Australian Government
Department of Health, Disability and Ageing
Australian Industrial Chemicals Introduction Scheme

1-Octen-3-ol, 3,7-dimethyl-, 3-acetate

Assessment statement (CA09951)

07 April 2026

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AICIS assessment (CA09951)

Chemical in this assessment

Name	CAS registry number
1-Octen-3-ol, 3,7-dimethyl-, 3-acetate	68345-17-5

Reason for the assessment

An application for an assessment certificate under section 31 of the *Industrial Chemicals Act 2019* (the Act).

Certificate application type

AICIS received the application in a Very Low to Low Risk type.

Defined scope of assessment

The chemical has been assessed:

- as imported into Australia at up to 1 tonne/year
- as imported at up to 100% concentration for reformulation into finished end-use products
- as imported in finished end-use products as a component
- for end-use in personal care products (cosmetics), laundry and dishwashing products, cleaning and furniture care products, and air care products at concentrations of
    - up to 10% in scented candles
    - up to 2.5% in fine fragrances
    - up to 1.5% in leave-on cosmetics
    - up to 1% in rinse-off cosmetics and non-spray deodorants
    - up to 1% in laundry and dishwashing products, cleaning and furniture care products, and other air care products
    - up to 0.5% in hair styling products

Summary of assessment

Summary of introduction, use and end use

The assessed chemical will not be manufactured in Australia. It will be imported either in neat form (100% concentration) or in fragrance formulations containing the chemical at up to 10% concentration for reformulation into finished end-use products, including personal care (cosmetics), laundry and dishwashing, cleaning and furniture care, and air care products. The chemical will also be imported as a fragrance component in finished end use products reformulated overseas.

The end-use concentrations of the chemical are proposed to be up to 10% in scented candles, up to 2.5% in fine fragrances, up to 1.5% in leave-on cosmetics, up to 1% in rinse-off

cosmetics, non-spray deodorants, laundry and dishwashing products, cleaning and furniture care products, and other air care products, and up to 0.5% in hair styling products.

The finished end-use products containing the assessed chemical are proposed to be used by professional workers under commercial or non-commercial settings and by members of the general public.

Human health

Summary of health hazards

The submitted toxicological data on the assessed chemical and analogue chemicals (see **Supporting information**) indicate that the chemical is:

- of low acute oral toxicity (LD50 > 2,000 mg/kg bw in rats)
- not irritating to skin
- not likely to be an eye irritant
- not likely to be a skin sensitiser (see below)
- not likely to cause systemic effects following repeated dermal exposure (see below)
- not genotoxic

Based on in chemico and in vitro study data provided and using the 2 out of 3 Defined Approach (DA) as described in the current OECD GL 497 (OECD 2025), the assessed chemical is not a skin sensitiser. However, a major limitation of the 2 out of 3 DAs is their lack of, or very limited, metabolic capacity. Pre- and pro-hapten chemicals require auto-oxidation or enzymatic activation to form reactive species, which are necessary to elicit a sensitising response. Because these activations cannot occur efficiently in the current testing systems, the skin sensitisation potential of such substances may not be accurately characterised and may often be under-predicted. A closely similar analogue chemical, linalool (CAS No. 78-70-6), may undergo auto-oxidation when exposed to air and subsequently cause weak skin sensitisation effects (see **Supporting information**). The assessed chemical may have similar auto-oxidation reactivity and subsequent skin effects. However, Derek Nexus (Lhasa Limited 2023) predicted the assessed chemical as a non-sensitiser to skin in mammals.

No repeated dose toxicity study on the assessed chemical was provided by the applicant. NICNAS IMAP report (NICNAS 2016) for the analogue chemical, linalool, indicates that there were no systemic toxicity effects observed in rats at up to 1,000 mg/kg bw/day in a 91-day dermal toxicity study (see **Supporting information**). Based on the available information, the assessed chemical is unlikely to cause systemic toxicity following repeated or prolonged dermal exposures.

