Australian Government
Department of Health and Aged Care
Australian Industrial Chemicals Introduction Scheme

2-Propenoic acid, 2-methyl-, alkyl ester, polymer with alkyl 2-propenoate, alkyl 2-propenoate, alkyl 2-propenoate and alkyl 2-methyl-2-propenoate

Assessment statement (CA09716)

19 February 2024

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AICIS assessment (CA09716)

Chemical in this assessment

AICIS Approved Chemical Name (AACN)
2-Propenoic acid, 2-methyl-, alkyl ester, polymer with alkyl 2-propenoate, alkyl 2-propenoate, alkyl 2-propenoate and alkyl 2-methyl-2-propenoate

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 polymer has been assessed:

- as meeting all criteria for a polymer of low concern (PLC) as per Schedule 2 of the Industrial Chemicals (General) Rules 2019, except for the criterion of being a stable polymer (within the meaning given by the Guidelines).
- for use in crude oil refining

Summary of assessment

Summary of introduction, use and end use

The assessed polymer will be imported into Australia as an additive for crude oils at 50 tonnes per year and at a concentration of up to 50% for reformulation. The end use concentration of the polymer will be up to 10%, prior to addition to crude oils. The assessed polymer will only be used at industrial sites. It will eventually be destroyed during the crude oil refining/cracking process due to the polymer being exposed to high heat in the process.

Human health

Summary of health hazards

No toxicological data were provided for the assessed polymer. The assessed polymer meets all requirements for a PLC except for stability. It is thus assumed to be a low hazard polymer.

The assessed polymer contains residual monomers that are classified as hazardous according to the GHS criteria. However, the hazardous residual monomers in the assessed polymer are below the GHS cut-off concentration for hazard classification.

Hazard classifications relevant for worker health and safety

Based on limited data provided by the applicant, the assessed polymer 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

This assessment does not identify any risks to public health that require specific risk management measures.

Workers

This assessment does not identify any risks to workers that require specific risk management measures.

Environment

Summary of environmental hazard characteristics

According to domestic environmental hazard thresholds and based on available data, the assessed polymer is:

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

Environmental hazard classification

No aquatic toxicity information was available for the assessed polymer. Therefore, the assessed polymer is not able to be formally classified under the *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) for acute and chronic aquatic toxicities (UNECE, 2017).

Summary of environmental risk

No significant release of the assessed polymer is expected to occur as a result of its use as a crude oil additive in the manufacture of industrial oils. A predicted environmental concentration was not calculated, however, if the assessed polymer is released to the environment a large portion of the released polymer is expected to adsorb and partition to soil and sediment (US EPA, 2013). The assessed polymer will stay in the crude oil phase as the crude oil enters the refining process. It will eventually be destroyed during the refining/cracking process due to the assessed polymer being exposed to high heat in the process, causing depolymerization and separation of the assessed polymer into similar components that are generated by the crude oil in the refinery processes.

The assessed polymer will not be made available for consumer use.

No environmental hazard information was supplied for the assessed polymer. The assessed polymer is assumed to be persistent. The assessed polymer is expected to have low bioavailability based on a number average molecular weight exceeding 1,000 g/mol. The assessed polymer is not expected to bioaccumulate based on its low bioavailability. It is not expected to cause toxic effects in aquatic organisms based on its low bioavailability and absence of reactive functional groups.

Based on the low hazard and lack of exposure, the environmental risk from the introduction of the assessed polymer can be managed.

Conclusions

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

Note:

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

Supporting information

Chemical identity

AACN	2-Propenoic acid, 2-methyl-, alkyl ester, polymer with alkyl 2-propenoate, alkyl 2-propenoate, alkyl 2-propenoate and alkyl 2-methyl-2-propenoate
Number Average Molecular weight (Mn)	> 1,000 g/mol
Percentage of low molecular weight species (< 1,000 g/mol)	< 2
Percentage of low molecular weight species (< 500 g/mol)	< 1
Chemical description	Polymer

Relevant physical and chemical properties

Physical form	Viscous yellow liquid*
Pour point	21 °C*
Water solubility	≤ 2 mg/L*

* Product containing the assessed polymer at up to 50% concentration

Environmental exposure

The assessed polymer will not be manufactured in Australia and will be imported as a component of a product in 208L drums, intermediate bulk containers or International Organization for Standardization (ISO) bulk containers via ship to a domestic port. From there, the product will be transported by road to customers for reformulation and subsequent use as an additive in crude oil. The assessed polymer will only be used at industrial sites.

