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**SCREENING ASSESSMENT OF THE ENVIRONMENTAL FATE
(BIODEGRADABILITY) OF 12 DETERGENTS**

By

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SUMMARY

The placing of detergents on the market has to comply with EU Regulation 648/2004 on Detergents (31 March 2004). In the current regulation, information on the biodegradability of the surfactants' components of the detergent is required. IMI TAMI has been requested by Friendly Environment Ltd. to review the information available on the biodegradability potential of 12 detergents and to assess the need for additional testing.

Seven surfactants' components were identified in the detergents: Alkyl poly glucoside, Cocoamidopropyl betaine, Coconut diethanolamide, Disodium laureth sulphosuccinate, Disodium laureth sulphosuccinate, Ethoxylated alcohol, Fatty acids derivatives, and Sodium laureth sulphate. A screening was performed for EINECS numbers, IUCLID files and data availability on biodegradability of these surfactants. The results indicate that most of the screened surfactants can be considered as readily biodegradable. For some of them (Alkyl poly glucoside, Cocoamidopropyl betaine, Coconut diethanolamide), specific information on their biodegradability is available. For others (Disodium laureth sulphosuccinate, Ethoxylated alcohol, Sodium laureth sulphate), conclusions can be drawn based on information for similar substances and for one of them (Fatty acids derivatives), the information is not sufficient.

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Abbreviations

CAS:	Chemical Abstract
EINECS:	European Inventory of Existing Commercial Chemical Substances
IUCLID:	International Uniform Chemical Information Database
OECD:	Organization for Economic Cooperation and Development

1. Introduction

The placing of detergents on the market has to comply with EU Regulation 648/2004 on Detergents (31 March 2004). In the current regulation, information on the biodegradability of the surfactants' components of the detergent is required. The biodegradability is assessed in a tiered approach. First, the ultimate biodegradability has to be determined according to EU guidelines for Ready biodegradation tests. If the surfactant does not pass the test, the primary biodegradation has to be investigated and degradation products have to be identified.

IMI TAMI has been requested by Friendly Environment Ltd. to review the information available on the biodegradability potential of 12 detergents and to assess the need for additional testing.

2. Objectives

1. Reviewing EU Regulation 648/2004 and identifying the information needed on biodegradability.
2. Screening and evaluation of the available data on biodegradability for the 10 detergents.
3. Assessing the need for further testing.

3. Methodology

1. Information needed

The EU regulation was reviewed; Information on biodegradability is needed only for the surfactants' components of the detergent.

2. Identification of surfactants in the detergents

The substances in the list of 12 detergents provided by Friendly Environment Ltd were identified. In Table 1 the components of the 12 detergents are listed, including the CAS numbers as provided by Friendly Environment Ltd. When EINECS numbers were available, there were also included. The identified surfactants, total of seven, are highlighted in grey.

3. Screening for available data

A screening was performed for EINECS numbers, IUCLID files and data availability on biodegradability of these surfactants. The results are presented in the Results section 4 and in Table 2.

4. Evaluation of data

Analysis of data, conclusions and recommendations on the need for further testing are presented in the Conclusions section 5.

Table 1: List of detergents

Surfactants are highlighted in grey

Detergent	CAS No.	EINECS No.
FABRIC SOFTENER		
[REDACTED]		
LAUNDRY GEL		
[REDACTED]		
DEGREASER		
[REDACTED]		

Table 1: List of detergents (cont.)




