File No: LTD/1500

January 2012

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

L-Glutamic acid, N-(1-oxotetradecyl)-, potassium salt (1:1) (INCI name: Potassium Myristoyl Glutamate)

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of Sustainability, Environment, Water, Population and Communities.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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Director
NICNAS

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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette:*

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
LTD/1500	Estee Lauder Pty. Limited	L-Glutamic acid, N-(1-oxotetradecyl)-, potassium salt (1:1) (INCI name: Potassium Myristoyl Glutamate)	Yes	≤ 1 tonne per annum	A component of cosmetic products at concentrations of ≤ 5%

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
Based on the available data the notified chemical is classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)]. The classification and labelling details are:
R38 Irritating to skin

and

The classification of the notified chemical using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2009) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

	Hazard category	*Hazard statement*
Skin Corrosion/Irritation	2	Causes skin irritation

Human health risk assessment
Under the conditions of the occupational settings described, the notified chemical is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified chemical is not considered to pose an unreasonable risk to public health.

Environmental risk assessment
On the basis of the PEC/PNEC ratio, maximum import volume and the assessed use pattern, the notified chemical is not considered to pose an unreasonable risk to the environment.

Recommendations

REGULATORY CONTROLS
Hazard Classification and Labelling

- Safe Work Australia, should consider the following health hazard classifications for the notified chemical:
  - R38 Irritating to skin

- Use the following risk phrases for products/mixtures containing the notified chemical:
  - Conc ≥ 20%: Xi; R38

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified chemical itself. However, these should be selected on the basis of all ingredients in the formulation.

- A copy of the MSDS should be easily accessible to employees.

- If products and mixtures containing the notified chemical are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)] workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified chemical should be disposed of to landfill.

Emergency procedures

- Spills or accidental release of the notified chemical should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification
This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(1) of the Act; if
  - the importation volume exceeds one tonne per annum notified chemical;
  - the function or use of the chemical has changed from a component of cosmetic products at concentrations of ≤ 5%, or is likely to change.

or

(2) Under Section 64(2) of the Act; if
  - the amount of chemical being introduced has increased from 1 tonne per annum, or is likely to increase, significantly;
  - the chemical has begun to be manufactured in Australia;
  - additional information has become available to the person as to an adverse effect of the chemical/polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

Material Safety Data Sheet
The MSDS of the notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Estee Lauder Pty. Limited (ABN 63 008 444 719)
21 Rosebery Avenue
ROSEBERY, NSW 2018

NOTIFICATION CATEGORY
Limited-small volume: Chemical other than polymer (1 tonne or less per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
No details are claimed exempt from publication.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows: melting/boiling point, density, vapour pressure, hydrolysis as a function of pH, partition co-efficient, absorption/desorption, dissociation constant, particle size, flash point, flammability limits, autoignition temperature and explosive properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
None

2. IDENTITY OF CHEMICAL

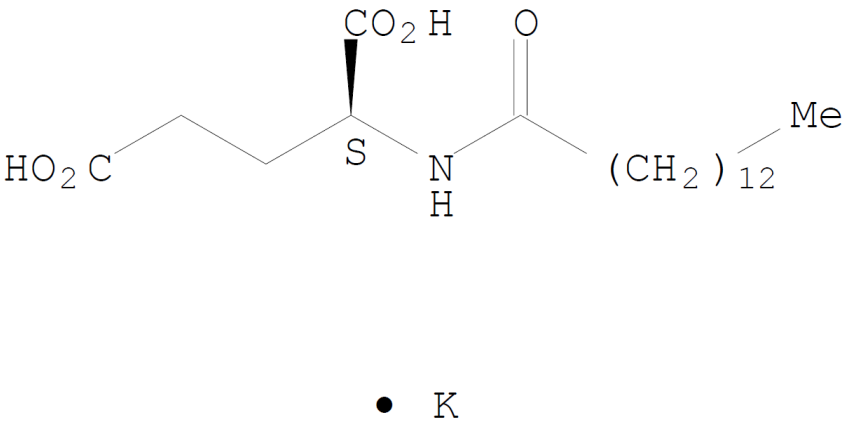
MARKETING NAME(S)
Amisoft MK-11F
Potassium Myristoyl Glutamate (INCI name)