No data on inhalation toxicity of the assessed chemical were provided.

Hazard classifications relevant for worker health and safety

Based on limited data provided by the applicant, the assessed chemical cannot be classified according to the *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) (UNECE 2017) for hazard classes relevant for worker health and safety as adopted for industrial chemicals in Australia.

Summary of health risk

Public

There will be widespread and repeated exposure of the public to the assessed chemical at various concentrations up to 10% through the use of a wide range of consumer end-use products. The principal route of exposure will be dermal, while incidental ocular exposure is also possible. Inhalation exposure may occur particularly from the use of air care products and other products applied by spray. However, based on the relatively low vapour pressure of the assessed chemical, low toxicity profile from other toxicology endpoints, in combination with the proposed end-use patterns, the chemical is not expected to pose a health risk through limited inhalation exposure.

No quantitative risk assessment for repeated exposure of the public was conducted for the assessed chemical, as the analogue (linalool) did not show systemic toxicity effects at the dose level of 1,000 mg/kg bw/day in rats in a 91-day repeated dose dermal toxicity study (see **Supporting information**). The No Observed Adverse Effect Level (NOAEL) for repeated dose dermal toxicity of the assessed chemical is estimated to be greater than 1,000 mg/kg bw/day. No adverse health effects are expected from the normal use of the finished consumer end-use products containing the assessed chemical.

At high concentrations, the assessed chemical may have potential to cause weak skin sensitisation when auto-oxidised in the air (see **Supporting information**). However, such purified form of the chemical will not be available to the general public.

Overall, this assessment does not identify any risks to public health that would require specific risk management measures.

Workers

Reformulation workers may be incidentally exposed to the assessed chemical at up to 100% concentration during reformulation processes, mainly via the dermal route, while ocular and inhalation exposures are also possible. The assessed chemical at high concentrations may have the potential to be a weak skin sensitiser when it is exposed to air and undergoes auto-oxidation. It is anticipated by the applicant that engineering controls such as enclosed and automated processes and local ventilation will be implemented where possible. According to the applicant, use of appropriate personal protective equipment (PPE) such as safety glasses, impervious chemical resistant gloves, protective clothing and respiratory protection will further reduce worker exposure.

Professional workers in cleaning or cosmetic businesses may experience exposure via dermal, inhalation or incidental ocular exposure to the assessed chemical during the use of end-use products containing the assessed chemical at various concentrations up to 10%. Professional workers may wear PPE (including gloves, safety glasses or face masks, and coveralls). If PPE is used, exposure of such workers is expected to be of a similar or lesser extent than that experienced by consumers using the same end use products containing the assessed chemical, requiring no specific risk management measures for these workers.

Environment

Summary of environmental hazard characteristics

According to the *Australian Environmental Criteria for Persistent, Bioaccumulative and/or Toxic Chemicals* (DCCEEW 2022) and based on the available data, the assessed chemical is:

- Not Persistent (not P)
- Not Bioaccumulative (not B)
- Not Toxic (not T)

Environmental hazard classification

The assessed chemical satisfies the criteria for classification according to the *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) (UNECE, 2017) as Acute Category 3 (H402) based on the toxicity data to aquatic invertebrates and algae from a major hydrolysis product of the assessed chemical. Considerations were also made for the degradation and bioaccumulation potential of the chemical.

Environmental Hazard	Hazard Category	Hazard Statement
Hazardous to the aquatic environment (acute / short-term)	Aquatic Acute 3	H402: Harmful to aquatic life

Summary of environmental risk

The assessed chemical will be introduced as a fragrance ingredient for use in a variety of products. These uses may result in the release of the assessed chemical to sewers and to air.