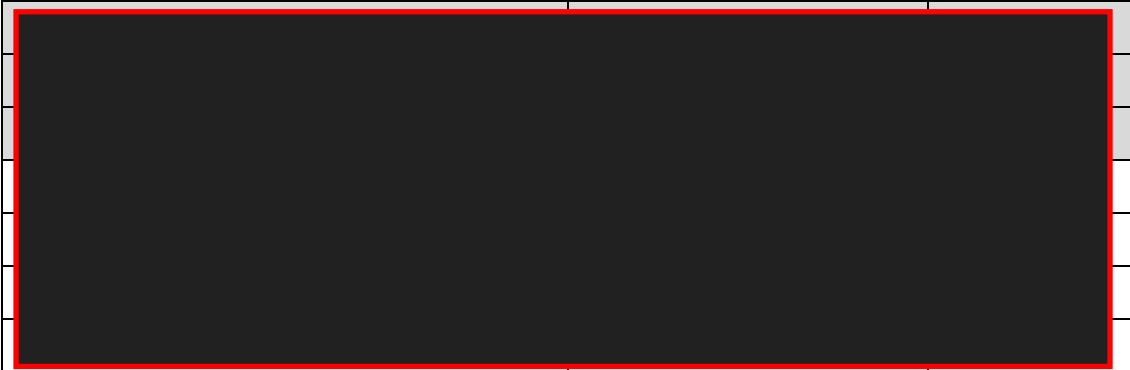

Detergent	CAS No.	EINECS No.
WASHING UP LIQUID		
		
WHITENING POWDER		
		
TOILET GEL		
		
MULTI PURPOSE CLEANER		
		
WINDOWS CLEANER		
		

Table 1: List of detergents (cont.)

Detergent	CAS No.	EINECS No.
DISHWASHING POWDER		
FLOOR CLEANER		
ANTI - SCALE		

4. Results

The search for information was performed only on the surfactants in the detergents, which include Alkyl poly glucoside, Cocoamidopropyl betaine, Coconut diethanolamide, Disodium laureth sulphosuccinate, Ethoxylated alcohol, Fatty acids derivatives, and Sodium laureth sulphate.

The information acquired for the surfactants in the different detergents is summarized in Table 2. The table includes the appropriate EINECS numbers and the biodegradation potential as assessed by Ready biodegradation tests. Whenever tests were described in IUCLID Dataset, there were considered as reliable. Many of the tests were performed in the 80's and hence no information on GLP compliances was available. Following is a summary of the information available for each of the surfactants.

[REDACTED]

The CAS number refers to a mixture of [REDACTED], which have the property of a non ionic surfactant. The monomer ([REDACTED]) is listed in the EU and has an EINECS number. The IUCLID file is not available. However, information on the biodegradability is presented in a report written by the Danish Center for Integrated Environment and Toxicity -CETOX¹ on the environmental and health assessment of substances in household detergents. This report, published by the Danish EPA, presents data on the biodegradability of some members of this group. Alkyl poly glucosides with the following [REDACTED] have been shown to be readily biodegradable: C8-C10, C8-C16, C12-C14, C9-C11, C12-C16.

[REDACTED]

The substance has properties of an amphoteric surfactant. It is listed in the EU and its EINECS number is [REDACTED]. Data presented in the IUCLID file² indicate that the substance is readily biodegradable according to OECD 301.

[REDACTED]

The substance is a non ionic surfactant. It is listed in the EU and its EINECS number is [REDACTED]. [REDACTED] Data presented in the IUCLID file³ indicate that the substance is readily biodegradable according to OECD 301.

[REDACTED]

The CAS number represents a mixture of different lengths of [REDACTED] listed as alcohols (C10-16), [REDACTED] salt. It is an anionic surfactant which is listed in EU with an EINECS number [REDACTED]. Sulphosuccinates are in general compounds that are biodegradable, however no information on the biodegradability of this specific CAS number could be found. The substance commercial name is on the list of surfactants approved by the Swedish Society for Nature Conservation, but there is no reference to the CAS number of the substance.

[REDACTED]

Alcohol ethoxylates (AE) are nonionic surfactants. The CAS number is referring to an [REDACTED] with an alkyl chain of 9-11 carbons and 6 ethylene oxide units (EO6). The specific AE doesn't have an EINECS number but there is significant information¹ on the biodegradability of members of this group. Many of the AEs, such as C12-C15 EO7, C12-C15 EO9, C9-C11 EO8, and C12-14 EO 7-8, are readily biodegradable according to OECD 301.

Fatty acids derivatives

This product is an anionic surfactant that is composed of a mixture of fatty acids condensate. CAS and EINECS numbers are not available. According to the producer (MSDS)⁴, the product contains surfactants which are 90% biodegradable. The identity of the substances in the product could not be available due to secrecy rights. In general, fatty acid salts with carbon chain lengths up to C18 are considered to be biodegradable under aerobic conditions.