CAS NUMBER
72716-26-8

CHEMICAL NAME
L-Glutamic acid, N-(1-oxotetradecyl)-, potassium salt (1:1)

MOLECULAR FORMULA
$C_{19}H_{35}NO_5.K$

STRUCTURAL FORMULA



MOLECULAR WEIGHT

395.6 g.mol^{-1}

ANALYTICAL DATA

METHOD	Infrared Spectroscopy
Remarks	Major bands observed at: 3330, 2920, 2850, 1650 and 1270 cm^{-1}. The IR spectrum is consistent with the structure of the notified chemical.
TEST FACILITY	Ajinomoto Co., Inc. (2006)

3. COMPOSITION

DEGREE OF PURITY 81-100%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

Chemical Name	Heavy metals (not specified)		
CAS No.	n/a	*ppm*	0-20
Hazardous Properties	Varies		
Chemical Name	Arsenic		
CAS No.	7440-38-2	*ppm*	0-2
Hazardous Properties	Conc ≥ 25%: T; R23/25 ≥ 3%Conc < 25%: Xn; R20/22		

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)

Chemical Name	L-Glutamic acid, N-(1-oxotetradecyl)-, dipotassium salt		
CAS No.	Not known	*Weight %*	< 20

ADDITIVES/ADJUVANTS None

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 ºC AND 101.3 kPa: White to pale yellow solid (flakes)

Property	Value	Data Source/Justification
Melting Point/Freezing Point	329.23ºC	Calculated, weighted value (MPBVP v1.43, US EPA 2011a)
Boiling Point	749.69ºC at 101.3 kPa	Calculated using the Adapted Stein and Brown Method (MPBPVP v1.43, US EPA 2011a)
Density	1,040 – 1,150 kg/m^3 at 25ºC	MSDS for an introduced product containing the notified polymer at ≤ 5%.
Vapour Pressure	3.68 × 10^{-19} kPa at 25 ºC	Calculated using the Modified Grain Method (MPBPVP v1.43, US EPA 2011a)
Water Solubility	≥ 0.5 g/L at 20ºC	Measured. Expected to be highly dispersible in water as it is a surfactant.
Hydrolysis as a Function of pH	Not determined	Contains hydrolysable functionality but expected to be hydrolytically stable under environmental conditions (pH 4-9, 25ºC)
Partition Coefficient (n-octanol/water)	log Pow = 1.30-4.45	Calculated (KOWWIN v1.67, US EPA 2011b) for the ionised and unionised form. Expected to concentrate at phase boundaries as it is a surfactant.
Adsorption/Desorption	log K_{oc} = 0.85-2.59	Calculated using the Kow method (KOCWIN v2.00, US EPA 2011b) for

		the ionised and unionised form. Expected to adsorb to organic carbon, soil and sediment as it is a surfactant.
Dissociation Constant	Not determined	Contains dissociable functionality and a salt. Expected to be ionised under environmental conditions (pH 4-9).
Particle Size	Not determined	Introduced in an aqueous solution
Flash Point	Not determined	Introduced in an aqueous solution
Flammability	Not determined	Introduced in an aqueous solution
Autoignition Temperature	Not determined	Introduced in an aqueous solution
Explosive Properties	Not expected to be explosive	The structural formula contains no explosophores.
Oxidising Properties	Not oxidising	Estimated based on chemical structure.

DISCUSSION OF PROPERTIES
For full details of tests on physical and chemical properties, refer to Appendix A.

Reactivity
Stable under normal conditions of use.

