

Tallow alkyl amines ethoxylated

This dossier on tallow alkyl amines ethoxylated presents the most critical studies pertinent to the risk assessment of tallow alkyl amines ethoxylated in its use in drilling muds, hydraulic fracturing fluids and water treatment. No sufficient data exist for this particular substance. This dossier does not represent an exhaustive or critical review of all available data. The majority of information presented in this dossier was obtained from The National Industrial Chemicals Notification and Assessment Scheme (NICNAS, 1994) and the ECHA database that provides information on chemicals that have been registered under the European Union (EU) REACH (ECHA). Where possible, study quality was evaluated using the Klimisch scoring system (Klimisch et al., 1997).

Screening Assessment Conclusion – Tallow alkyl amines ethoxylated is classified as a **tier 1** chemical and requires a hazard assessment only.

1 BACKGROUND

Tallow alkyl amines ethoxylated refers to a range of non-ionic surfactants derived from animal fats (tallow). Tallow alkyl amines ethoxylated is a UVCB substance. Based on properties for a similar fatty acid, tallow alkyl amines ethoxylated are expected to biodegrade and show some degree of sorption to sediments and soils. They are not expected to bioaccumulate. Tallow alkyl amines ethoxylated are of low aquatic toxicity concern based on data from analogous substances.

2 CHEMICAL NAME AND IDENTIFICATION

Chemical Name (IUPAC): Tallow alkyl amines ethoxylated

CAS RN: 61791-26-2

Molecular formula: Not applicable. Substance is a UVCB.

Molecular weight: Not applicable. Substance is a UVCB.

Synonyms: Amines, tallow alkyl, ethoxylated

3 PHYSICO-CHEMICAL PROPERTIES

There are no physical or chemical data for tallow alkyl amines ethoxylated. The data presented in Table 1 are abstracted from data on a similar substance, fatty acids tall-oil ethoxylated (CAS RN 61791-00-2).

Table 1 Overview of Physico-Chemical Properties of Tallow Alkyl Amines Ethoxylated¹

Property	Value	Klimisch score	Reference
Physical state at 20°C and 101.3 kPa	Liquid.	2	ECHA
Melting point	-85°C @ 101.3 kPa	2	ECHA
Boiling point	Not available. During the heating process the test item began to change its state at approximately 172°C from liquid to	2	ECHA

Property	Value	Klimisch score	Reference
	highly viscous. This indicates a thermally caused change of the test item.		
Density	958 kg/m ³ @ 20°C	2	ECHA
Vapour pressure	The vapour pressure could not be determined.	2	ECHA
Partition coefficient (log K _{ow})	5.94 @ 25°C	-	-
Water solubility	The test item can be mixed with water up to a ratio of 3:7 (test item):(water) @ 20°C	-	-
Viscosity	58.0 mPa*s at 20°C	2	ECHA

¹ = data from fatty acids tall-oil ethoxylated (CAS RN 61791-00-2)

4 DOMESTIC AND INTERNATIONAL REGULATORY INFORMATION

A review of international and national environmental regulatory information was undertaken (Table 2). This chemical is listed on the Australian Inventory of Chemical Substances – AICS (Inventory). No conditions for its use were identified. No specific environmental regulatory controls or concerns were identified within Australia and internationally for tallow alkyl amines ethoxylated.

Table 2 Existing International Controls

Convention, Protocol or other international control	Listed Yes or No?
Montreal Protocol	No
Synthetic Greenhouse Gases (SGG)	No
Rotterdam Convention	No
Stockholm Convention	No
REACH (Substances of Very High Concern)	No
United States Endocrine Disrupter Screening Program	No
European Commission Endocrine Disruptors Strategy	No

5 ENVIRONMENTAL FATE SUMMARY

A. Summary

Tallow alkyl amines ethoxylated are expected to biodegrade and show some degree of sorption to sediments and soils. They are not expected to bioaccumulate.

B. Partitioning

Hydrolysis is not considered to be a relevant degradation pathway, since the substance is readily biodegradable (ECHA).

