

## **Ecolabelling Norway**

# **The harmonised Detergent Ingredient Database ("DID-list") for eco-labelling.**

## **Final report**

**June 10, 2004**

Marianne B. Eskeland, Ecolabelling Norway  
Erik Svanes, ESC

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Historical background of the DID-list .....</b>	<b>2</b>
<b>3. Historical background of the Nordic list.....</b>	<b>3</b>
<b>4. Description of the lists .....</b>	<b>3</b>
<b>5. Description of the use of the lists .....</b>	<b>4</b>
5.1 Critical dilution volume (CDV).....	6
5.1.1 The EU calculations regarding critical dilution volume .....	6
5.1.2 The Nordic calculations regarding critical dilution volume .....	10
<b>6. Comparison of the lists.....</b>	<b>12</b>
6.1 Toxicity .....	12
6.2 Degradation .....	14
6.3 Other parameters .....	16
<b>7. New framework.....</b>	<b>16</b>
7.1 Toxicity .....	17
7.2 Degradation factor .....	21
7.3 Anaerobic biodegradability .....	25
7.4 Other parameters .....	27
7.6 The status of the list .....	28
7.7 Brand names.....	28
7.8 Alternative documentation .....	29
<b>8. Extension and revision of the list .....</b>	<b>30</b>
8.1 Introduction .....	30
8.2 Toxicity .....	30
8.3 Degradability .....	31
8.4 Alternative documentation .....	31
<b>9. Update and revisons.....</b>	<b>31</b>

## **1. Introduction**

Ecolabelling Norway was assigned by the European Commission as lead Competent Body for the revision of the Detergent Ingredient Database ("DID-list") for the EU Eco-label

The aim of the project was twofold:

- Updating the list by including more detergent ingredients.
- Harmonisation of the list with other similar lists used for ecolabelling.

Only one other similar list used for ecolabelling purposes has been found: the List of Chemicals used by the Nordic Swan Ecolabelling scheme.

The Swedish Ecolabelling scheme "Good Environmental Choice" has published several lists of detergent ingredients based on the inherent properties of the ingredients and of their origin. In this list the ingredients are grouped according to toxicity, degradation properties and origin. Hence the exact values of toxicity, degradation and percentage of raw material from renewable sources are not known for the users of the list. The list are then of limited use for applicants in the EU or Nordic ecolabelling schemes. The list from "Good Environmental Choice" has accordingly not been included in the project.

In order to get expert opinions of the lists and scientific assistance in the revision work Ecolabelling Norway has engaged two experts on aquatic toxicology:

Torben Madsen of DHI Water and Environment, Denmark.  
Torsten Källqvist of the Norwegian Institute for Water Research.

### **The ad hoc working group**

All interested parties has been invited to take part in the revision process, either by joining the ad-Hoc Working Group (ahwg) or by giving feedback in other ways.

The first ahwg meeting was held in Brussels on November 6, 2002. 23 people representing detergent manufacturers, detergent ingredient manufacturers, environmental organisations, consumer's organisations and the Member States Competent Bodies attended the meeting.

A meeting between representatives of the Nordic and EU Ecolabelling shemes took place on January 9.

The second ahwg meeting was held in Brussels on March 4, 2003 and was attended by 24 people representing detergent manufacturers, detergent ingredient manufacturers, environmental organisations, consumer's organisations and the Member States Competent Bodies

Based on these meetings and consultations with the experts the list has been revised. Some parameters have been modified, some have been added and others have been deleted. The proposed new framework was sent out to a number of interested parties in the Nordic Countries and in the rest of Europe during the summer of 2003.

The third ahwg-meeting was held September 10, 2003 with a broad representation from interested parties. The comments and questions received during the consultation phase were discussed and agreement was reached on a new framework.

### **Updating and extension of the list**

From September 2003 to May 2004 the revision work has been focused on collecting data, processing the received data and producing a revised and extended list.

The toxicology experts set up guidelines for quality for environmental data. The guidelines were used for evaluating the received data.

Some data have been found in open sources, in particular the report "Environmental Project 615" commissioned by the Danish EPA. However, the bulk of the data have been received by the ingredient manufacturers. AISE, the main detergents producers organisation, set up a task force and contributed information on many ingredients at the end of 2003. These data concerned non-surfactants. This information together with all other submitted information were reviewed by the toxicology experts in a meeting on 3 and 4 March 2004.

CESIO contributed a large body of information on surfactants in April 2004. The data was processed by Ecolabelling Norway. A new meeting with expert Torben Madsen was held June 1 2004, where the surfactant data were reviewed. At this meeting the whole list was also reviewed in detail by Torben Madsen. A few parameter values were modified based on experience and QSAR calculations.

The work has resulted in a list, which is very much simplified compared to the previous lists and with a large number of ingredients. The background database with the toxicology and degradation data is extensive, and cover almost all the ingredient on the list. Unfortunately there is still a lack of test data on chronic toxicity and on anaerobic degradation.

## **2. Historical background of the DID-list**

Development of the list started in late 1992 and in 1995 the first list was established. The list was revised in 1997.

The initial list was developed by a working group and contained mostly ingredients relevant for Laundry Detergents. The German Competent Body was responsible for the project. In the 1997 revision the industry did not cooperate and the work was done without the use of a working group.

The DID-list now contains 84 ingredients.

### **3. Historical background of the Nordic list**

An expert group developed this list in 1995-1996. Two experts were independent (Torsten Källqvist from the Norwegian Centre for Water Research and Magnus Nyström from the Finnish Environmental Protection Agency), three came from manufacturers (Jan Rosenblom from Akzo Nobel, Jouko Salminen from Hackman Havi and Hamish Will from Unilever) and 4-6 representatives from the Nordic Swan were present. Additionally the consultant Eva Walterson of the Company MFG (Miljøforskargruppen) participated. Four meetings were held from 22 September 1995 to 13 January 1996. Background data were mostly obtained from the EU work. In addition, some data were given from the chemicals suppliers during the course of the work. Like the DID-list the first Nordic List contains mostly ingredients relevant for laundry detergents.

The list has been updated several times. The list now contains 95 ingredients.

### **4. Description of the lists**

Both the EU DID-list and the Nordic Chemicals List are divided in two parts: the list itself, and a written procedure for determining the parameter values for ingredients not on the list. The list contains a number of detergent ingredients and their environmental properties and some parameters based on environmental properties.

Both lists contain a toxicity parameter (EU: LTE, Nordic: ToxI). The Nordic list contains an assessment factor (Security Factor = SF) to be multiplied with the ToxI. The corresponding EU factor (Uncertainty factor=UF) has already been incorporated into the LTE.

Both lists contain a degradation factor. The EU factor (Loading Factor) is supposed to be a measure of the removal of each ingredient when passing through a wastewater treatment plant. Removal happens in two main processes: degradation and absorption. The extent of removal has not been tested and measured. It is calculated using data on degradation and bioaccumulation potential. The Nordic factor (Degradation Factor=NF) is supposed to be a measure of the removal of each ingredient through degradation. These are derived factors based on procedures outlined in the annexes of both lists. The difference between the factors will be described later.

The degradation factor and the toxicity factor are combined in a formula together with the amount of each substance to form a parameter (Nordic Swan: GN, EU: CDV) that is a measure of the products toxicity load on water recipients. This parameter is the most important parameter of many of the detergent criteria.

Both lists contain information about the aerobic biodegradability of the ingredients. In both lists ready biodegradability (according to OECD 301 A-F) is listed but only the Nordic list contain information about inherent biodegradability (according to OECD 302 A-C).

Both lists contain information about the anaerobic biodegradability of the ingredients.

The DID-list contains a correction factor (CF). This factor applies only on anaerobically non-biodegradable ingredients. It is calculated on the basis of a procedure outlined in the DID-list part B. The Nordic List contains no such parameter.

The Nordic list has information about bioaccumulation potential formulated as the parameter logKow. It is based on experimental data but in the case of surfactants (where it is difficult to measure logKow) the parameter seems to be based mostly on calculations.

Both lists contain information about the solubility of inorganic compounds. It is indicated whether the compound has a high or low solubility in water.

The EU list furthermore contains the parameter ThOD that indicates the theoretical oxygen demand of the compound.

74 of the ingredients are present on both lists. 10 of the ingredients on the DID-list are not present on the Nordic list. 21 of the ingredients on the Nordic list are not present on the DID-list. Even though the lists have been updated several times most ingredients are still pertinent to laundry detergents.