The assessed chemical does not meet any of the *Australian Environmental Criteria for Persistent, Bioaccumulative and/or Toxic Chemicals* (DCCEEW 2022). It is unlikely to have unpredictable long-term effects and its risk may be estimated by the risk quotient method (RQ = PEC ÷ PNEC). Based on calculated RQ values < 1 for the river and ocean compartments, the environmental risk from the introduction of the assessed chemical can be managed.

Means for managing risk

Workers

Information relating to safe introduction and use

The information in this statement should be used by a person conducting a business or undertaking at a workplace (such as an employer) to determine the appropriate controls under the relevant jurisdiction Work Health and Safety laws.

The following control measures could be implemented to reduce potential exposure of workers to the assessed chemical during reformulation:

- Use of engineering controls such as
    - enclosed and automated systems where possible

    - adequate workplace ventilation to avoid accumulation of dusts, mists or aerosols

- Use of safe work practices to

    - avoid skin contact
    - avoid inhalation of mists or aerosols

- Use of personal protective equipment (PPE)

    - gloves and overalls
    - respiratory protection where local ventilation may be inadequate

Conclusions

The Executive Director is satisfied that the risks to human health or the environment associated with the introduction and use of the industrial chemical can be managed.

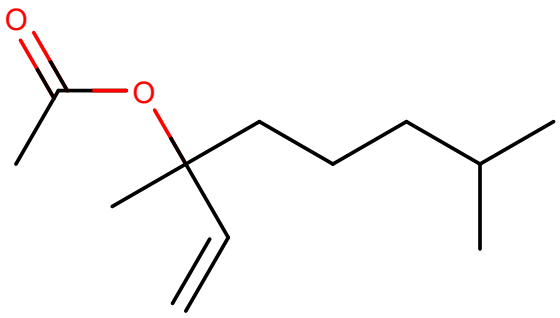
Note:

1. Obligations to report additional information about hazards under s 100 of the *Industrial Chemicals Act 2019* apply.
2. A person introducing this chemical should be aware of their obligations under environmental, workplace health and safety and poisons legislation as adopted by the relevant state or territory.

Supporting information

Chemical identity

CAS number	68345-17-5
CAS name	1-Octen-3-ol, 3,7-dimethyl-, 3-acetate
Molecular formula	$C_{12}H_{22}O_2$
Associated names	1-Octen-3-ol, 3,7-dimethyl-, acetate
	3,7-Dimethyloct-1-en-3-yl acetate
Molecular weight (g/mol)	198.30
SMILES (canonical)	O=C(OC(C=C)(C)CCCC(C)C)C
Structural formula	



Relevant physical and chemical properties

Physical form	Liquid
Melting point	-30°C
Boiling point	213.8°C
Density	875.9 kg/m^3 at 20°C
Vapour pressure	0.016 kPa at 25 °C
Water solubility	not determined due to rapid hydrolysis
Flash Point	83.5°C at 101.3 kPa
log K_{ow}	4.7

Health hazard information

Acute toxicity

Oral

In an acute oral toxicity study (similar to OECD TG 423) provided by the applicant, an analogue chemical, dihydrolinalool (CAS No. 18479-51-1), was administered as a single dose of 2,000 mg/kg to Wistar rats (n = 5/sex). No mortalities were observed during the study. Several clinical signs, such as dyspnoea, apathy, staggering, piloerection, salivation and poor general state, were observed in both males and females. Females also showed abnormal position, atonia, paresis, narcotic like state, impaired general state and exsiccosis (dehydration). Bodyweight gain appeared normal in both sexes. No information on the macroscopic examination was reported. Under the conditions of this study, the acute oral median lethal dose (LD50) of dihydrolinalool was determined to be > 2,000 mg/kg bw.

NICNAS IMAP report on linalool (NICNAS 2016) indicates that the analogue has low acute toxicity in animal tests following oral exposure (LD50 ranging from 2,790 to 3,120 mg/kg bw).

Based on the information from the analogues, the assessed chemical is likely to be of low acute oral toxicity.