C. Biodegradation

Data on the ready biodegradability of tallow alkyl amines ethoxylated (EO > 1 < 2.5) (CAS 61791-00-2) are not available. Therefore, data on the ready biodegradability of the structurally related analogue substance Fatty acids, tall-oil, ethoxylated (EO 5) (CAS No. 9004-96-0) is used as read across in accordance with Regulation (EC) No. 1907/2006, Annex XI, 1.5.

This read-across is justified because both target and source substance are structurally identical (ethoxylated oleic acid) except for the fact that the source substance is slightly higher ethoxylated (5 EO) than the target substance (1-2.5EO). This difference might lead to a slightly lower water solubility of the target substance; however, since the solubility of both substances is rather high and does not limit the bioaccessibility of the substances to aquatic microorganisms this is not considered to influence the identical biodegradation behaviour of both substances. Both substances share the same functional groups and the same mode of action (baseline toxicity caused by the long lipophilic fatty acid chain). Thus, biotransformation can, with very high certainty, be assumed to be identical.

The test with the source substance was conducted according to OECD Guideline 301B, under GLP conditions. Domestic, non-adapted activated sludge was exposed to the test substance for 28 days at 22°C, and biodegradation was measured by CO₂ consumption. After 28 days, the test substance reached a biodegradation of 90 - 100%.

Based on the results for the read-across substance, fatty acids, tall-oil, ethoxylated (EO > 1 < 2.5) (CAS 61791-00-2) is considered to be readily biodegradable.

If a chemical is found to be readily biodegradable, it is categorised as Not Persistent since its half-life is substantially less than 60 days (DoEE, 2017).

D. Environmental Distribution

One study investigating the adsorption/desorption behaviour of fatty acids, tall-oil, ethoxylated (CAS 61791-00-2) is available. The study was performed according to GLP and OECD guideline 121. Six different peaks were observed, with log K_{oc} values ranging from < 1.8 to > 5.63. The two main components (> 85%) show log K_{oc} values > 4. Based on these values and its limited water solubility, fatty acids, tall-oil, ethoxylated will be slightly to hardly mobile in soil as adsorption to soil is expected.

E. Bioaccumulation

The test substance consists of components with log K_{ow} values in the range of 5 to > 10 (KOWWIN v1.68) indicating a potential for bioaccumulation. But due to rapid environmental biodegradation, metabolisation via enzymatic hydrolysis (monoesters and diesters) as well as sterical hindrance of crossing biological membranes (high molecular weight of diesters) a relevant uptake and bioaccumulation in aquatic organisms is not expected. This is supported by low bioconcentration factor (BCF values of < 100 litres per kilogram of water weight (L/kg ww) (BCFBAF v3.01, Arnot-Gobas, including biotransformation, upper trophic) calculated for different components of the UVCB (mono- and diester EO1 to EO5). Thus, taking all information into account, the test substance is not considered to be bioaccumulative

6 ENVIRONMENTAL EFFECTS SUMMARY

A. Summary

Tallow alkyl amines ethoxylated are of low aquatic toxicity concern based on data from analogous substances.

B. Aquatic Toxicity

Table 3 lists the results of acute aquatic toxicity studies on salts of tallow alkyl amines ethoxylated.

Table 2 Acute Aquatic Toxicity Studies Tallow Alkyl Amines Ethoxylated *

Test Substance	Test Species	Endpoint	Results (mg/L) [WAF]	Kl. score
Fatty acids, tall-oil, ethoxylated	<i>Danio rerio</i>	96-hr LL ₅₀	>100	1
Fatty acids, tall-oil, ethoxylated	<i>Daphnia magna</i>	48-hr LL ₅₀	12.41	1
Fatty acids, tall-oil, ethoxylated	<i>Pseudokirchnerella subcapitata</i>	72-hr LL ₅₀	39.7	1

* Based on acute aquatic toxicity studies on Fatty acids, tall-oil, ethoxylated

All studies used the water accommodated fractions (WAFs) of the test substance.

Chronic Studies

No chronic data were available

C. Terrestrial Toxicity

No studies are available.

7 CATEGORISATION AND OTHER CHARACTERISTICS OF CONCERN

A. PBT Categorisation

The methodology for the Persistent, Bioaccumulative and Toxic (PBT) substances assessment is based on the Australian and EU REACH Criteria methodology (DEWHA, 2009; ECHA, 2008).