Dangerous Goods classification
Based on the submitted physical-chemical data in the above table the notified chemical is not classified according to the Australian Dangerous Goods Code (NTC, 2007). However, the data above do not address all Dangerous Goods endpoints. Therefore, consideration of all endpoints should be undertaken before a final decision on the Dangerous Goods classification is made by the introducer of the chemical.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified chemical will not be manufactured within Australia. The notified chemical will be imported as a component of finished cosmetic products at concentrations ≤ 5%.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	1	1	1	1	1

PORT OF ENTRY
Sydney

TRANSPORTATION AND PACKAGING
The notified chemical will be imported as a component (≤ 5%) of finished cosmetic products in containers that are expected to be predominantly 125 mL in size. These containers will be packed in cardboard cartons and the cartons will be packed 12 cartons to a cardboard shipper. The cardboard shippers will be transported in a shipping container from the wharf, to the notifier's central warehouse in NSW. The cartons will be transported to retail stores' central distribution centres from the notifier's warehouse by road.

USE
The notified chemical will be used as a component of cosmetic products at concentrations of ≤ 5%. The notified chemical will be used in both leave-on and rinse-off cosmetic products and in particular cleansing and hair care products.

OPERATION DESCRIPTION
The notified chemical will not be manufactured or reformulated within Australia. The notified chemical will be imported as a component (≤ 5%) in finished cosmetic products that will be warehoused prior to distribution to customers. The finished cosmetic products containing the notified chemical will be used by the public and may also be used occupationally by hairdressers and beauticians.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport and Storage	4	12
End Users	8	365

EXPOSURE DETAILS

Transport and warehousing

It is expected that transport and warehouse workers handling the imported finished products containing ≤ 5% notified chemical will only be exposed to the notified chemical in the event of spills due to an accident or as a result of leakage. The main route of exposure in these situations will be dermal.

End use

Hairdressers and beauticians will be exposed to cosmetic products containing the notified chemical (≤ 5%) during application of the products to their clients. The main route of exposure is expected to be dermal, although ocular exposure to splashes is possible. Inhalation of product mist is also possible, particularly for hair styling products applied by spray. PPE is not expected to be worn, however good hygiene practices are expected to be in place.

6.1.2. Public Exposure

Public exposure to the notified chemical is expected to be widespread and frequent through daily use of cosmetic products containing the notified chemical. Exposure to the notified chemical will vary depending on individual use patterns. The principal route of exposure will be dermal, while ocular and inhalation exposure are also possible, particularly if products are applied by spray. Accidental ingestion from the use of these types of products is also possible.

Public exposure from transport, storage, reformulation or disposal is considered to be negligible.

6.2. Human Health Effects Assessment

The results from toxicological investigations conducted on the notified chemical are summarised in the table below. Details of these studies can be found in Appendix B.

Endpoint	*Result and Assessment Conclusion*
Mouse, acute oral toxicity	LD50 2,000 mg/kg bw; low toxicity
Rabbit, skin irritation	moderately irritating
Rabbit, eye irritation	slightly irritating
Guinea pig, skin sensitisation – adjuvant test	no evidence of skin sensitisation
Modified repeated insult patch test (0.5%)	non-irritating and non-sensitising
Mutagenicity – bacterial reverse mutation	non mutagenic

Toxicokinetics, metabolism and distribution.

The water solubility of 0.5 g/L, the calculated log Pow of 1.30-4.45 and the molecular weight of 395.6 g.mol^{-1} of the notified chemical are favourable for absorption across the gastro-intestinal tract and the skin (ECHA, 2008). In addition the moderately irritating nature of the notified chemical may increase dermal adsorption (ECHA, 2008).

Acute toxicity.

The notified chemical was found to be of low acute oral toxicity in mice. No acute dermal or inhalation toxicity studies were available for the notified chemical.

Irritation and Sensitisation.

Based on limited data from tests conducted in rabbits, the notified chemical is considered to be moderately irritating to the skin and slightly irritating to the eye. In the skin irritation test, exposure time was longer than the OECD Test Guideline, and this could have influenced the scores, however based on the available data the chemical is classified as R38: Irritating to skin. In the eye irritation test the study was discontinued before all effects resolved, leading to uncertainty about the persistence of the effects. Based on the available data, the chemical could not be classified for this endpoint. The notifier has classified the chemical as R36: Irritating to eyes.