The DID-list is an annex to the following detergent eco-labelling criteria:

- All purpose cleaners and sanitary cleaners
- Detergents for dishwashers
- Hand dishwashing agents
- Laundry detergents

The Nordic List is a separate document and is used in the following criteria:

- All-purpose cleaners
- Car care products
- Car wash installations
- Filmforming floor care products
- Hand dishwashing agents
- Hand towel roll services
- Industrial cleaning and degreasing agents
- Laundry detergents
- Laundries
- Machine dishwashing agents
- Sanitary cleaning products
- Shampoo, body shampoo, liquid and solid soap

## **5. Description of the use of the lists**

In the EU as well as in the Nordic countries, criteria have been laid down for the award of eco-labels for different product groups including several detergent products.

Many of the eco-labelling requirements are based on key environmental properties of the ingredients in aquatic environments:

- toxicity
- degradation factor
- biodegradability (in both aerobic and anaerobic compartments)
- bioaccumulation potential
- solubility in water
- theoretical oxygen demand.

Some of the requirements are simple hurdle requirements whereas other are more complex, for example equations with several parameters. In some criteria documents the requirements are linked together in matrixes whereas in others they are separate. The main purpose of the DID-list and the Chemical List is to ensure that all licence applications are treated in a similar way, i.e. that the same values are used for similar ingredients no matter how and by whom the ingredients are manufactured and tested. It is also very important to make the background data for the related requirements generally available and thus save time for licence applicants and application handling organisations alike. Finally, the lists serve as an aid to manufacturers, especially SMEs (small and medium size enterprises), to substitute ingredients with a negative environmental impact and to find ingredients that fulfil the criteria without spending a lot of money on testing. For those ingredients not on the list principles for deriving similar data have been developed.

At a first glance, the EU and Nordic eco-labelling criteria (and the associated chemical lists) seem to describe very different principles for the use of environmental data. However, the detergent eco-labelling criteria of the two eco-labelling schemes combine biodegradability/removal and aquatic toxicity of chemical substances by use of principles developed in environmental risk assessment.

The practical approach for the use of the data and the calculation methods are different between the two eco-labels:

1. The EU criteria and the DID-list use the lowest effect concentration for calculation of an LTE (long-term toxicity effect concentration) by means of various uncertainty factors; these factors increase with decreasing data quality or number of trophic levels included in the data set.
2. The Nordic criteria and the Chemicals List express the toxicity of the substance by a toxicity index and derive a median effect concentration (ToxI-value) for the most sensitive group of organisms. The ToxI is based on EC50 or LC50-values from short-term toxicity tests, and uncertainty factors ('safety factors' in the criteria) are used according to similar principles as described for the EU criteria.

In order to obtain a measure of the environmental exposure both types of criteria include the recommended dose of product related to a defined

function, but different methods are used to estimate the removal of the substances during wastewater treatment.

The DID list has adopted many of the elements from the Technical Guidance Document (TGD) for risk assessment of existing chemicals in the EU and therefore attempts to base the evaluation of the chemicals on the predicted risk they pose on the aquatic environment. The Swan list on the other hand is more focused on hazard ranking of chemicals based on inherent properties. The approach of the DID-list may consequently appear to be more ambitious, but it is difficult to assess which approach is more efficient for the purpose, i.e. to promote the development of more environmentally friendly detergent products. This is also due to the fact that the result depends not only the lists, but also on the use of data from the lists in the criteria documents.

### **5.1 Critical dilution volume (CDV)**

This parameter is a very important parameter in both schemes. It is based on a formula containing toxicity, degradation and the amount used of each ingredient.

#### **5.1.1 The EU calculations regarding critical dilution volume**

One of the main parameters in the detergent eco-labelling criteria is the Critical Dilution Volume.

The main equation leads to the derivation of the Critical Dilution Volume toxicity ( $CDV_{tox}$ ) for each ingredient in a product, and the criteria specify limits or points related to the  $CDV_{tox}$  for the recommended dose.

$$CDV_{tox} = (\text{weight (i)} \times LF / LTE) \times 1000$$

Where

weight (i) is the weight of the ingredient per recommended dose for the defined function,

LF is the loading factor,

LTE is the long-term toxicity effect concentration of the ingredient.

The EU criteria<sup>1</sup> includes an Appendix (the DID-list) of which part 1A contains the data of specific ingredients whereas part 1B describes methods to obtain similar data for ingredients that are not included in the DID-list.

---

<sup>1</sup> Example: Commission decision of 19 July 2001 establishing the ecological criteria for the award of the Community eco-label to hand dishwashing detergents, 2001/607/EC



## LF

The Loading Factor (LF) reflects the percentage of the ingredient, which is assumed to pass the sewage treatment system. It depends on the biodegradability and sorption tendency of the substance. By multiplying this value with the amount of ingredient used per recommended dose, an estimate of the concentration of the ingredient in the effluent of the sewage treatment plant is obtained. Thereby the LF is equivalent to the Predicted Environmental Concentration (PEC), which is used in the environmental risk assessment of chemicals (Technical Guidance document (EU TGD) for risk assessment)<sup>2</sup>.

Table. 3. Setting of loading factors (LF).

	sorption	original removal	original LF	revised removal	revised LF
Readily biodegradable substances	low	91 %	0,09	87 %	0,13
	medium	93 %	0,07	90 %	0,10
	high	95 %	0,05	93 %	0,07
Inherently biodegradable substances	low	50 %	0,5	40 %	0,6
	medium	60 %	0,4	50 %	0,5
	high	80 %	0,2	70 %	0,3
Non-degradable substances	low	0 %	1	0 %	1
	medium	25 %	0,75	25 %	0,75
	high	50 %	0,5	40 %	0,4

In the case of ready biodegradable surfactants a further distinction of removal was made. The following factors were used: 0,1; 0,05; 0,03 and 0,02. Generally readily degradable surfactants are assumed to have a loading factor of no more than 0,05 (removal  $\geq$  95 %). These factors were retained in the revision in 1997.

For insoluble inorganics a LF of 0,05 is set, whereas for soluble inorganics no removal is expected and LF=1, but it can be set as low as 0,5 if some degree of removal has been proven.

If sorption is based on  $K_{OW}$ -data the following applies:

$\log K_{OW} < 2$	$\Rightarrow$	low sorption
$2 < \log K_{OW} < 4$	$\Rightarrow$	medium sorption
$\log K_{OW} > 4$	$\Rightarrow$	high sorption

The logKow was in many cases calculated.

log Kow was calculated using the following procedures:

- According to fragment method Leo & Hansch programme CLOGP3, the anionic parts were subtracted using published increments in "Lyman, Rosenblatt: Chemical properties estimation" according to Leo & Hansch.
- Using data from Roberts, Science of Total Environment 109/110, 1991, p. 557-568, esp for branched surfactants. The branching factor in this

<sup>2</sup> Technical guidance document for risk assessment in support of Commission Directive 93/67/EEC on risk assessment for new notified substances and Commission Regulation (EC) No. 1488/94 on risk assessment of existing substances. (Revision of the 1996 version, Brussels 2002)

publication, normally for  $CP=3$  (i.e. at least 3 C-atoms for shorter branch), and the correction for EO-contribution for ethoxylates was used.

Unfortunately it is very difficult to measure logKow for surfactants with the current test method. Currently the logKow for surfactants is based on calculations. Calculation methods of logKow of surfactants often yield quite different results for the same compounds and it is difficult to experimentally verify the results.

#### LTE

The calculation of the LTE is based on the available toxicity data for the substance. The LTE may be seen as an estimate of the concentration in the environment at which the substance is not expected to give rise to unacceptable effects (although with a lower margin of safety than prescribed in the EU TGD, Table 1). The derivation of the LTE is based on the (lowest) available effect concentration of the substance in tests with fish, crustaceans and/or algae. For the calculation, this effect concentration is divided by an uncertainty factor (UF). The size of the UF depends on the extent of the data set and the quality of the data. If results of long-term tests (NOEC-values) with species from several groups are available, the uncertainty in extrapolating from the results obtained in the laboratory to the environment is considered to be low, and then the UF is low ( $UF = 1$ ). If results from fewer long-term tests or even only from acute tests are available, the UF is higher (5 to 100). The demands for the data sets for applying a specific UF are different for non-surfactants and surfactants. The reasons for this difference are not clear.

The use of effect concentrations and uncertainty factors is a parallel to the approach for deriving the Predicted No Effect Concentration (PNEC) according to the EU risk assessment of chemicals (see note 2). The differences are related to the size of the UF (termed assessment factor (AF) in the EU TGD) as illustrated in Table 1.

