Carbamic acid, [2-(sulfothio)ethyl]-, C-(.gamma.-.omega.-perfluoro-C6-9-alkyl) esters, monosodium salts: Human health tier II assessment

21 April 2016

CAS Number: 95370-51-7

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Preface

This assessment was carried out by staff of the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) using the Inventory Multi-tiered Assessment and Prioritisation (IMAP) framework.

The IMAP framework addresses the human health and environmental impacts of previously unassessed industrial chemicals listed on the Australian Inventory of Chemical Substances (the Inventory).

The framework was developed with significant input from stakeholders and provides a more rapid, flexible and transparent approach for the assessment of chemicals listed on the Inventory.

Stage One of the implementation of this framework, which lasted four years from 1 July 2012, examined 3000 chemicals meeting characteristics identified by stakeholders as needing priority assessment. This included chemicals for which NICNAS already held exposure information, chemicals identified as a concern or for which regulatory action had been taken overseas, and chemicals detected in international studies analysing chemicals present in babies' umbilical cord blood.

Stage Two of IMAP began in July 2016. We are continuing to assess chemicals on the Inventory, including chemicals identified as a concern for which action has been taken overseas and chemicals that can be rapidly identified and assessed by using Stage One information. We are also continuing to publish information for chemicals on the Inventory that pose a low risk to human health or the environment or both. This work provides efficiencies and enables us to identify higher risk chemicals requiring assessment.

The IMAP framework is a science and risk-based model designed to align the assessment effort with the human health and environmental impacts of chemicals. It has three tiers of assessment, with the assessment effort increasing with each tier. The Tier I assessment is a high throughput approach using tabulated electronic data. The Tier II assessment is an evaluation of risk on a substance-by-substance or chemical category-by-category basis. Tier III assessments are conducted to address specific concerns that could not be resolved during the Tier II assessment.

These assessments are carried out by staff employed by the Australian Government Department of Health and the Australian Government Department of the Environment and Energy. The human health and environment risk assessments are conducted and published separately, using information available at the time, and may be undertaken at different tiers.

This chemical or group of chemicals are being assessed at Tier II because the Tier I assessment indicated that it needed further investigation.

For more detail on this program please visit:www.nicnas.gov.au

Disclaimer

Acronyms & Abbreviations

Chemical Identity

Synonyms	Nil
Structural Formula	**No Structural Diagram Available**
Molecular Formula	Unspecified
SMILES	C(F)(F)(F)C(F)(F)C(F)(F)C(F)(F)C(F)(F)C(F)(F)OC(=O)NCCSS(=O)(=O)O[Na]

Import, Manufacture and Use

Australian

Based on information collected by NICNAS in 2006 indicated that the chemical was not expected manufactured, imported or used in Australia at that time (NICNAS, 2013).

It is noted that the chemical could be present in the environment due to historic use, or due to release from articles.

International

No specific international use, importation, or manufacturing information has been identified.

Restrictions

Australian

No known mandatory restrictions have been identified for this chemical.

International

No known mandatory restrictions have been identified for this chemical.

Existing Work Health and Safety Controls

Hazard Classification

The chemical is not listed on the Hazardous Substances Information System (HSIS) (Safe Work Australia).

Exposure Standards

Australian

No specific exposure standards exist for this chemical or its likely degradation product, perfluoroheptanoic acid (PFHpA).

International

No specific exposure standards exist for this chemical or its likely degradation products, PFHpA, perfluorohexanoic acid (PFHxA) or perfluoropentanoic acid.

Health Hazard Information

Toxicity information for the chemical is not available. The chemical is a carbamic acid ester of a fluorotelomer alcohol which includes a perfluorinated carbon chain. Carbamic acid esters may hydrolyse to an amine, an alcohol and CO_2 (Nielsen, 2012); and in the case of CAS No. 95370-51-7, the hydrolysis will produce a fluorotelomer alcohol containing up to seven perfluorinated carbons.

The chemicals which hydrolyse to fluorotelomer alcohols are expected to predominantly degrade by loss of one perfluorinated carbon atom (Butt et al., 2014). Hence, according to the NICNAS action plan to assess and manage chemicals which may degrade to perfluorocarboxylic acids (PFCAs), perfluoroalkane sulfonates (PFASs) or similar chemicals, the chemical (CAS No. 95370-51-7) is assumed to have potential to degrade to perfluoroheptanoic acid (PFHpA) as well as mixture of shorter-chain PFCAs (for more information, see Appendix G of the NICNAS Handbook for Notifiers (NICNASa)). The primary health risk is expected to arise from secondary, long-term exposure to the degradation products.

The chemical PFHpA and its salt (direct precursors) have been assessed by NICNAS, with limited human health hazard information existing for PFHpA, but the hazard is expected to lie at some point between that of perfluoroheptanoic acid (PFHxA) and perfluorooctanoic acid (PFOA) (NICNASb). Due to the uncertainty of the chronic effects of PFHpA, data from studies using PFOA and its ammonium salt (APFO) have been used, as the worst case scenario, to estimate the hazard of the chemicals (for further details see NICNASC). This assessment approach meets the requirements of the NICNAS action plan and addresses the safety of public health and workers.