The notified chemical did not induce sensitisation in guinea pigs when tested at induction and challenge concentrations up to 5%. Based on the data provided the study may not have maximised the conditions of the test, and therefore may not have fully tested the potential for sensitisation. However the chemical does not have structural alerts for sensitisation.

A Repeated Insult Patch Test was conducted on a 0.5% solution of the notified chemical with 111 volunteers under semi-occlusive dressing. The notified chemical was non-irritating and non-sensitising under the conditions of the test.

Repeated Dose Toxicity.
There is no information on repeated dose toxicity available on the notified chemical. The notified chemical is a combination of L-glutamic acid, potassium salt (1:1) (CAS 19473-49-5) and tetradecanoic acid (CAS 544-63-8) joined with an amide bond. Therefore it is expected that these two components would form a significant proportion of the initial metabolites formed after absorption of the notified chemical. Tetradecanoic acid has been shown to have low systemic toxicity based on feeding studies in rats and rabbits (IUCLID, 2000). L-Glutamic acid, potassium salt (1:1) has low acute oral toxicity in rats (4,500 mg/kg bw) (RTECS, 2011) and based on the close sodium salt analogue (L-glutamic acid, sodium salt (1:1), CAS number 142-47-2) which is a common food additive with a maximum recommended daily intake of 16,000 mg/kg bw (Beyreuther et al., 2007) is also expected to have low systemic toxicity. The above data on the likely metabolites suggests that the notified chemical is not expected to cause adverse effects as a result of repeated exposure.

Mutagenicity.
The notified polymer was found to not be mutagenic using a bacterial reverse mutation test, using two bacterial strains only.

Health hazard classification
Based on the skin irritation study the notified chemical is classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004) with the following risk phrase:
R38 Irritating to skin

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety
Based on data provided the notified chemical is a moderate skin irritant and a slight eye irritant.

Transport and warehouse workers handling the imported finished products containing ≤ 5% notified chemical will only be exposed to the notified chemical in the event of spills due to an accident or as a result of leakage. The risk to the occupational health and safety of reformulation workers is therefore not considered unreasonable, due to the expected low exposure and the low hazardous nature of the notified chemical at the imported concentration.

Hairdressers and beauticians will be exposed to cosmetic products containing the notified chemical (≤ 5%) during application of the products to their clients. Although hairdressers and beauticians may not use PPE, considering the irritating effects of the notified chemical are expected to be reduced at the proposed use concentration, the risk to these workers is not considered unreasonable.

6.3.2. Public Health

The general public will be repeatedly exposed to the notified chemical during the use of cosmetic products containing the notified chemical at ≤ 5% concentration.

Local effects

The notified chemical is a moderate skin irritant and a slight eye irritant. There is some uncertainty from the available test results on the degree of skin and eye irritation, and on the potential for skin sensitisation. However, the notified chemical will be present in cosmetic products at concentrations ≤ 5% and at this concentration irritancy in consumers is expected to be reduced, especially where products are washed off the skin after use. Overall the risk of adverse local effects is not considered to be unreasonable.

Systemic effects

No studies were provided on the systemic effects of the notified chemical. However based on the low systemic toxicity of the components the notified chemical is not expected to be a danger of serious damage to health by prolonged exposure. With the low expected systemic toxicity of the notified chemical combined with the moderately low concentration proposed for use the risk of adverse systemic effects following exposure via leave-on and rinse-off cosmetic products is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified chemical is imported as the finished product and is not manufactured or reformulated in Australia; therefore, no release is expected from these activities. In the event of an accidental spill during distribution, transport or storage, the notified chemical is expected to be collected using inert material and disposed of to landfill.

RELEASE OF CHEMICAL FROM USE

The majority of the notified chemical is expected to be released to sewer in domestic situations across Australia as a result of its use in rinse-off and leave-on cosmetic products which are washed off the hair and skin of consumers.

RELEASE OF CHEMICAL FROM DISPOSAL

An estimated 3% of the annual import volume of notified chemical is expected to remain in consumer packaging and be disposed of through domestic garbage disposal to either enter landfill or be recycled.