[REDACTED]

This substance belongs to the group of [REDACTED]. The substances have properties of anionic surfactants. The EINECS number [REDACTED] is for the CAS number [REDACTED] which is referring to the group of C10-C16. There was not a IUCLID available for this CAS number. However, a IUCLID file was found for CAS No. 3088-31-1, which is the C12 member of the group [REDACTED]. The information presented in this file⁵ indicates that the substance is readily biodegradable according to OECD 306 in sea water, and in fresh water according to OECD 301.

5. Conclusions and Recommendations

Most of the screened surfactants can be considered as readily biodegradable. For some of them, specific information on their biodegradability is available. For others, conclusions can be drawn based on information for similar substances and for one of them, the information is not sufficient. Following are the recommendations for each of the surfactants:

1. [REDACTED]
Information on [REDACTED] with longer carbon chains indicates that this family is readily biodegradable. Therefore, there is a very high probability that this specific mixture is biodegradable and there is no need to perform additional testing. Since the information cited was published in a report, it would be helpful to get reference to the EINECS numbers of the specific substances mentioned in this report to support the statement that similar substances are indeed biodegradable.

2. [REDACTED]
The substance is readily biodegradable and there is no need for additional testing.

3. [REDACTED]
The substance is readily biodegradable and there is no need for additional testing.

4. [REDACTED]
There is no available information on the biodegradability of the specific CAS number. However, the sulphosuccinates in general belong to a family of biodegradable substances. The substance name is listed on the Swedish Society for Nature Conservation but the identity of the listed substance should be clarified. It is recommended to approach the Society to get this information. If it is not the same substance, or if the information cannot be disclosed, it is recommended to perform a ready biodegradation test.

5. [REDACTED]
Information on similar [REDACTED] with longer carbon chains indicates that this family is readily biodegradable. Therefore, there is a very high probability that this specific mixture is biodegradable and there is no need to perform additional testing. However, since the information cited was published in a report (CETOX), it would be helpful to get reference to the CAS/EINECS numbers of the specific substances mentioned in this report to support the statement that similar substances are indeed biodegradable. Further investigation into the original publications cited in the report is recommended.

[REDACTED]

According to the producer, the product is biodegradable. In general, [REDACTED] with carbon chains lengths up to C18 are considered as biodegradable, however since there is no information available on the components of this mixture, it is hard to extrapolate from other similar substances. The information on the biodegradability could be presented in a discrete way to the authorities by the producer, if needed. If this is not a possible option, a ready biodegradation test should be performed for the mixture.

7 [REDACTED]

The information available on one member of the mixture represented by this CAS number indicates that the substance is readily biodegradable. Therefore, there is probably no need for additional testing.

6. References

1. Torben Madsen, Helle Buchardt Boyd, Dorthe Nylén, Anne Rathmann Pedersen, Gitte Petersen, Flemming Simonsen (2000): Environmental and Health Assessment of Substances in Household Detergents and Cosmetic Detergent Products. Center for Integrated Environment and Toxicity (CETOX) Project No. 615.
2. IUCLID Data set for CAS No. [REDACTED], ECB 2000.
3. IUCLID Data set for CAS No. [REDACTED], ECB 2000.
4. Material Safety Data Sheet for [REDACTED]
5. IUCLID Data set for CAS No. [REDACTED]

Table 2: Summary of information on the surfactants

Surfactant	CAS No.	EINECS No. and name	Readily biodegradable
[REDACTED]	[REDACTED]	[REDACTED]	Yes
[REDACTED]	[REDACTED]	[REDACTED]	Yes
[REDACTED]	[REDACTED]	[REDACTED]	Yes
[REDACTED]	[REDACTED]	[REDACTED]	Yes for many of this group. No information on specific CAS number
[REDACTED]	[REDACTED]	No EINECS number. Information available on members of the group.	Yes for many of the group
[REDACTED]	[REDACTED]	[REDACTED]	Yes according to supplier
[REDACTED]	[REDACTED]	[REDACTED]	Yes for CAS 3088-31-1


7. Distribution List

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8. Report Approval

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