Table 1 Extrapolation factors for deriving PNEC and LTE values for the aquatic (freshwater) environment recommended by the EU TGD and the DID-list; N-S = non-surfactant, S=surfactant

		EU TGD Assessment factor	DID N-S Safety factor	DID S Uncertainty factor
EU TGD	At least 1 short-term L(E)C50 from each of three trophic levels of the base-set <sup>1</sup>	1000		
DID N-S	At least two acute LC50 on fish, daphnia or algae		100	
DID S	At least one LC50 on fish, daphnia or algae			50 (20)
EU TGD	One long-term NOEC <sup>2</sup> (fish or daphnia)	100		
DID N-S	One NOEC on fish, daphnia or algae		10	
DID S	One NOEC on fish, daphnia or algae			1 or 10 3
EU TGD	Two long-term NOEC from species representing two trophic levels (fish and/or daphnia and/or algae)	50		
DID N-S	Two NOEC on fish, daphnia or algae		5	
DID S	At least two NOEC on fish, daphnia or algae			1
EU TGD	Long-term NOEC from at least three species (normally fish, daphnia and algae) representing three trophic levels	10		
DID N-S	Three NOEC on fish, daphnia or algae		1	

- 1 The base set for testing the toxicity of substances towards aquatic organisms consists of acute tests with fish, daphnia and algae.
- 2 NOEC (No Observed Effect Concentration) is the highest tested concentration without significant effect. NOEC is used as the test result in long-term (chronic) tests.
- 3 1 is used if the species tested is the most sensitive in acute tests; 10 is used if the species is not the most sensitive in acute tests.

For several of the entries in Table 1, there are specifications in the EU TGD as well as in the DID-list document. For simplicity these are not included here, and the table simply illustrates the similarities and differences between the three calculation methods. Generally, the lowest obtained effect concentration should be used and, if long-term data from only one or two of the three organism groups are available, it should be demonstrated that these include the most sensitive group of organisms.

Table 1 shows that the UF used for calculation of LTE for non-surfactants are one order of magnitude lower than the assessment factors used for derivation of PNEC-values according to the EU TGD with data sets of similar quantity. For surfactants, the UF are generally lower than those for non-surfactants but the logic behind this is not described in the DID-list, Appendix 1B.

Examination of the data in the DID-list indicates that the principles outlined above were not used for derivation of the LTE-values for all of the ingredients. E.g., for some of the non-ionic surfactants, UF of 5 and 2.5 (not included in Appendix 1B) seem to have been used, while for some of the non-surfactants, UF lower than those prescribed in Appendix 1B were

used for short-term toxicity data (i.e., EC<sub>50</sub> or LC<sub>50</sub>). This apparent inconsistency and the lack of explanations for the use of different UF for surfactants and non-surfactants lead to a lack of transparency of the DID-list document.

#### 5.1.2 The Nordic calculations regarding critical dilution volume

The documents describing the principles used for the Nordic eco-label include a separate list of data (Chemicals List) and specific criteria documents for the individual product groups. The list now contains 95 ingredients. 74 of these ingredients are also present on the DID-list. 21 of the ingredients on the Nordic list are not present on the DID-list. 10 of the ingredients on the DID-list are not present on the Nordic list.

The evaluation of chemical ingredients in the Nordic eco-labelling criteria also includes the calculation of a 'dilution volume' parameter, which is related to a limit value. In the Nordic criteria, the 'dilution volume' parameter is termed 'toxicity and degradation points' (abbreviated GN<sup>3</sup>):

$$GN = NF \times \text{weight per NAD} \times SF/ToxI$$

where

NF is the degradation factor,

NAD is the normalised recommended dose for the defined function,

SF is the safety factor,

ToxI is the toxicity index.

The degradation factor (NF) is a measure of the biodegradability of the ingredient; NF is 1 for readily degradable substances, 5 for inherently degradable substances, and 10 for not ultimately degradable substances and for inorganic chemicals. Although the NF is not equivalent to the loading factor (LF) in the DID-list, it has the same function. The multiplication of the amount of ingredient used per recommended dose and the NF provides a figure, which is proportional to the concentration of the substance assumed released to the environment with the effluents of sewage treatment plants. The 'NF × weight per NAD' part of the above equation is equivalent to the 'LF × weight' in the calculation of the CDV<sub>tox</sub> in the EU eco-labelling criteria.

The 'SF/ToxI' part of the equation is a measure of the toxicity, based on short-term toxicity data and a safety factor (uncertainty factor, assessment factor). Although short-term toxicity data are used directly in the calculation, and not transformed to a 'chronic value' like LTE, the ToxI serves the same function as LTE (DID-list) or PNEC (EU TGD). Both the Nordic and the EU eco-labelling criteria relate a 'measure' of the predicted environmental concentration with a 'measure' of aquatic toxicity.

The statistical treatment of the toxicity values is different in the NS list. If there are several values in one trophic level the median value is determined. If values for several trophic levels are available the lowest median value is chosen. Finally

---

<sup>3</sup> The abbreviations used in the Nordic documents are based on the Nordic languages and may therefore not be immediately comprehensible in an English text.

the median toxicity value is related to predefined intervals (Toxicity windows), which are used to derive a value for ToxI (Table 4).

The reason for using interval mean values instead of the median values themselves was the great variation in test results for a compound even on the same species and the same conditions. A variation of a magnitude of 2 is common. Hence it was considered more relevant to regard compounds with rather similar toxicity (e.g. median values 2 and 3) as having the same toxicity rather than one being much less toxic (in the above-mentioned case 50 % less) than the other.

Table 4. Toxicity windows

Toxicity window	ToxI-value mg/l
< 0,25	0,1
0,25-0,45	0,3
0,45- <0,9	0,6
0,9- <1,8	1,2
1,8 - < 3,6	2,5
3,6 - < 7,2	5,0
7,2 - < 14	10
14 - < 58	30
58 - < 150	100
> 150	300

The main alternative for choosing the median value was the lowest value. The median value was chosen because:

- It reflected more the whole set of the data than the lowest value.
- There is a great variation of test results, even when testing the same compound with the same organism under the same conditions.
- Ingredients tested many times would be more likely to have low test results (i.e. high toxicity) than those tested few times even though the real toxicity was the same.
- Producers would have little incentive to do more testing since the ToxI could never get any higher, just lower.

Another alternative was to use the average value instead of the median value. Median values were considered better because it reduced the effects of outliers, which are common because of the great variability of biological testing.

The test results for the most sensitive trophic level were used for reason of precaution.

The safety factors are defined as follows:

Table 2 Safety factors used in the Nordic eco-labelling – only short-term toxicity is considered

	Safety factor
L/EC <sub>50</sub> s from one trophic levels (fish, daphnia and algae)	10
L/EC <sub>50</sub> s from two trophic levels (fish, daphnia and algae)	5
L/EC <sub>50</sub> s from three trophic levels (fish, daphnia and algae)	1

## 6. Comparison of the lists

### 6.1 Toxicity

One of the differences between the lists is the type of data used to describe the toxic effects. The risk assessment approach of the DID-list requires consideration of long-term effects and, hence, use of data for chronic toxicity. The disadvantage of basing the scheme on chronic toxicity is that this information is usually scarce and more expensive to produce than data on acute toxicity. The option to calculate chronic toxicity from acute data by using application factors is, however, included.

It is correct to say that the environmental risk of detergent chemicals is more related to chronic than to acute toxicity. This is because the discharge to the environment through municipal sewers is continuous. Therefore a constant exposure is maintained in spite of the fact that most of the ingredients are degradable.

The reason that the toxicity scores on the Nordic Swan List were based on acute toxicity was primarily that this type of data was much more available than for chronic toxicity. Also, the higher costs involved in chronic toxicity testing would prevent inclusion of new chemicals on the list. Because of the higher number of data available for acute toxicity it was felt that the basis for a correct ranking of chemicals with respect to toxicity would be better than if the scarce data on chronic toxicity had been used. However, a ranking based on acute toxicity may not be strictly applicable for chronic toxicity because of the variation of acute/chronic ratios between chemicals.

It appears that the amount of data on chronic toxicity of detergent chemicals may have increased slightly since the first Nordic Swan List was developed. However, still there is a much better basis for ranking according to acute toxicity.