7.1.2. Environmental Fate

Following its use in Australia in cosmetic products, the majority of the notified chemical is expected to enter the sewer system. Hydrolysis is not expected to be significant under environmental conditions based on structure but the notified chemical is predicted to be readily biodegradable (BIOWIN v4.10, US EPA 2011a). Although the notified chemical has a high predicted partition coefficient (log Pow up to 4.45) the notified chemical is not likely to bioaccumulate based on its predicted low bioconcentration factor (log BCF = 0.5, regression based estimate, BCFBAF v3.00, US EPA 2011a). The predicted adsorption coefficient indicates that the notified chemical has medium to high mobility in soils but it is expected to adsorb to organic carbon, soil and sediment based on its surface active properties. Therefore, the notified chemical would be expected to be partially removed during sewage treatment plant processes by biodegradation and partitioning to sludge. A proportion of notified chemical may be applied to land when sewage effluent is used for irrigation or when sewage sludge is used for soil remediation, or disposed of to landfill. In surface water, soils or in landfill, the notified chemical is not expected to persist based on its predicted ready biodegradability and is expected to degrade to form water, oxides of carbon and nitrogen and inorganic salts.

7.1.3. Predicted Environmental Concentration (PEC)

Since most of the notified chemical will be washed into the sewer, under a worst case scenario, with no removal of the notified chemical in the sewage treatment plant (STP), the resultant Predicted Environmental Concentration (PEC) in sewage effluent on a nationwide basis is estimated as follows:

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Total Annual Import/Manufactured Volume	1,000	kg/year
Proportion expected to be released to sewer	100%	
Annual quantity of chemical released to sewer	1,000	kg/year
Days per year where release occurs	365	days/year
Daily chemical release:	2.74	kg/day
Water use	200	L/person/day
Population of Australia (Millions)	22.613	million
Removal within STP	0%	
Daily effluent production:	4,523	ML
Dilution Factor - River	1	
Dilution Factor - Ocean	10	
PEC - River:	0.61	µg/L
PEC - Ocean:	0.06	µg/L

STP effluent re-use for irrigation occurs throughout Australia. The agricultural irrigation application rate is assumed to be 1000 L/m^2/year (10 ML/ha/year). The notified chemical in this volume is assumed to infiltrate and accumulate in the top 10 cm of soil (density 1500 kg/m^3). Using these assumptions, irrigation with a concentration of 0.606 µg/L may potentially result in a soil concentration of approximately 4.039 µg/kg. Assuming accumulation of the notified chemical in soil for 5 and 10 years under repeated irrigation, the concentration of notified chemical in the applied soil in 5 and 10 years may be approximately 20.19 µg/kg and 40.39 µg/kg, respectively.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted. As there is the potential for high aquatic exposure from the use and disposal of the notified chemical, modelled estimates for ecotoxicological endpoints for the notified chemical have been calculated (ECOSAR (v1.00), surfactants, anionic; US EPA, 2011b) and are tabulated below.

Endpoint	*Result*	*Assessment Conclusion*
Fish Toxicity	96 h LC50 = 91.285 mg/L	Predicted to be harmful to fish
	28 d NEC = 14.044 mg/L	Predicted to be not harmful to fish with long lasting effects
Daphnia Toxicity	48 h LC50 = 91.285 mg/L	Predicted to be harmful to aquatic invertebrates
	21 d NEC = 14.044 mg/L	Predicted to be not harmful to fish with long lasting effects
Algal Toxicity	96 h EC50 = 0.300 mg/L	Predicted to be very toxic to algae
	21 d NEC = 0.214 mg/L	Predicted to be toxic to algae with long lasting effects

$NEC = ChV = (NOEC \times LOEC)^{½}$

The anionic surfactant ECOSAR endpoint estimates are derived from the carbon chain length of the hydrophobic component. In this case, the aliphatic chain length used, C10, was that which has a comparable partition coefficient to the hydrophobic component (including amide) of the notified chemical. Further discussion about the use of quantitative structure-activity relationships (QSAR) for estimating the toxicity of anionic surfactants can be found in Appendix C. The notified chemical is predicted to be very toxic to aquatic organisms.