Corrosion/Irritation

Skin irritation

In an in vitro skin irritation test (OECD TG 439), the undiluted assessed chemical was tested on Reconstructed Human EpiDermis (RHE) tissues. The treated tissues showed 112.5% mean viability compared to the negative control after a 60-minute exposure and 42-hour incubation. The mean viability of the treated tissues was above the 50% threshold for GHS hazard classification.

The assessed chemical was determined as not to be irritating to the skin.

Eye irritation

In an in vitro eye irritation study using Bovine Corneal Opacity and Permeability test method (BCOP) (OECD TG 437) conducted on the undiluted assessed chemical, 10-minute treatment of fresh bovine cornea with the assessed chemical caused a slight increase of corneal opacity but no relevant changes in permeability. The calculated mean in vitro irritancy score (IVIS) was 3.85. As the IVIS was > 3 and < 55, no prediction on eye irritation could be made according to the test guideline.

The undiluted assessed chemical was further tested for eye irritation potential using the Reconstructed human Cornea-like Epithelium test method (OECD TG 492, EpiOcular™ model). The relative mean viability of the treated tissues was 86.9% after 30 minutes of exposure. As the tissue viability was > 60%, the assessed chemical was not considered as an eye irritant under GHS criteria.

Sensitisation

Skin sensitisation

One direct peptide reactivity assay (DPRA, OECD TG 442C) and one ARE-Nrf2 luciferase assay (KeratinoSens, OECD TG 442D) were conducted to evaluate the skin sensitisation potential of the assessed chemical. These tests are part of Integrated Approach to Testing and Assessment (IATA) which address specific key events of the Adverse Outcome Pathway (AOP) leading to development of skin sensitisation (OECD 2025). The DPRA aimed to address the first key event (KE1, molecular initiation) of the AOP and the KeratinoSens aimed to address the second key event (KE2, keratinocyte activation) of the AOP. The assessed chemical tested negative in both KE1 and KE2.

However, in the DPRA, precipitates and/or micelles were observed at the end of the incubation with the peptides. It was possible that the peptide depletion might be underestimated. Therefore, the conclusion on the lack of reactivity could not be drawn with sufficient confidence. Precipitates were also observed in the positive control samples.

Only the first two KE assays in the skin sensitisation AOP have been provided for this assessment. According to the *Supporting document to Test Guideline 497 on Defined Approaches for Skin Sensitisation* (OECD 2025), pre- and pro-haptens are considered difficult chemicals to predict as they require metabolic or autoxidation transformation to become sensitisers. The 2 out of 3 DA has shown more inconclusive results for these types of chemicals, with DPRA and KeratinoSens having sensitivities below 0.75, the lowest of all the methods compared.

Derek Nexus (Lhasa Limited 2023) skin sensitisation prediction showed that the assessed chemical was non-sensitiser in mammal. Based on the results of the two AOP assays, using the 2 out of 3 DA in the OECD GL 497 (OECD 2025) and using the in silico Derek Nexus prediction for weight of evidence, the assessed chemical itself cannot be classified as a skin sensitiser.

Linalool, in its highly purified form, may be a weak skin sensitiser showing an EC3 of 53% in a local lymph node assay (LLNA) in mice. Linalool may undergo auto-oxidation when exposed to air, forming hydroperoxides that can cause skin sensitisation (NICNAS 2016). The assessed chemical, in high concentrations, may have the potential to undergo similar auto-oxidation when exposed to the air and cause weak skin sensitisation effects.

Repeat dose toxicity

Dermal

No repeated dose toxicity study was submitted on the assessed chemical. The NICNAS IMAP report on linalool (NICNAS 2016) reported that the analogue was tested in a repeated dose dermal toxicity study (OECD TG 411). Linalool was applied topically to SD rats (n = 20/sex/dose) at doses of 250, 1,000 and 4,000 mg/kg bw/day (corresponding to low, mid and high dose groups) for 91 days. In the high dose group, mortalities (9 females and 2 males), neurotoxicity (mainly lethargy and depressed motor activity), depressed food consumption, increased liver weight and kidney weight were observed. For local skin effects, treatment-related squamous epithelial hyperplasia was observed in the high dose group, ranging from slight to moderate. Slight erythema was also observed in all treated groups and persisted until week 13 in the high dose group. However, no systemic toxicity effects were reported in the low and mid dose groups up to the level of 1,000 mg/kg bw/day.