A comparison of the toxicity parameters on the two lists for each chemical shows a general correlation with LTE approximately one order of magnitude lower than ToxI, which indicates an acute/chronic ratio =10 as shown in figure 1. However, many chemicals deviate significantly from

this ratio. Some of the "outliers" are indicated with numbers referring to the Swan list. Among those that have high ToxI-values as compared to LTE are no. 132 (perfume), 29 (C 12/18 A, 0-3 EO) and 118 (triethanol amine). On the other side of the regression line are no. 24 (C 12/15 (mean value C>14) A, >6-9 EO) and several low toxicity substances like no. 130 (Na/Mg OH), 102 (glycerol) and 103 (phosphate). For these substances actual data on acute toxicity are not available and all chemicals with L(E)C50>150 mg/l were originally assigned the ToxI score 300. Later, it was realised that inorganic compounds that occur naturally in surface waters should be given a higher ToxI score in order not to indicate a too high environmental risk of such compounds. Hence, these inorganics (e.g. phosphate, sodium sulphate and carbonates) have been assigned the ToxI score 1000. Still these compounds come out as potentially more hazardous on the Swan list than in the DID-list, where actual LTE has been determined as high as 1000.

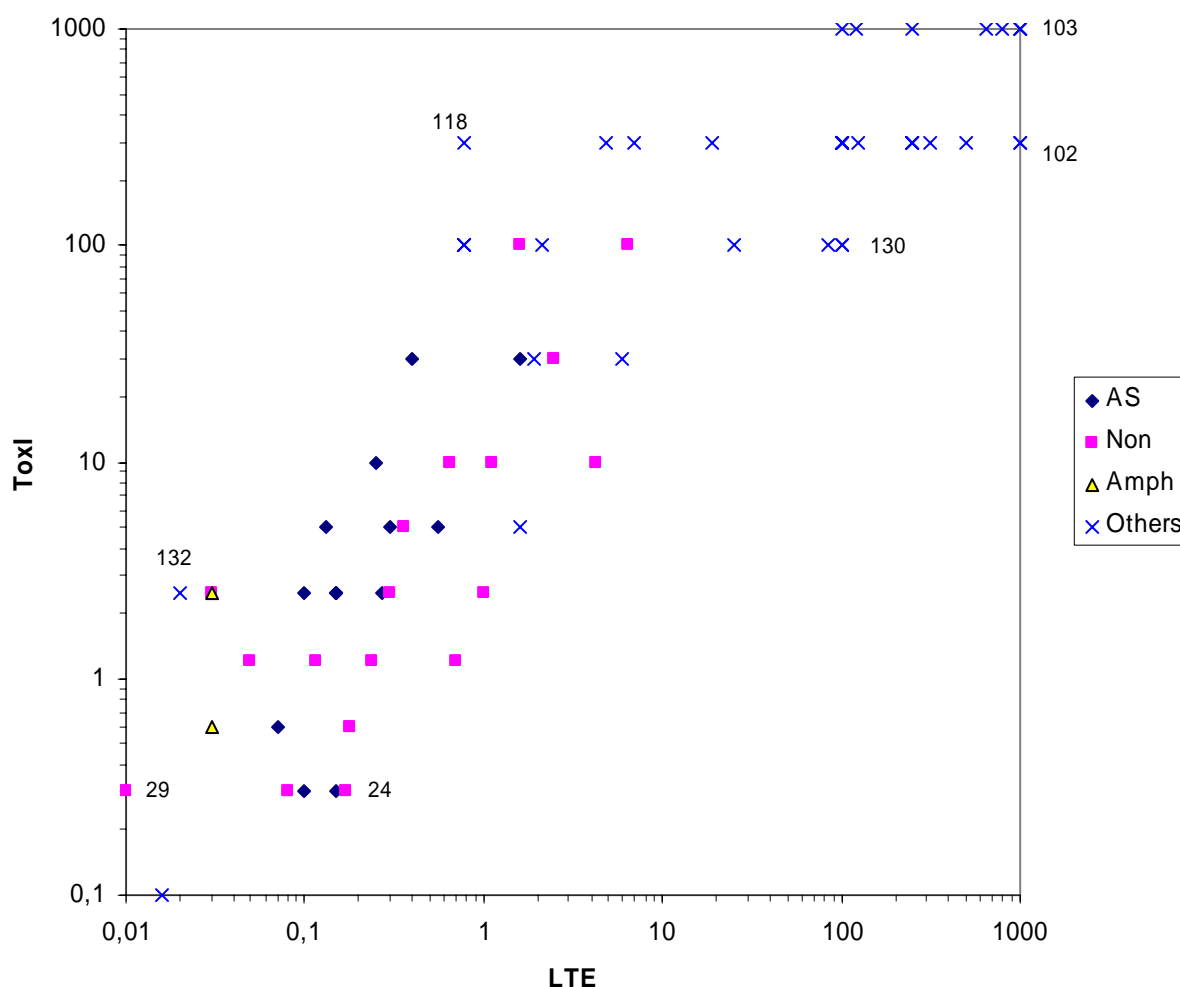


Fig. 1 Correlation between ToxI and LTE (Numbers refer to the Swan List). AS=Anionic surfactants, Non = non-ionic surfactants, Amph= amphoteric surfactants.

The advantage of the DID-list approach on toxicity is:

- Chronic toxicity more relevant than acute toxicity for effects in the environment

The disadvantage of this approach is that:

Less data are available for chronic than for acute toxicity, which implies that:

- Ranking of chemicals will be heavily influenced by single test results
- More expensive to produce data

## **6.2 Degradation**

The basis for evaluation of degradation in the two lists is partly the same, i.e. data for ready degradability, inherent degradability and anaerobic degradability. However different approaches have been used to account for degradation in the scoring systems. Again, the DID-list follows a risk assessment approach, where the removal of ingredients in treatment plants, by degradation and sorption is modelled to obtain a Loading Factor (for the receiving water). This model yields a high degree of differentiation (13 classes of LF) based on various combinations of degradability and sorption.

A major difficulty is that the LF is partially based on logKow, which is a measure of the lipophilicity of the ingredient and is meant to indicate the tendency for bioaccumulation. A high logKow shows a high lipophilicity and hence an increased risk for bioaccumulation in organisms. Unfortunately it is very difficult to measure logKow for surfactants with the current test method. Currently the logKow for surfactants is based on calculations. Calculation methods of logKow of surfactants often yield quite different results for the same compounds and it is difficult to experimentally verify the results.

In the Swan list the chemicals are classified as readily, inherently and non-degradable and assigned a degradation factor (NF) 1, 5 or 10 respectively. This gives less differentiation than the DID-list. Removal through sorption to sewage sludge is not accounted for. The rationale behind this approach is that the potential for environmental effects of the chemicals is not restricted to the receiving water. Adsorption of harmful substances may cause other problems; e.g. when sludge is used as fertiliser, and should therefore be considered in a more general environmental perspective.

In both the DID and Swan lists, aerobic biodegradation is combined with toxicity as a basis for an environmental risk score. The anaerobic degradation is treated as a separate parameter.

In the DID-list a correction factor is applied on the anaerobic non-degradable chemicals to account for their potential environmental impact. The Correction factor (CF) is now used in only one criteria document in the EU-scheme, which has a matrix with anaerobic biodegradation as one parameter. The weight of the parameter is adjusted according to the



toxicity and bioaccumulation of the chemical. This is not a measured quantity but rather derived from other factors that will be on the list (toxicity, biodegradability and logKow). It is very easy to find the CF if these 3 parameters are available. With the exception of surfactants they are to a large extent available. The Swan list does not make this distinction among anaerobic non- degradable chemicals but just adds them up in their anaerobic parameter.

The requirement for data on anaerobic degradation data has created some problems in revisions of the Swan list since this type of information is still not generally available. Often various analogy considerations are suggested as a basis for classification. There is a need for better guidance on the use of analogy considerations in the assessment of anaerobic degradability of new chemicals related to those already included on the list.

In the use of the data from the chemicals list in criteria documents for various groups of products there appears to be another difference between the Nordic Swan and the European Flower ecolabelling systems. In some Swan criteria ingredients an "escape clause" have been given: Ingredients that are aerobically readily degradable and have a low sorption rate are accepted as anaerobic biodegradable even though this has not been proven by the appropriate test for anaerobic biodegradability.

However this "escape clause" is not accepted for ingredients that have been tested and found to be not anaerobic biodegradable.

The reasoning behind the "escape clause" is:

- Ingredients with a high aerobic biodegradability will be less likely to even reach anaerobic compartments
- Ingredients with a low adsorption tendency unto solids will be less likely to enter into anaerobic compartments.