The QSAR estimation used here is a generic QSAR for anionic surfactants and is considered reliable to provide general indications of the likely environmental effects of the notified chemical. However, this method is not considered sufficient to formally classify the acute and long term hazard of the notified chemical to aquatic life

under the Globally Harmonised System for the Classification and Labelling of Chemicals (United Nations, 2009).

7.2.1. Predicted No-Effect Concentration

The predicted no-effect concentration (PNEC) has been calculated from the estimated chronic algal toxicity of the notified chemical and an assessment factor of 50. A more conservative assessment factor of 50 is appropriate in this case as although acute and chronic endpoints for three trophic levels are calculated, these endpoints are modelled estimates for a complex surfactants chemical structure adapted to a generic surfactant QSAR model.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
NEC (Alga)	0.21	mg/L
Assessment Factor	50.00	
PNEC:	4.28	µg/L

7.3. Environmental Risk Assessment

Based on the above PEC and PNEC values, the following Risk Quotient (Q) has been calculated:

Risk Assessment	PEC µg/L	PNEC µg/L	Q
Q - River:	0.61	4.28	0.142
Q - Ocean:	0.06	4.28	0.014

The risk quotient for discharge of treated effluents indicates that the notified chemical is not expected to reach ecotoxicologically significant concentrations in the aquatic environment. It is also noted that the above calculation represents a worst-case estimate of exposure as it does not account for the likely partial removal from waste water during sewage treatment plant processes by degradation and sorption to sewage sludge. The notified chemical has a low potential for bioaccumulation and is unlikely to persist in surface waters or soils. Therefore, on the basis of the PEC/PNEC ratio, maximum annual importation volume and assessed use pattern in cosmetic products, the notified chemical is not expected to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Water Solubility ≥ 0.5 g/L at 20ºC

METHOD In-house

Remarks The notified chemical, at a concentration of 0.05% and 20.0%, was dissolved at 80ºC. The temperature was then stabilised at 20ºC for 24 hours before visual inspection of the sample. Based on the provided test method, the water solubility of the notified chemical is equal to or greater than 0.5 g/L, but less than 200 g/L, at 20ºC. As a surfactant, it is expected to be highly dispersible in water due to structural considerations.

TEST FACILITY Ajinomoto Lab (Date unknown)

APPENDIX B: TOXICOLOGICAL INVESTIGATIONS

B.1. Acute toxicity – oral

TEST SUBSTANCE: Notified chemical

METHOD: Similar to OECD TG 401 Acute Oral Toxicity.
- Species/Strain: Mouse/ICR
- Vehicle: Water
- Remarks - Method: Translated study summary only was provided. No significant protocol deviations. The control group was administered water.

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
I	5 male	1,000	0/5
II	5 male	2,000	0/5
Control	5 male	0	0/5

- LD50: > 2,000 mg/kg bw
- Signs of Toxicity: A decrease in locomotory activity was observed 10 minutes after administration of the test substance in all animals in the 2,000 mg/kg bw dose group and half of the animals in the 1,000 mg/kg bw dose group. All symptoms had disappeared within 24 hours.
- Effects in Organs: No abnormalities were noted at necroscopy
- Remarks - Results: Body weight gains were as expected.

CONCLUSION: The notified chemical is of low toxicity via the oral route.

TEST FACILITY: Ajinomoto (1991a)

B.2. Irritation – skin

TEST SUBSTANCE: Notified chemical (100%)

METHOD: Similar to OECD TG 404 Acute Dermal Irritation/Corrosion.
- Species/Strain: Rabbit/New Zealand White
- Number of Animals: 4 male
- Vehicle: Test substance administered as supplied
- Observation Period: 7 Days
- Type of Dressing: Semi-occlusive.
- Remarks - Method: Translated study summary only was provided. The patch was applied for 24 hours.

RESULTS

Lesion	*Mean Score**	*Maximum Value*	*Maximum Duration of Any Effect*	*Maximum Value at End of Observation Period*
Erythema/Eschar	2	**	> 7 days	≥ 1**
Oedema	0.67	**	< 7 days	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for ALL animals.
** Effects seen in individual animals were not provided in the test report.

