no	no	no	no	no	no	no	no	no
133-49-3	pentachlorobenzenethiol	no	no	no	no	no	no	no	no	no
78-51-3	tris(2-butoxyethyl) phosphate	no	no	no	no	no	yes	yes	yes	no
78-42-2	tris(2-ethylhexyl) phosphate	no	no	no	no	no	no	yes	no	no
115-86-6	Triphenyl phosphate	no	no	no	no	no	no	yes	yes	no
56038-13-2	Sucralose	no	no	no	no	no	no	yes	yes	no

Overwiev of monitoring studies in Sweden

Cas nr	Substance Name	Monitoring in Denmark			Faroe Islands	Finland	
		DMU nr.585	Miljøstyrelsen Nr. 9, 2005	DMU nr. 642	Havnarvág 2002	Veska project	surface waters 2006-2008
103-23-1	bis(2-ethylhexyl) adipate	no	yes	no	no	no	no
3089-55-2	Benzyl octyl adipate	no	no	no	no	no	no
33703-08-1	diisononyl adipate	no	no	no	no	no	no
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate	no	no	no	no	no	no
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro	no	no	no	no	no	no
85535-85-9	Alkanes, C14-17, chloro	no	no	no	no	no	no
28553-12-0	di-''isononyl'' phthalate	no	yes	no	no	no	no
117-81-7	bis(2-ethylhexyl) phthalate	yes	yes	yes	yes	yes	yes
84-74-2	dibutyl phthalate	yes	yes	no	yes	yes	yes
26761-40-0	di-''isodecyl'' phthalate	no	no	no	no	no	no
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	no	no	no	no	no	no
68515-41-3	Dialkyl(C7-C9)phthalate	no	no	no	no	no	no
27554-26-3	diisooctyl phthalate	no	no	no	no	no	no
117-84-0	dioctyl phthalate	no	yes	no	yes	no	no
3648-20-2	Diundecyl Phthalate	no	no	no	no	no	no
85-68-7	benzyl butyl phthalate	no	yes	no	yes	yes	yes
122-62-3	bis(2-ethylhexyl) sebacate	no	no	no	no	no	no
143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane	no	no	no	no	no	no
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	no	no	no	no	no	no
63148-62-9	Polydimetylsiloxan	no	no	no	no	no	no
115-83-3	Pentaerythrityltetrastearate	no	no	no	no	no	no
103-24-2	bis(2-ethylhexyl) azelate	no	no	no	no	no	no
3370-35-2	N-(hydroxymethyl)stearamide	no	no	no	no	no	no
25429-29-2	pentachloro[1,1'-biphenyl]	no	no	no	no	no	no
133-49-3	pentachlorobenzenethiol	no	no	no	no	no	no
78-51-3	tris(2-butoxyethyl) phosphate	no	no	no	no	no	no
78-42-2	tris(2-ethylhexyl) phosphate	no	no	no	no	no	no
115-86-6	Triphenyl phosphate	no	yes	no	no	no	no
56038-13-2	Sucralose	no	no	no	no	no	no

Overwiev of monitoring studies in Denmark, Faroe Islands and Finland

Cas nr	Substance Name	Monitoring in Denmark			Faroe Islands	Finland	
		DMU nr.585	Miljøstyrelsen Nr. 9, 2005	DMU nr. 642	Havnarvág 2002	Veska project	surface waters 2006-2008
103-23-1	bis(2-ethylhexyl) adipate	no	yes	no	no	no	no
3089-55-2	Benzyl octyl adipate	no	no	no	no	no	no
33703-08-1	diisononyl adipate	no	no	no	no	no	no
141-17-3	bis(2-(2-butoxyethoxy)ethyl) adipate	no	no	no	no	no	no
63449-39-8	Paraffin waxes and Hydrocarbon waxes, chloro	no	no	no	no	no	no
85535-85-9	Alkanes, C14-17, chloro	no	no	no	no	no	no
28553-12-0	di-''isononyl'' phthalate	no	yes	no	no	no	no
117-81-7	bis(2-ethylhexyl) phthalate	yes	yes	yes	yes	yes	yes
84-74-2	dibutyl phthalate	yes	yes	no	yes	yes	yes
26761-40-0	di-''isodecyl'' phthalate	no	no	no	no	no	no
68515-51-5	Di(n-hexyl,n-octyl,ndecyl) phtalate	no	no	no	no	no	no
68515-41-3	Dialkyl(C7-C9)phthalate	no	no	no	no	no	no
27554-26-3	diisooctyl phthalate	no	no	no	no	no	no
117-84-0	dioctyl phthalate	no	yes	no	yes	no	no
3648-20-2	Diundecyl Phthalate	no	no	no	no	no	no
85-68-7	benzyl butyl phthalate	no	yes	no	yes	yes	yes
122-62-3	bis(2-ethylhexyl) sebacate	no	no	no	no	no	no
143-29-3	bis(2-(2-butoxyethoxy)ethoxy)methane	no	no	no	no	no	no
64742-53-6	Hydrotreated Light Naphthenic Distillate (Petroleum)	no	no	no	no	no	no
63148-62-9	Polydimetylsiloxan	no	no	no	no	no	no
115-83-3	Pentaerythrityltetrastearate	no	no	no	no	no	no
103-24-2	bis(2-ethylhexyl) azelate	no	no	no	no	no	no
3370-35-2	N-(hydroxymethyl)stearamide	no	no	no	no	no	no
25429-29-2	pentachloro[1,1'-biphenyl]	no	no	no	no	no	no
133-49-3	pentachlorobenzenethiol	no	no	no	no	no	no
78-51-3	tris(2-butoxyethyl) phosphate	no	no	no	no	no	no
78-42-2	tris(2-ethylhexyl) phosphate	no	no	no	no	no	no
115-86-6	Triphenyl phosphate	no	yes	no	no	no	no
56038-13-2	Sucralose	no	no	no	no	no	no

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