In the "European" criteria, scores for anaerobic degradability are included for all chemicals, but as noted earlier correction factors are used to account for other properties of the chemicals that may influence the environmental risk associated with the anaerobic non-degradable chemicals.

In summary, both lists rely on the same type of information as a basis for biodegradation. However, the DID-list uses a more quantitative approach, which allows a higher degree of differentiation as regards loading into the receiving water. The Swan list on the other hand follows strictly the OECD classification system, and distinguishes only between readily degradable, inherently degradable and persistent chemicals. The higher differentiation with the DID-approach may give a more just comparison between chemicals than with the classification system of the Swan-list. However, the problem of determining logKow for surfactants makes the use of the LF impractical for surfactants that are the most important class of ingredients in detergents. Additionally it is not good that the CDV that is the main parameter in many criteria is based on a factor that doesn't take

into account the adsorbed fraction. One major disadvantage with the Nordic Factor is that quantitative data is derived from tests that were designed to provide data for classification only.

One problem that has been identified with the biodegradation classification in the Swan list is the application of the "10-days window". According to the OECD Guidelines a minimum level of degradation has to be achieved within a 10 days window of the tests period (28 days). It has been argued that this criterion should not be applied on chemicals which are series of homologues (which e.g. surfactants often are). In the Swan list, chemicals which reach the minimum level of degradation, but not within the 10-day window, are classified as not readily (but inherently) degradable and get the degradation score 5 (instead of 1). Insertion of an additional class of degradability for chemicals reaching the limit level of degradation in a ready biodegradability test, but not within the 10-days window should be considered. This would increase the differentiation of the Swan list, although not to the level of the DID-list.

Advantages the DID- list approach on degradation are that:

- The DID-list provides a higher degree of differentiation
- The scores for anaerobic degradability is corrected for other properties

The disadvantage of the DID-list approach is that:

- The calculation of loading factor based on sorption and degradability means that only effects on the aquatic environment is considered

### **6.3 Other parameters**

#### **Soluble and insoluble inorganic materials.**

The material from both lists regarding insoluble and soluble inorganic materials is not conflicting.

#### **Bioaccumulation potential.**

This parameter appears only on the Nordic list but is used in the EU scheme for calculating the Correction Factor for anaerobic non-biodegradable compounds. The reason for including this factor in the Nordic scheme is mainly for classification according to the environmental risk phrase R53.

#### **Theoretical oxygen demand (ThOD).**

This parameter appears only on the DID-list. The reason for including this parameter is that the oxygen demand is seen as the main environmental impact of degraded organic compounds. It has only been used in the environmental matrix in the Laundry Detergents criteria. The revised Laundry Detergent criteria do not contain this parameter.

## **7. New framework**

This chapter gives an overview of the discussions that has taken place in the meetings that has been held and presents the conclusions of the discussions.

The discussions about the revised list has centred around the following issues:

- What parameters should the list contain?
- How shall the parameters be calculated?
- What alternative documentation should be accepted?

## **7.1 Toxicity**

Chronic toxicity is more relevant to the actual situation in the environment, but the lack of NOEC data makes the ranking of the chemicals less precise than if acute data (LC50 or EC50) are used. The production of NOEC data has been low in the years that have passed since the first list was published but there are signs of an increase of the availability of such data. Both detergent producers and ingredients producers have said that in the recent couple of years more NOEC-tests are being carried out. Additionally it is now required under EU legislation to carry out chronic tests for new compounds.

It is expected that the new EU chemicals directive (as outlined in the White Paper on chemicals policy) and the coming updated detergents directive will lead to the production of more chronic data.

Chronic test results are less available and the tests are more expensive and time-consuming than acute tests. Additionally acute tests are required for classification purposes. Hence if a toxicity parameter based on acute tests is chosen, little or no further testing is needed.

The ad-Hoc Working Group was in favour of continuing the policy of using chronic data as a basis for the Toxicity Factor. Because of the relative shortage of chronic data the Toxicity Factor would have to be supplemented with acute data where no chronic data is available. The Nordic Swan has a large number of licences for detergents and a long-standing practise for using a Toxicity Factor based on acute data. The representatives of the Nordic Swan indeed expressed that they would probably still use the Toxicity Factor based on acute data in the future unless much more chronic data will be available. For these reasons the Group accepted the inclusion of a second Toxicity Factor based on acute data.

**It was decided to include chronic and acute toxicity on the list, as well as their corresponding Toxicity Factors (TF).**

The UFs (uncertainty factors) currently in use in the DID-list has been criticised because it differs from the ones stipulated in the TGD of the Risk Assessment directive. Our investigations have not shed light on the reasons for these differences. The reports from the development and from first revision of the list does not give any explanation. The corresponding uncertainty factors employed (incorporated into the ToxI) by the Nordic Scheme are not harmonised with the TGD assessment factors.

Ecolabelling Norway proposed new Safety Factors harmonized with the Risk Assessment Directive. The main advantage with this is that such factors would have a more solid scientific backing and be based on an European consensus.

**It was decided to make a harmonised approach between the two ecolabelling schemes where the EU Risk assessment directive and its TGD as basis for the setting of the harmonised Safety Factor (=AF=UF).**

#### **The proposed new Safety Factors (SF):**

<b>Data</b>	<b>Safety factor (SF)</b>	<b>Toxicity factor (TF)</b>
<b>1 short-term L(E)C50</b>	<b>10000</b>	<b>Toxicity/10000</b>
<b>2 short-term L(E)C50 from species representing two trophic levels (fish and/or daphnia and/or algae)</b>	<b>5000</b>	<b>Toxicity/5000</b>
<b>At least 1 short-term L(E)C50 from each of three trophic levels of the base-set1</b>	<b>1000</b>	<b>Toxicity/1000</b>
<b>One long-term NOEC2 (fish or daphnia)</b>	<b>100</b>	<b>Toxicity/100</b>
<b>Two long-term NOEC from species representing two trophic levels (fish and/or daphnia and/or algae)</b>	<b>50</b>	<b>Toxicity/50</b>
<b>Long-term NOEC from at least three species (normally fish, daphnia and algae) representing three trophic levels</b>	<b>10</b>	<b>Toxicity/10</b>

- The base set for testing the toxicity of substances towards aquatic organisms consists of acute tests with fish, daphnia and algae.

There are great variations between the data set for acute and chronic toxicity and accordingly the same safety factor cannot be used for the two toxicity factors.

**As a consequence it was decided to include two Safety Factors on the list:  $SF_{acute}$  and  $SF_{chronic}$ .**

The  $SF_{acute}$  is identical to the current safety factor used in the Nordic Swan except that they are 1000 times higher. This just means that the CDV has to be adjusted accordingly. It does not influence the ranking of the ingredients.

The  $SF_{chronic}$  is almost identical to the UF currently used in the EU but two more levels are introduced: L(E)C50 from only 1 trophic level ( $UF_{chronic}=10\ 000$ ) or 2 trophic levels ( $UF_{chronic}=5\ 000$ ). Another difference is that the values for the 4 other levels are 10 times higher but since that concerns all levels equally it is just a matter of increasing the CDV 10 times.

Regarding the  $SF_{chronic}$ : The Safety Factors will, just as in the current scheme, encourage manufacturers to produce more NOEC-values. The most important effect of this scheme is that, in the event that no NOEC-values are available, the production of more L(E)C50 data is encouraged.

Members of the aHWG have voiced concern that the gap of  $UF_{\text{chronic}}$  - values from 10 to 10 000 is very high. Their worry is that less investigated, but environmentally preferable, ingredients will be put too much in disfavour. However, the cases where very few acute data are available are rare.

Members of the aHWG has also asked for a simplification of the UF by dividing all values by 10 so that values would range from 1 to 1000 instead of 10 to 10 000. This clearly would not influence the ranking of the ingredients but just the CDV-values. The increase in CDV-values in the Nordic Scheme will be to a certain degree counteracted by a decrease in the Uncertainty factor. The CDV-values in the criteria documents will just have to be multiplied by approximately 100 in the Nordic Scheme and by 10 in the EU scheme. The figure 10 for the EU scheme is very uncertain because the new CDV-values will be based on a new degradation factor. The increase will probably be more than 10 times because the fraction of the ingredients removed by adsorption is no longer taken into account in the calculation of the DF.