- Remarks - Results: A single 24-hour, semi-occluded application of the test material to the intact skin of the four rabbits produced erythema and oedema in rabbits at the 24, 48 and 72 hour observations. Erythema but not oedema was observed at the 7 day observation. Mean effects for both erythema and oedema were greatest at the 48 hour observation.

CONCLUSION	The notified chemical is moderately irritating to the skin.
TEST FACILITY	Ajinomoto (1991b)

B.3. Irritation – eye

TEST SUBSTANCE	Notified chemical
METHOD	Similar to OECD TG 405 Acute Eye Irritation/Corrosion.
Species/Strain	Rabbit/New Zealand White
Number of Animals	4 male
Observation Period	72 hours
Remarks - Method	Translated study summary only was provided. Individual results for each animal were not provided in the test report.

RESULTS

Remarks - Results	The test substance scored 5.5, 3.5 and 2.5 on the Draize scale at 24, 48 and 72 hours respectively. It was noted in the test report that conjunctiva redness of score 2 and chemosis of score 1 were observed at 24 hours after treatment with the effects showing a reduction in the severity at later observations. According to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004) when effects are still present at the end of the observation period the test substance should be classified as R41 Risk of serious damage to eyes. However the test observations were discontinued after 3 days, rather than 21 days as specified in OECD TG 405 and the effects seen in the test subjects were decreasing through out the course of the study. It is feasible that there would have been no effects present after 21 days. Therefore the test substance cannot be classified based on the available information.
CONCLUSION	The notified chemical is slightly irritating to the eye.
TEST FACILITY	Ajinomoto (1991c)

B.4. Skin sensitisation

TEST SUBSTANCE	Notified chemical (5%)
METHOD	OECD TG 406 Skin Sensitisation – Guinea Pig Maximisation test
Species/Strain	Guinea pig/Harthey
PRELIMINARY STUDY	No preliminary study was conducted
MAIN STUDY	
Number of Animals	Test Group: 10 females Control Group: 5 females
INDUCTION PHASE	Induction Concentration: intradermal: 5% topical: 5%
Signs of Irritation	No information on irritation caused by the test substance or the Freund's Complete Adjuvant were reported in the test report.
CHALLENGE PHASE	
1st challenge	topical: 5%
Remarks - Method	Translated study summary only was provided. There is no evidence provided in the report that the notified chemical was applied at a concentration that causes irritation during the induction. There was no evidence of a positive control being used.

RESULTS

Animal	*Challenge Concentration*	*Number of Animals Showing Skin Reactions after: 1st challenge*	
		24 h	*48 h*
Test Group	5%	0/10	0/10
Control Group	5%	0/5	0/5

Remarks - Results: There were no deaths or substance-related signs of toxicity during the study. There were no signs of irritation seen in any animals at either 24 or 48 hours after challenge.

As there was no evidence that the test substance produced irritation in the animals during induction it is not possible to determine that induction had taken place and therefore it may be possible that the test substance could induce skin sensitisation at higher concentrations.

CONCLUSION: There was no evidence of reactions indicative of skin sensitisation to the notified chemical under the conditions of the test.

TEST FACILITY: Ajinomoto (1992)

B.5. Skin sensitisation – human volunteers

TEST SUBSTANCE: A "Soft Clean Moist Rich Foaming Cleanser" product containing the notified chemical at a concentration of 5%.

METHOD: Modified version of the Repeated Insult Patch Test

Study Design: Induction Procedure: nine sequential 24-hour induction applications
Rest Period: 9 days
Challenge Procedure: two 24-hour challenge applications.

Study Group: 111 from ages 18-74 (64 female and 47 male)

Vehicle: Water

Remarks - Method: The test substance was diluted in water to a concentration of 10% which gave a concentration of the notified chemical of 0.5%.
Ten subjects pulled out of the study before it was completed.
The test substance was applied using a semi-occlusive 2 × 2 cm patch.
Both original induction sites and new sites were used in the challenge phase.