Tallow alkyl amines ethoxylated was noted to be readily biodegradable. Thus, the substance is not expected to meet the screening criteria for persistence.

Modelling of a representative structure indicates tallow alkyl amines ethoxylated does not have the potential to bioaccumulate. Thus, it does not meet the screening criteria for bioaccumulation.

Tallow alkyl amines ethoxylated did not exhibit substantial acute toxicity to fish, invertebrates, or algae. Thus, tallow alkyl amines ethoxylated is not expected to meet the screening criteria for toxicity.

The overall conclusion is that tallow alkyl amines ethoxylated is not a PBT substance.

B. Other Characteristics of Concern

No other characteristics of concern were identified for tallow alkyl amines ethoxylated.

8 SCREENING ASSESSMENT

Chemical Name	CAS No.	Overall PBT Assessment ¹	Chemical Databases of Concern Assessment Step		Persistence Assessment Step		Bioaccumulative Assessment Step	Toxicity Assessment Step			Risk Assessment Actions Required ³
			Listed as a COC on relevant databases?	Identified as Polymer of Low Concern	P criteria fulfilled?	Other P Concerns	B criteria fulfilled?	T criteria fulfilled?	Acute Toxicity ²	Chronic Toxicity ²	
Tallow alkyl amines ethoxylated	61791-26-2	Not a PBT	No	No	No	No	No	No	1	No data	1

Footnotes:

1 - PBT Assessment based on PBT Framework.

2 - Acute and chronic aquatic toxicity evaluated consistent with assessment criteria (see Framework).

3 - Tier 1 - Hazard Assessment only.

Notes:

PBT = Persistent, Bioaccumulative and Toxic

B = bioaccumulative

P = persistent

T = toxic

9 REFERENCES, ABBREVIATIONS AND ACRONYMS

A. References

Department of the Environment, Water, Heritage and the Arts [DEWHA] (2009). Environmental risk assessment guidance manual for industrial chemicals, Department of the Environment, Water, Heritage and the Arts, Commonwealth of Australia.

Department of the Environment and Energy [DoEE]. (2017). Chemical Risk Assessment Guidance Manual: for chemicals associated with coal seam gas extraction, Guidance manual prepared by Hydrobiology and ToxConsult Pty Ltd for the Department of the Environment and Energy, Commonwealth of Australia, Canberra.

ECHA. ECHA REACH database: <http://echa.europa.eu/information-on-chemicals/registered-substances>

European Chemicals Agency [ECHA] (2008). Guidance on Information Requirements and Chemical Safety Assessment, Chapter R11: PBT Assessment, European Chemicals Agency, Helsinki, Finland.

Klimisch, H.J., Andreae, M., and Tillmann, U. (1997). A systematic approach for evaluating the quality of experimental and toxicological and ecotoxicological data. Regul. Toxicol. Pharmacol. 25:1-5.

NICNAS (1994). National Industrial Chemicals Notification and Assessment Scheme (NICNAS), AGPS, Canberra, Australia.

B. Abbreviations and Acronyms

°C	degrees Celsius
AICS	Australian Inventory of Chemical Substances
BCFBAF	USEPA program to estimate bioconcentration and bioaccumulation factors
BCF	bioconcentration factor
COC	constituent of concern
DEWHA	Department of the Environment, Water, Heritage and the Arts
ECHA	European Chemicals Agency
EO	Ethoxylated
EU	European Union
g/L	grams per liter
GLP	Good Laboratory Procedures
hPa	hectopascal
IUPAC	International Union of Pure and Applied Chemistry
kg/m ³	kilogram per cubic metre

KI	Klimisch scoring system
KOWWIN	USEPA program to estimate the organic carbon-normalised sorption coefficient for soil and sediment
kPa	kilopascal
LL	Lethal level
mg/L	milligrams per litre
mPa*s	millipascal second
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
OECD	Organisation for Economic Co-operation and Development
Pa	Pascal
PBT	Persistent, Bioaccumulative and Toxic
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
SGG	Synthetic Greenhouse Gases
UVCB	Unknown or Variable Composition, Complex Reaction Products and Biological Materials
WAF	water accommodated fraction
ww	wet weight