In both schemes a lot seems to depend on the importance that is put on the magnitude of the CDV-value. In both ecolabelling schemes it seems that the CDV is adjusted so that the desired percentage of the market can fulfil the requirement. The criteria developers do not claim to have set the CDV levels according to investigations of for example, the carrying capacity of waterways in relation to the requirement levels. However it is clear that a dramatic increase in CDV requirement levels caused by the new UF can be difficult to explain to the general public in both the EU and the Nordic countries.

The Group wished to harmonize the Safety Factors with those of the Risk Assessment Directive and decided to retain the proposed Safety Factors.

**The aHWG accepted the proposed new Safety Factors ( $SF_{\text{acute}}$  and  $SF_{\text{chronic}}$ ) and the assigned numerical values.**

**7.1.1. Statistical evaluation of toxicity data**

The aHWG has expressed a wish to continue the EU approach to let the risk assessment approach be the guiding principle in the setting and definition of parameters on the list. However, some of the elements on the list have been criticised in the past and also by members of the aHWG. The precautionary element seems to have been the reason for the choice of the lowest toxicity value as basis for the LTE. It has been argued by many that the use of the lowest value is not appropriate in this context because it does not reflect the whole set of data for a particular ingredient.

The aHWG agreed that the main aim of the list is to create a ranking of chemicals. The precautionary principle should not be applied in the setting of the values on the list. Rather this principle should be used when setting the requirements in the ecolabelling criteria. The use of median values instead of the lowest values would encourage production and publication of more data leading to greater precision in the ranking. Additionally, the use of median values rather

than average values greatly reduces the impact of outliers, i.e. test results that are very much higher or lower than the bulk of the other results for the same ingredient and tested species.

### **The ahwg decided to use median values as a basis for the Toxicity values.**

The toxicity windows were introduced in the Nordic list to account for the great variation in test results. However this is to a certain extent taken care of already when the median value is put on the list.

The ahwg agreed that there are big problems in the use of the toxicity windows. One big problem is that the currently used windows do not cover sufficiently the very high and low toxicity ranges, since all chemicals with toxicity below 0,25 mg/l are assigned the ToxI-value 0,1 and those with toxicity above 150 mg/l are assigned the ToxI-value 300 (except for some natural inorganic constituents, which have ToxI=1000). This could be remedied by introducing additional windows in the high and low ranges. The other main problem is that very small changes in the median value can lead to a transfer from one interval to another with very different mean values. Thirdly, the use of toxicity windows is less in line with the risk assessment approach that hitherto has been employed in the DID-list. It has been argued that the danger of misuse of the values on the list for classification purposes is not a good reason for using the windows. This misuse takes place today anyway, even though the Nordic list uses the windows.

For these reasons the ahwg has not wished to retain the use of toxicity windows.

The precautionary principle is applied in many ways in the current lists. One is the use of the values for the most sensitive species to express the LTE or ToxI. The ahwg agrees that this approach should be followed in the future but concerns have been raised about the use of the fish test. The fish test is regarded ethically questionable by many stakeholders. Efforts are underway to design a new test that would still use fish, but in an early life stage. As soon as this test is developed and standardised it should be accepted, instead of or in addition to, the current OECD standard fish toxicity test. Until that occurs the ahwg agrees that results from the current fish test should be accepted.

There has been a broad consensus in the ahwg to continue to use the data from the most sensitive trophic level.

In many cases there are more than one test result from one species. For other species within the same trophic level there might be just one result. If all test results within a trophic level would count equally in the calculation of the median this could have unwanted consequences. It would mean that the species with the most test results would have a great influence on the median. If many test results exists for a very insensitive species it would give a relatively high number for the toxicity, i.e. a low toxicity. And correspondingly a large number of test results on a sensitive species would give a high toxicity. Torben Madsen argued that all species within a trophic level should count equally no matter how many test results we have. The proposal was to first calculate the median of all species. Then the median of each trophic levels should be calculated using the

species medians as basis of the calculation. The ahwg accepted the proposal without discussion.

**The ahwg decided to apply the following principles for statistical treatment of toxicity data:**

- **the median of all species, for which data has been given, should be calculated**
- **the median of each trophic level should be calculated using the species medians as a basis**
- **the median value for the most sensitive trophic level should be used in the list**
- **no use of toxicity windows**

## ***7.2 Degradation factor***

The intention behind the current Loading Factor (LF) was to give a measure of the fraction of the ingredient that would reach a water recipient. Part of a detergent ingredient will degrade, another part will be adsorbed on solids (e.g. sludge in the waste water treatment plant), a (usually small) part will be released to air but the remainder will be released into water recipients. The LF does not include the adsorbed fraction or the one released into air. The fraction adsorbed to solids is high for some ingredients. An ingredient that has low degradation but high sorption onto solids would give a low LF and hence a low contribution to the total CDV. One possible consequence of this is that eco-labelled products would lead to contamination of sewage sludge and sediments. Given the current importance of the CDV this does not give the right signals to the manufacturers. The criteria development working groups and the EU Ecolabelling Board has agreed that in eco-labelled products use of primarily compounds that are highly degradable under both aerobic and anaerobic conditions should be encouraged. Hence it was decided to replace the LF with a new factor which would only take into account removal through degradation.

Another difficulty brought up by the ahwg is the way the LF is calculated. It is based partly on logKow-values. For surfactants the method of measuring logKow is not possible to use. In the past calculations have been made for logKow but these calculations do not yield reliable and realistic results (see chapter on Bioaccumulation). Finally the reasoning behind the chosen values for LF is not adequate. This especially concerns the special values used for surfactants. For these reasons there is a need to redefine the LF anyway.

The ahwg agreed in the first meeting to abandon the currently used Loading Factor.

The alternative of keeping the LF as it is (only consider the non-degraded and non-adsorbed) but to use a different approach for calculations, was rejected by the group.

### **The ahwg accepted to replace the loading factor with a degradation factor.**

The Nordic chemical list has a simple degradation factor based on widely available data from standardised and internationally accepted test methods. The values are quite similar to the values from the DID-list when adsorption is excluded.

The proposed values for DF based on the Risk Assessment Directive and its TGD. Hence also this factor is based on scientific studies and European consensus.

The value for ready biodegradability is quite low and reflects the fact that, even though the limit is set to 60 or 70 % degradation in the standard OECD degradation tests, the degradation is in fact almost 100 %. Some degraded matter is incorporated into the degrading organisms. Another part is converted into waste substances (apart from CO<sub>2</sub>) that are almost the same no matter what "feed" the organisms are given.

One of the most discussed issues in the ahwg has been the problem (in both the Swan list and the DID-list) of the application of the "10-days window". According to the OECD Guidelines a minimum level of degradation has to be achieved within a 10 days window of the test period (28 days), and it has been discussed how this should be reflected in the new DID-list.

Some members have argued that this criterion should not be applied on chemicals that are series of homologues (which e.g. surfactants often are). The reason is that the organisms will first start to degrade the easiest degradable homologue, then the second best, and so forth. Even if all the single homologues pass the 10-day-window the resultant degradation curve for the mixture will not. Many ecolabelling criteria have the requirement that all surfactants must be readily biodegradable. We have reasons to believe that manufacturers claim that their products are readily biodegradable if they fulfil the final degradation percentage but not the 10-day window requirement.

Other members argue that there are nevertheless surfactants that we positively know has passed the 10-day-window. It has been argued that these surfactants pass the test just because they are "small-spectrum" surfactants, i.e. have few homologues or one very dominant homologue. One producer has warned that strict requirements on the 10-day-window could lead to an increased use of distillation and other energy-intensive partition techniques to produce "small-spectrum" surfactants that would perhaps be mixed to form "broad-spectrum" surfactants in the detergents anyhow. This would mean a waste of energy and hence be detrimental for the environment.

One producer has argued that they see the non-fulfilment of the 10-day-window for a surfactant as a contra-indication for its use in their products. The reason is that they have experienced that the degradation properties are affected in a negative direction when such surfactants are used.

Based on this the ahwg has reached the conclusion that it is reasonable to accept all surfactants that consist of a series of homologues as readily biodegradable when the final degradation percentage is fulfilled, even if the 10-day window



criterion is not fulfilled.

The ahwg also discussed which score should be given to other mixtures used in detergents. One member suggested that each ingoing component in the mixture should be treated individually. Other members countered that in the case of complex mixtures such as natural extracts this is not practical. A perfume may consist of many hundred compounds! It seems fair to apply the same principles here as for surfactants. A potential problem is that such mixtures could "mask" the addition of ingredients that are not biodegradable.

The ahwg has stated that perfumes will probably not be on the list anyway because there are so many formulations. Furthermore the group agreed that other ingredients also consisting of a group of homologues should be treated in the same way as surfactants.