Based on above information, the assessed chemical is likely to have a systemic toxicity NOAEL of greater than 1,000 mg/kg bw/day via the dermal route in rats.

Genotoxicity

The assessed chemical was not mutagenic in a bacterial reverse mutation assay (Ames Test, OECD TG 471) using *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537 and *Escherichia coli* strain WP2uvrA, with or without metabolic activation. Test concentrations of the chemical were set at 0, 1, 3, 10, 33, 100, 333, 1,000, 2,500 and 5,000 µg/plate. No statistically significant increases in the frequency of revertant colonies were recorded for any of the bacterial strains at any tested concentrations, in the presence or absence of metabolic activation. The assessed chemical was not mutagenic under the conditions of the study.

The assessed chemical was tested for its clastogenic and aneugenic potential in an in vitro mammalian micronucleus test (OECD TG 487) using human lymphocytes. Two separate experiments were conducted with concentration levels of 7.4, 12.9, 22.5, 39.5, 69.0, 120.8, 211.4, 370.0, 647.5, 1,133.1 and 1,983.0 µg/mL with and without metabolic activation, and concentration levels of 0.94, 1.88, 3.75, 7.5, 15, 30, 60 and 120 µg/mL without metabolic activation. No precipitation of the test item in the culture medium was observed. Phase separation was observed in both experiments (above 22.5 µg/mL) at the end of the tests. No statistically significant increase in the frequency of cells with aberrations or in the incidence of polyploidy was recorded at any concentration tested in the presence or absence of metabolic activation. The assessed chemical was neither clastogenic nor aneugenic under the conditions of the study.

Overall, the assessed chemical is not likely to be genotoxic.

Environmental exposure

The assessed chemical will be imported into Australia as a component of end-use products, or in either the pure form or as a component of fragrance solutions for reformulation into the end-use products.

Reformulation will occur through automated and closed processes. Significant releases of the assessed chemical to the environment are not expected during reformulation, transport or storage. Release of the assessed chemical to the environment due to accidental spills is expected to be absorbed on suitable materials, and disposed of in accordance with relevant Local, State, Territory and Federal regulations. Any unused product containing the assessed chemical is expected to be disposed of in accordance with relevant Local, State, Territory and Federal regulations.

The assessed chemical is a fragrance ingredient to be included in personal care (cosmetics), laundry and dishwashing, cleaning and furniture care, and air care products. Use of these products is expected to result in the release of the assessed chemical “down the drain” and into the sewers. Consequently, the assessed chemical will be treated at sewage treatment plants (STPs) before release to surface waters.

Environmental fate

Partitioning

The partitioning of the assessed chemical was not determined. The chemical is assessed as if it is mobile in the environment as a worst-case scenario.

Degradation

Based on measured degradation in water, the assessed chemical is considered not persistent.

In a ready biodegradation screening test conducted in water (OECD TG 301F), the assessed chemical showed 82% degradation after 28 days, however the 10-day-window criterion was not satisfied. Therefore, the assessed chemical is not readily biodegradable but is considered inherently biodegradable.

In a hydrolysis test (OECD TG 111), the assessed chemical hydrolysed under all tested pH conditions with a tendency of more rapid hydrolysis at basic and acidic pH values. Half-life values at 37°C were 0.3 h at pH 2.2, 2.37 h at pH 4, 3.41 h at pH 7.5 and 2.9 h at pH 9.2.

Bioaccumulation

Based on the weight of evidence, the assessed chemical is categorised as not Bioaccumulative.