Risk Characterisation

Critical Health Effects

The main degradant of this chemical is expected to be PFHpA. It is not currently clear whether the hazards for the PFHpA are comparable to the long-chain PFOA or to the short-chain PFCAs (NICNASb). Due to this uncertainty, PFOA hazard information is used to estimate the hazard of PFHpA and its precursors.

The critical health effects for risk characterisation include systemic long-term effects (hepatotoxicity and developmental toxicity). The evidence for carcinogenicity is regarded as limited. For further information, see Tier II Human Health risk assessment for PFOA and direct precursors (NICNASc).

Public Risk Characterisation

Based on the available use information, the chemical is not likely to be available for domestic or cosmetic uses. Hence, the public risk from direct use of the chemical is not considered to be unreasonable.

Secondary exposure to PFCAs via the environment

The primary health risk is expected to arise from secondary, long-term exposure to the degradation products of the chemical, with the main concern being PFHpA. It is noted that the degradation products are persistent and potentially bioaccumulative (NICNASd). Chemicals which are persistent and bioaccumulative remain in the environment and accumulate in biota over an extended period of time. However, currently reported blood levels of PFHpA are similar to levels found for PFHxA, which is more rapidly eliminated compared with PFHpA (NICNASb). This indicates that current exposure to PFHpA is generally low.

Occupational Risk Characterisation

Based on the available use information, the chemical is not likely to be used by workers in significant quantities in Australia. Therefore, the chemical is not considered to pose an unreasonable risk to the health of workers.

Long term occupational exposure to low concentrations of PFHpA could occur while using the chemical.

NICNAS Recommendation

The breakdown product of the chemical has the potential to cause adverse outcomes for the environment and public health. The chemical has been assessed as having the potential to cause adverse outcomes for the environment and human health. The chemical is currently listed on the Australian Inventory of Chemical Substances (AICS), and is available to be introduced into Australia without any further assessment by NICNAS. Other chemicals with a reduced potential for adverse human health and environment outcomes are becoming increasingly available but, given the properties of these chemicals, their assessment as new chemicals under the Industrial Chemicals (Notification and Assessment) Act 1989 (the ICNA Act) is still required to fully characterise the human health and environmental risks associated with their use.

It is recommended that NICNAS continue to consult with industry and other stakeholders to consider strategies, including regulatory mechanisms available under the ICNA Act, to encourage the use of safer chemistry.

Regulatory Control

Advice for consumers

Products containing the chemicals should be used according to the instructions on the label.

Advice for industry

Control measures

Control measures to minimise the risk from exposure to the chemical should be implemented in accordance with the hierarchy of controls. Approaches to minimise risk include substitution, isolation and engineering controls. Measures required to eliminate, or minimise risk arising from storing, handling and using a hazardous chemical depend on the physical form and the manner in which the chemicals are used. Examples of control measures that could minimise the risk include, but are not limited to:

- using closed systems or isolating operations;
- using local exhaust ventilation to prevent the chemicals from entering the breathing zone of any worker;
- health monitoring for any worker who is at risk of exposure to the chemical, if valid techniques are available to monitor the effect on the worker's health;
- air monitoring to ensure control measures in place are working effectively and continue to do so;
- minimising manual processes and work tasks through automating processes;
- work procedures that minimise splashes and spills;
- regularly cleaning equipment and work areas; and
- using protective equipment that is designed, constructed, and operated to ensure that the worker does not come into contact with the chemical.

Guidance on managing risks from hazardous chemicals are provided in the *Managing risks of hazardous chemicals in the workplace—Code of practice* available on the Safe Work Australia website.

Personal protective equipment should not solely be relied upon to control risk and should only be used when all other reasonably practicable control measures do not eliminate or sufficiently minimise risk. Guidance in selecting personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

Obligations under workplace health and safety legislation

Information in this report should be taken into account to help meet obligations under workplace health and safety legislation as adopted by the relevant state or territory. This includes, but is not limited to:

- ensuring that hazardous chemicals are correctly classified and labelled;
- ensuring that (material) safety data sheets ((M)SDS) containing accurate information about the hazards (relating to both health hazards and physicochemical (physical) hazards) of the chemicals are prepared; and
- managing risks arising from storing, handling and using a hazardous chemical.

Your work health and safety regulator should be contacted for information on the work health and safety laws in your jurisdiction.

Information on how to prepare an (M)SDS and how to label containers of hazardous chemicals are provided in relevant codes of practice such as the *Preparation of safety data sheets for hazardous chemicals—Code of practice* and *Labelling of workplace*

hazardous chemicals—Code of practice, respectively. These codes of practice are available from the Safe Work Australia website.

A review of the physical hazards of the chemical has not been undertaken as part of this assessment.

References

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