In the Swan list, chemicals which reach the minimum level of degradation, but not within the 10-day window, are classified as not readily (but inherently) degradable and get the degradation score 5 (instead of 1). Insertion of an additional class of degradability for chemicals reaching the limit level of degradation in a ready biodegradability test, but not within the 10-days window was proposed and accepted. This increases the differentiation of the Swan list, although not to the level of the DID-list.

**The following Degradation Factor, based on the risk assessment directive, and consists of 4 levels, was proposed:**

Table 1. The accepted new degradation factor (DF):

	NF (The Swan)	TGD (half time)	New DF
Readily biodegradable (*)	1	15 days	0,05
Readily biodegradable (**)	1	50 days	0,15
Inherently biodegradable	5	150 days	0,5
Persistent	10	Not degraded	1

(\*) All surfactants or other ingredients that consist of a series of homologues and which fulfil the final degradation requirement of the test shall be included in this class regardless whether the 10-day window criterion is fulfilled or not.

(\*\*) 10-day window criterion not fulfilled.

The definitions of ready and inherent biodegradability are given in the relevant OECD Guidelines. An ingredient is termed "persistent" if it does not fulfil the criteria for inherent biodegradability or if it has not been tested for ready or inherent biodegradability.

**The ahwg decided to adopt the proposed degradation factor. Surfactants and other ingredients that consist of a series of homologues do not have to fulfil the 10-day-window to get a DF of 0,05.**



### **7.3 Anaerobic biodegradability**

In most of the detergent criteria documents in both schemes requirements are set on anaerobic biodegradability. The ahwg has agreed that an indication of the anaerobic biodegradability of the ingredients should be on the list.

The issue of anaerobic biodegradability of detergent ingredients have been the cause of much controversy in the criteria development for detergents. This is a major issue also in the discussions of the new detergent directive.

Some Industry Representatives in the ahwg for this project has warned against tough restrictions on the use of anaerobically non-degradable compounds. They argue that such requirements does not have a solid enough scientific backing. A recent report by the Fraunhofer Institute has been used to support these claims.

The Industry Representatives also argued that the currently used ECETOC test method is not good enough. They argue that both "false negatives" and "false positives" have been found. Madsen agreed that this was the case but proposed that as long as one is aware of this fact means that the true result can be arrived at by other means. One possibility is analogy considerations. Another is the use of tests with radioactive labelled ingredients at low concentrations.

Another argument from the Industry Representatives was that ingredients that are aerobically biodegradable and have a low tendency to adsorb onto solids should be accepted as anaerobically biodegradable even if it has failed the ECETOC test or have not been tested. This possibility has been called the "Escape Clause". The Group argued in favour of onøy including data on anaerobic degradability in the column for anaerobic degradability. The Group wanted to let the ahwg developing criteria decide whether or not the Escape Clause should be used. Data for aerobic degradability is on the list. Data for adsorption unto solids is relatively scarce and could be supplied by ingredients producers. Hence it was decided not to include a separate class of ingredients for compounds that falls into the "escape clause"-category.

Some Member States and representatives of other interested parties have argued in favour of tough requirements on anaerobic biodegradability. They point out that many Member States would like to use sewage sludge as fertiliser for agriculture. Because of contamination the sludge in many places constitute a big waste problem instead of a valuable resource. It has also been suggested to include sewage sludge as a resource for ecolabelled soil improvers. This is very controversial as long as sewage sludge is heavily contaminated. It is important that these initiatives are not undermined by other eco-labelling efforts. Furthermore they argue that the use of anaerobically non-degradable compounds will lead to an accumulation of these compounds in sediments. The effects of this have not been extensively studied and might only be known after a long time. Finally many of the arguments against restrictions of the use of anaerobically non- biodegradable ingredients are based on studies in well functioning treatment plants, many of whom have activated sludge treatment. However a large percentage of European households are either not connected to a waste

water treatment plant (WWTP) or the WWTP they are connected to only have a low degree of treatment, e.g. only mechanical removal of solids.

The problem of anaerobically non-biodegradable detergent ingredients can be addressed in many ways. The ahwg has reached the conclusion that it is not necessary to reach a solution on this issue in the current project. This task should be laid on the working groups for the development or revision of detergent criteria documents. The DID-list should, however, contain the necessary tools no matter which solutions the criteria development groups choose.

**Hence the ahwg has decided to use the following categories on the list under the heading of anaerobic biodegradability:**

<b>Category</b>	<b>Label</b>
<b>Anaerobically not biodegradable, i.e. tested and found not biodegradable.</b>	<b>N</b>
<b>Anaerobically biodegradable i.e. tested and found biodegradable or not tested but demonstrated through analogy considerations etc.</b>	<b>Y</b>
<b>Not tested for anaerobic biodegradability.</b>	<b>0</b>

The Correction Factor was also discussed. Ecolabelling Norway argued that the factor should be removed due to the following reasons:

- It is only used in one criteria document.
- It is partially based on logKow. Such values cannot be determined accurately enough for surfactants.
- It is a derived factor, i.e. based on parameters already on the list (except logKow for surfactants). Hence it is easy for those interested to find the value using the list and the flow-sheet. It is not necessary to devote an entire column to his value.
- The CDV encompass also the adsorbed fraction of the compound, e.g. the part that most likely will end up in anaerobic compartments. Hence the need for the anNBDO, which is a sort of "anaerobic CDV", using the CF, is diminished.

**The members of the ahwg accepted these arguments and agreed to remove the correction factor from the list. This also implies removing from the list the flow sheet calculating the correction factor. The flow sheet could be a part of the concerned criteria document.**

#### **7.4 Other parameters**

Theoretical oxygen demand (ThOD) is no longer needed as a separate item on the list because there are no corresponding requirements in the criteria. The Swan label uses TOC, but of the whole products not individual compounds. **Hence it was decided to omit the ThOD.**

**It was decided to remove easily soluble inorganic compounds as a parameter of the list because it does not exist as a requirement in any criteria document.**

There still exists requirements on insoluble inorganic compounds but it seems unnecessary to occupy a whole column for this purpose especially when we know that most compounds on the list are organic. **Hence it was decided to indicate by other means whether the inorganic compounds that are considered insoluble.**

Bioaccumulation potential expressed as logKow has never been on the EU list but it is used as information source when determining CF and LF. In the Nordic Swan it has been included and used to a limited extent. It can be used to determine whether a compound should be classified as R50/53 and whether a preservative is potentially bio-accumulating (this requirement exists in many criteria documents). Many preservatives are on the list. Bioaccumulation potential is often regarded as a strong indicator for environmental hazard.

The members of the aHWG see logKow as a potentially useful tool in criteria development and licensing. They argued, however, that for surfactants there are neither satisfactory computational nor experimental methods for determining logKow. They also argued that the logKow is currently not much used in the detergents criteria except for preservatives. Furthermore the classification of a compound is in most ecolabelling criteria the responsibility of the licence applicants. Those handling the applications do not classify the ingredients but may in some cases want to check the classifications made.

**It was decided to remove the logKow as a parameter on the list.**

**The ahwg agreed on the following:**

- i) ThOD will be removed as a parameter.**
- ii) Soluble inorganic ingredients will be removed as a parameter.**
- iii) Insoluble inorganic ingredients is retained as a parameter but not indicated in a separate column. It will indicated in a paranthesis behind the ingredient name.**
- iv) LogKow will be removed as a parameter.**

## **7.6 The status of the list**

The DID-list is currently an appendix of the 4 detergent criteria documents in the EU. In the Nordic Scheme it is a separate document and it is referred to in 12 criteria documents. If the Nordic scheme and the EU scheme agree on one list it is impractical to keep the list as an appendix to criteria documents. It would mean that Nordic documents would have to refer to an appendix in an EU criteria document.

### **The ahwg preferred to establish the DID-list as an independent document.**

The current name of the list is "Detergent Ingredients Database" and it is commonly known as the "DID-list". It is however, not a database and the name is difficult to understand for many. The ahwg has considered some alternative names but no name has been agreed upon.

### **The list will retain its current name.**

## **7.7 Brand names**

Inclusion of brand names in the list has been a topic in the discussions. Should we have ingredients on the list that are only defined by their trade names or with limited chemical information in addition?

The issue has been raised because we want to have as many new ingredients on the list as possible. The discussion has concerned new ingredients only, i.e. those currently not on the list.