RESULTS

Remarks - Results: No signs of irritation were noted during either the induction or challenge phases in any of the test subjects.

CONCLUSION: A Repeated Insult Patch Test was conducted using Soft Clean Moist Rich Foaming Cleanser (5% notified chemical) diluted with water to 10% (0.5% notified chemical) under semi-occlusive dressing. The notified chemical was non-irritating and non-sensitising under the conditions of the test.

TEST FACILITY: Product Investigations (2008)

B.6. Genotoxicity – bacteria

TEST SUBSTANCE: Notified chemical

METHOD: Similar to OECD TG 471 Bacterial Reverse Mutation Test.
Pre incubation procedure

Species/Strain: *S. typhimurium*: TA98, TA100

Metabolic Activation System: Not specified in the test report

Concentration Range in: a) With metabolic activation: 3 – 5,000 µg/plate

Main Test	b) Without metabolic activation: 3 – 5,000 µg/plate
Vehicle	Water
Remarks - Method	Translated study summary only was provided. No significant protocol deviations.

RESULTS

Metabolic Activation	*Test Substance Concentration (µg/plate) Resulting in:*			
	Cytotoxicity in Preliminary Test	*Cytotoxicity in Main Test*	*Precipitation*	*Genotoxic Effect*
Absent				
Test 1	*	≥ 625	*	negative
Present				
Test 1	*	≥ 625	*	negative

* Information not provided in the test report.

Remarks - Results	No toxicologically significant increases in the frequency of revertant colonies were recorded for any of the bacterial strains, with any dose of the test material, either with or without metabolic activation. All the positive control chemicals used in the test induced marked increases in the frequency of revertant colonies thus confirming the activity of the S9-mix and the sensitivity of the bacterial strains.
CONCLUSION	The notified chemical was not mutagenic to bacteria under the conditions of the test.
TEST FACILITY	Ajinomoto (1991d)

APPENDIX C: ENVIRONMENTAL FATE AND ECOTOXICOLOGICAL INVESTIGATIONS

C.1. Ecotoxicological Investigations

TEST SUBSTANCE	Notified chemical
METHOD	QSAR estimation methods
Remarks – Method	Surfactant toxicity has been found to depend on carbon chain length (Nabholz et al., 1993) and consequently, QSARs based on chain length have been derived and validated for fish, daphnid and green algae (e.g. ECOSAR (v1.00), anionic surfactant class; US EPA, 2011b). For the calculation of ecotoxicological endpoints for anionic surfactants containing complex hydrophobic components (such as the notified chemical which contains amide functionality) the partition coefficient (log Pow) of the hydrophobic component is calculated and the alkyl side chain with the closest log Pow value is used (method suggested by Clements *et al*., 1996). The calculated partition coefficient for the modelled hydrophobic component of the notified chemical (Figure 1, log Pow = 5.20, KOWWIN v1.68, US EPA, 2011b) was considered to correspond to an aliphatic chain of 10 carbons ($C_{10}H_{22}$, log Pow = 5.25, KOWWIN v1.68, US EPA, 2011b). **Figure 1. Modelled hydrophobic component of the notified chemical**  *Structure:* *Smiles*: C(=O)(CCCCCCCCCCCCC)NC It is also noted that the notified chemical has a complex head-group (diacid), however, the anionic surfactant class in ECOSAR encompasses a range of sub-classes and in the absence of empirical data, it is therefore considered an acceptable model for the notified chemical (Mayo-Bean *et al.,* 2011).

RESULTS

ECOSAR (v1.00, US EPA, 2011b) *Anionic surfactant class - C10*	
Fish 96 h LC50 = 91.285 mg/L	Fish 28 d NEC = 14.044 mg/L
Daphnid 48 h LC50 = 91.285 mg/L	Daphnid 21 d NEC = 14.044 mg/L
Green Algae 96 h EC50 = 0.300 mg/L	Green Algae 21 d NEC = 0.214 mg/L

CONCLUSION	The notified chemical is predicted to be harmful to fish and daphnid and very toxic to green algae.
TEST FACILITY	US EPA (2011b)

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