During reformulation, sealed delivery systems will be used to transfer the assessed polymer from its containers into blending vessels, where reformulation will take place. Blending operations are expected to be automated and to be carried out in closed systems therefore, no releases are expected during these processes.

No release to the environment is expected during transport and storage. Any spills that occur during transport, storage or reformulation processes are expected to be collected for appropriate disposal.

The assessed polymer is expected to share the fate of the oil it is incorporated into and will eventually be destroyed during the crude oil refining/cracking process due to the polymer being exposed to high temperatures in the process causing depolymerization and separation of the

assessed polymer into similar components that are generated by the crude oil in the refinery processes.

Environmental fate

Partitioning

The assessed polymer as imported at up to 50% concentration has very low water solubility (≤ 2 mg/L) and has high molecular weight (NAMW > 1,000 g/mol) and low cationic density. If the assessed polymer is released to water, it is expected adsorb strongly to soil and sediment and become immobile (US EPA, 2013).

As the assessed polymer has a high molecular weight (NAMW > 1,000 g/mol), its vapour pressure and volatility are expected to be negligible (US EPA, 2013). As such, the assessed polymer is not expected to evaporate and partition to air.

Degradation

No information on the degradation of the assessed polymer was provided. Therefore, the assessed polymer is assumed to be persistent.

Bioaccumulation

No bioaccumulation information was provided for the assessed polymer. The assessed polymer has high molecular weight (NAMW > 1,000 g/mol), and as such, is not expected to be bioavailable. Therefore, the assessed polymer is considered to be of low concern for bioaccumulation.

Predicted environmental concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated as release of the assessed polymer to the aquatic environment is expected to be negligible based on its assessed use patterns.

Environmental effects

No information about the toxicity of the assessed polymer is available. The assessed polymer is not expected to be bioavailable and does not contain functional groups of concern. Thus, it is not expected to cause toxic effects in the environment.

Predicted no-effect concentration (PNEC)

A predicted no-effect concentration (PNEC) was not calculated as no aquatic toxicity data were provided and the assessed polymer is not considered harmful to aquatic organisms.

Categorisation of environmental hazard

The categorisation of the environmental hazards of the assessed polymer according to domestic environmental hazard thresholds is presented below:

Persistence

Persistent (P). No information about the degradation of the assessed polymer was available. Based on its assumed stability, and lack of demonstrated degradation, the assessed polymer is categorised as Persistent.

Bioaccumulation

Not Bioaccumulative (Not B). Based on its very high molecular weight and expected low bioavailability, the assessed polymer is categorised as Not Bioaccumulative.

Toxicity

Not Toxic (Not T). Based on its low bioavailability and absence of reactive functional groups, the assessed polymer is categorised as Not Toxic.

Environmental risk characterisation

Although the assessed polymer is persistent, it does not meet all three PBT criteria. It is hence unlikely to have unpredictable long-term effects (EPHC 2009). A Risk Quotient (PEC/PNEC) for the aquatic compartment was not calculated as the currently available information indicates the assessed polymer is not harmful to aquatic organisms and will have limited bioavailability. Additionally, the release to the environment is expected to be minimal based on its use patterns. Therefore, the risk from the assessed polymer can be managed.

References

UNECE (United Nations Economic Commission for Europe) (2017). Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Seventh Revised Edition. UNECE.

US EPA (2013), Interpretive Assistance Document for Assessment of Polymers, URL: Interpretive Guidance Document (epa.gov), accessed February 2024 at https://www.epa.gov/sites/production/files/2015-05/documents/06-iad_polymers_june2013.pdf.