No bioaccumulation information was provided for the assessed chemical. The experimental partition coefficient of the assessed chemical (log Kow = 4.7) is above the domestic bioaccumulation threshold of log Kow = 4.2 (DCCEEW 2022) indicating a potential for bioaccumulation. However, the assessed chemical undergoes rapid hydrolysis at all pH levels into a hydrolysis product with a measured log Kow value of 3.69 which is below the bioaccumulation threshold. As hydrolysis is a relevant metabolism pathway in biota, the assessed chemical is expected to rapidly hydrolyse within biota and therefore, will not bioaccumulate in the environment.

Predicted environmental concentration (PEC)

A predicted environmental concentration (PEC) for Australian waters was calculated assuming the maximum allowable introduction volume for environmental exposure band 2 (1,000 kg/annum) with a release reduction factor of 1 for down-the-drain style end use scenarios. Correspondingly, 100% of the introduction volume is released into sewage treatment plants (STP) over 365 days per annum. The extent to which the assessed chemical is removed from the effluent in STP processes was not calculated as a worst-case scenario.

The calculation of the PEC (EPHC 2009) is detailed in the table below:

Total Annual Import 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	25.423	Million
Removal within STP	0%	Mitigation
Daily effluent production	5,085	ML/day
Dilution Factor – River	1	
Dilution Factor – Ocean	10	
PEC – River	0.54	µg/L
PEC – Ocean	0.05	µg/L

Environmental effects

Effects on aquatic life

Acute toxicity

The following median effective concentration (EC50) values for model organisms were supplied for a major hydrolysis product of the assessed chemical:

Taxon	Endpoint	Method
Invertebrate	48 h EC50 = 39 mg/L	*Daphnia magna* (Water flea) Immobility OECD TG 202 Static conditions Nominal concentration
Algae	72 h ErC50 = 64 mg/L	*Pseudokirchneriella subcapitata* (Green algae) Growth inhibition OECD TG 201 Static conditions Nominal concentration

Predicted no-effect concentration (PNEC)

The predicted no-effect concentration is expected to be greater than 0.54 µg/L.

The available standard acute ecotoxicity endpoints for this chemical are greater than 0.54 mg/L. With a conservative assessment factor of 1,000, the lowest calculable PNEC is greater than 0.54 µg/L.

Categorisation of environmental hazard

The categorisation of the environmental hazards of the assessed chemical according to the *Australian Environmental Criteria for Persistent, Bioaccumulative and/or Toxic Chemicals* (DCCEEW 2022) is presented below:

Persistence

Not Persistent (Not P). Based on measured degradation studies, the assessed chemical is categorised as Not Persistent.

Bioaccumulation

Not Bioaccumulative (Not B). Based on the weight of evidence, the assessed chemical is categorised as not Bioaccumulative.

Toxicity

Not Toxic (Not T). Based on available ecotoxicity values above 1 mg/L, the assessed chemical is categorised as Not Toxic.

Environmental risk characterisation

The assessed chemical is not PBT and is hence unlikely to have unpredictable long-term effects (EPHC 2009). An estimate of risk may therefore be determined using the risk quotient method.

Compartment	PEC	PNEC	RQ
River	< 0.54 µg/L	> 0.541 µg/L	< 1
Ocean	< 0.05 µg/L	> 0.541 µg/L	< 0.1

The risk quotient for the aquatic compartment is expected to be less than 1. This is based on a conservative PEC, assuming 100% release of 1 tonne/annum to STPs and no removal from the aqueous stream during STP processes, and a conservative PNEC based on an assessment factor of 1,000 and acute aquatic toxicity endpoints for the chemical that each exceed 0.54 mg/L.

Therefore, based on the expected RQ < 1 the assessed chemical is not expected to pose a risk to the environment. As such, the environmental risks associated with the introduction of the assessed chemical can be managed.

References

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