The topic has been discussed in the ahwg, and it was agreed that an important aim in ecolabelling that the list should be as transparent as possible. It should not be proposed to replace any of the chemical names on the lists with trade names.

One of the reasons for the wish to have Brand Names on the list is the wish of the ingredients manufacturers to protect information about their products. Some manufacturers have expressed the wish to have some of their ingredients on the list without revealing the chemical structures. One important reason is the fear of "free riders" (other companies getting free access to data that one company has paid a lot to produce). Sometimes it is important to keep the structure of ingredients secret because a lot of time and money has been invested in the development of the ingredient. This seems to be bigger for speciality chemicals, i.e. ingredients used in a few applications and/or produced by a few companies.

Thirdly there is the commercial aspect. It might be of commercial value to have a product listed under a Brand Name. Some companies have expressed a willingness to pay to have their Brand Names on the list. One company representative has stated that this would make companies less likely to submit too many Brand Names for the system to handle.

The ahwg agreed that ingredients such as perfumes that are not standardised but are tailor-made for almost every producer should not be included on the list. The ahwg also recommended not including ingredients whose chemical structure is completely unknown on the list. The ahwg concluded that if a chemical is listed under Brand Names some chemical information must be given.

The Commission discussed the legal aspects of establishing a Brand Names list were discussed by the Commission, and decided not to establish such a list in the name of the European Ecolabel. The Mandate given for the current revision did not include the development of a list with brand names, and the resources for a successful completion of such a list was not provided. Ecolabelling Norway has therefore set the revision of the DID-list in its current form as their first priority.

**As a consequence Ecolabelling Norway has decided not to take steps towards establishing a Brand Names List even though the ahwg had no objections towards establishing such a list.**

### ***7.8 Alternative documentation***

The ahwg has accepted to continue the current policy in EU Ecolabelling of accepting a lower Safety Factor if sufficient scientific data is presented to demonstrate that a lower factor should be used.

Ecolabelling Norway has also proposed to continue the current policy in EU Ecolabelling of accepting QSARs to correct test results that are clearly anomalous e.g. when comparing the values from a group of homologous compounds.

What alternative documentation should be accepted for the parameters on the list? In some cases the ingredients have been tested but with other tests than the ones specified. In other cases there is other evidence that might be presented, for example computer simulations like QSARs (Quantitative Structure Activity Relationships). It is very important that it is completely clear for everybody which alternative documentation is acceptable. Otherwise there is a risk for situations of doubt in the application handling.

**The ahwg has accepted the use of QSARs, analogy considerations and other scientific reasoning (f ex expert opinions based on experience) to change parameter values that are not consistent with those of similar, but not identical ingredients.**

Based on the discussions we proposed to accept high-quality data even though they do not come from the specified tests. It is important to reward those companies that have invested in thorough investigations of the environmental effects of their activities. High-quality data could be defined in many ways but the proposed way is to define it as results from internationally accepted standardised tests. One such example is the newly completed OECD 309 simulation test on mineralisation of organic substances in surface water.

Another example concerns the test for anaerobic biodegradability. If the recommended screening test is not feasible because of the high concentration of test product needed, it should be possible to use non-standardised tests conducted with low concentrations of test product. Alternatively, assessments of anaerobic biodegradability may be based on test results of very similar substances. An independent expert judgement of the data may be requested when the applicant uses alternative documentation,

**The ahwg has accepted these proposals.**

## **8. Extension and revision of the list**

### **8.1 Introduction**

Ecolabelling Norway has repeatedly asked the Industry (both detergent manufacturers and detergent ingredient manufacturers) for environmental data on detergent ingredients. The Industry has responded very well and supplied us with a large body of data.

We received in November 2003 data on 54 non-surfactants from AISE with aid from CEFIC. In April 2004 we received data on 70 surfactants from CESIO. We have also received some data from individual companies. From open sources we have found data on 71 ingredients, both surfactants and non-surfactants. From two reports we have the majority of data used in the current DID-list. Based on these data we have been able to update the parameter values for most of the ingredients on the list. We have also been able to extend the list from the current 85 to 166 ingredients. The real number of new ingredients is higher than 81 (=164-85) because some "old" ingredients have been grouped together, e.g. mono-ethanolamine, di-ethanolamine and tri-ethanolamine.

We have introduced new categories for Cationic Surfactants and for Preservatives. Indeed many of the new ingredients are preservatives.

Most new entries are non-surfactants. The reason is that most surfactants used in detergents are already on the list. The most noted change in the surfactants area are inclusion of cationic surfactants, separate entries for branched alcohol etoxylates, inclusion of alcohol with both EO and PO groups and inclusion of a few other surfactant groups (e.g. C9/11 2-10 EO Carboxymethylated, sodium salt or acid). However the submitted data on surfactants have been of great value for updating the surfactant parameter values making especially the Toxicity Factors more accurate than what would otherwise be the case.

Most new entries are non-surfactants, especially preservatives. We have also received a lot of data on ingredients already on the list. This has enabled us to revise the parameter values for many ingredients. This ensures a higher precision in the ranking of the ingredients.

### **8.2 Toxicity**



For some ingredients we have experienced a lack of data for acute toxicity. In some cases we have remedied the lack of data by accepting data of slightly inferior data, ie toxicity test results from test with too low exposure time. In other cases we have adopted median values used in the establishment of the Nordic Swan Chemicals List. In these cases we know the number of test results and the median for each trophic level but we do not have access to the individual test results. We hope that the number of ingredients based on such data will be greatly reduced in a future revision.

We have received little data on chronic toxicity. This has meant that for many ingredients we did not have any data to use as a basis for the chronic Toxicity Factor (TF<sub>chronic</sub>). In these cases we were forced to use the number for acute Toxicity Factor (TF<sub>acute</sub>) also for the chronic TF as agreed by the aHWG. We hope that much more chronic toxicity data will be produced in a future revision, enabling a more precise ranking based on chronic toxicity.

### **8.3 Degradability**

We have received a lot of data on aerobic biodegradability. There are now very few cases of ingredients for which no data on aerobic biodegradability have been found. Unfortunately we have received very little data on degradability under anaerobic conditions. This means that the list will be of less value than it could have been. Detergent producers will have few alternatives available in their search for anaerobically biodegradable ingredients. We hope that more data on anaerobical biodegradation will be available in the next revision.

### **8.4 Alternative documentation**

In the process of evaluating and processing submitted data Ecolabelling Norway have followed certain principles regarding quality control and regarding statistical treatment of data and calculation of parameters. The principles regarding statistical treatment of data and calculation of parameters are in Appendix 1. The principles regarding quality control are in Appendix 2.

In some cases the experts have chosen to change the parameter values that have been calculated according to the above-mentioned principles. In some cases a QSAR calculation show that the Toxicity Factor (TF) of an ingredient is not consistent with other similar ingredient, e.g. a surfactant within a series of homologues. In these cases the TF is changed so that it is consistent with the TF of the other ingredients. In other cases the Safety Factor (SF) has been reduced to a lower level. This concerns for instance ingredients with very low toxicity but which have not been tested extensively.

All the cases where the calculated values have been changed have been recorded in a separate file.

## **9. Updates and future revisions**

The DID-list and the Nordic Swan Chemicals List were developed in the years 1992-1995. Since then the ecolabelling schemes have updated the lists (adding new ingredients and modifying parameter values) but the framework has been

largely unchanged. In the current revision the framework of the lists has been thoroughly investigated and discussed. A European consensus has been reached for a revised framework based on more than 10 years of experience with the lists. It is our belief and hope that there will be no need for further revisions of the framework in the foreseeable future.

Given the high level of innovation and scientific research in the Industry it is easily understood that the Industry wants frequent updates to take place. In this connection we define updates as inclusion of new ingredients or changes of the parameter values of the ingredients already on the list. Not only Industry but many other interested parties have asked when the list will be updated or revised and how this will be done.

The official new list is the version 30 Jun 2004 and no validity period has been set for it. This is consistent with the current practise by both ecolabel schemes.

Future updating of the list shall be evaluated by the EU Commission on request from the European Eco-Labeling Board, the Nordic Swan ecolabelling Board or from industry or other users of the lists.

As this project was launched as a part of the working plan for the Co-ordination and co-operation Management Group, the revision has therefore been made in close cooperation with the Nordic Swan ecolabel. The harmonisation of the list from the two labels will hopefully bring many benefits and contribute to saving resources both in the Competent Bodies and with the industry. In order to retain these benefits, future changes of the list should only be made in co-operation with the Nordic Swan and the EU Flower eco-labelling schemes.