PRD2009-09

Proposed Registration Decision

Roctenol
(3R)-1-octen-3-ol

(publié aussi en français)

18 August 2009

This document is published by the Health Canada Pest Management Regulatory Agency. For further information, please contact:

Publications
Pest Management Regulatory Agency
Health Canada
2720 Riverside Drive
A.L. 6605C
Ottawa, Ontario
K1A 0K9

Internet: pmra_publications@hc-sc.gc.ca
healthcanada.gc.ca/pmra
Facsimile: 613-736-3758
Information Service:
1-800-267-6315 or 613-736-3799
pmra_infoserv@hc-sc.gc.ca

Canada

HC Pub: 8344

ISBN: 978-1-100-13201-3 (978-1-100-13202-0)
Catalogue number: H113-9/2009-9E (H113-9/2009-9E-PDF)

Table of Contents

Overview

Proposed Registration Decision for Roctenol

Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act* and Regulations, is proposing full registration for the sale and use of the technical grade active ingredient roctenol, containing (3R)-1-Octen-3-ol.

An evaluation of available scientific information supports the full registration of the technical grade active ingredient roctenol.

This Overview describes the key points of the evaluation, while the Science Evaluation provides detailed technical information on the human health and environmental assessments of the technical grade active ingredient roctenol.

What Does Health Canada Consider When Making a Registration Decision?

The key objective of the *Pest Control Products Act* is to prevent unacceptable risks to people and the environment from the use of pest control products. Health or environmental risk is considered acceptable[1] if there is reasonable certainty that no harm to human health, future generations or the environment will result from use or exposure to the product under its proposed conditions of registration. The Act also requires that products have value[2] when used according to the label directions. Conditions of registration may include special precautionary measures on the product label to further reduce risk.

To reach its decisions, the PMRA applies modern, rigorous risk-assessment methods and policies. These methods consider the unique characteristics of sensitive subpopulations in humans (for example, children) as well as organisms in the environment (for example, those most sensitive to environmental contaminants). These methods and policies also consider the nature of the effects observed and the uncertainties present when predicting the impact of pesticides. For more information on how the PMRA regulates pesticides, the assessment process and risk reduction programs, please visit the Pesticides and Pest Management portion of Health Canada's website at healthcanada.gc.ca/pmra.

---

1 "Acceptable risks" as defined by subsection 2(2) of the *Pest Control Products Act.*

2 "Value" as defined by subsection 2(1) of the *Pest Control Products Act* "...the product's actual or potential contribution to pest management, taking into account its conditions or proposed conditions of registration, and includes the product's (a) efficacy; (b) effect on host organisms in connection with which it is intended to be used; and (c) health, safety and environmental benefits and social and economic impact".

Before making a final registration decision on roctenol, the PMRA will consider all comments received from the public in response to this consultation document.[3] The PMRA will then publish a Registration Decision[4] on roctenol, which will include the decision, the reasons for it, a summary of comments received on the proposed final registration decision and the PMRA's response to these comments.

For more details on the information presented in this Overview, please refer to the Science Evaluation of this consultation document.

What Is Roctenol?

Roctenol is the resolved isomer of the currently registered octenol (Registration Number 28439) which is a naturally occurring and ubiquitous chemical secreted by mushrooms, plants and mammals. Roctenol is a semiochemical which modifies the behaviour of some insects.

Health Considerations

Can Approved Uses of Roctenol Affect Human Health?

The technical grade active ingredient, roctenol, is chemically similar to the currently registered active ingredient, octenol, in that the overall toxicity of the optically pure form, roctenol, is expected to resemble that of the racemic mixture of octenol. According to the available information, roctenol is moderately acutely toxic when administered by the oral route, is expected to have a low acute dermal toxicity, is a mild irritant when applied to the eyes and skin, but is not a skin sensitizer. Roctenol is not expected to be genotoxic, nor is it expected to be a short-term or a prenatal developmental toxicant.

Residues in Water and Food

The proposed registration of the active ingredient, roctenol, is not for use on food or feed, thus dietary risks from food and water are not of concern.

Occupational Risks From Handling Roctenol

Potential worker and/or bystander exposure to end-use products containing roctenol as the active ingredient was not considered because only the technical grade active ingredient was submitted for registration. When assessing health risks, two key factors are considered: the levels where no health effects occur and the levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (for example, children and nursing mothers). Only uses for

[3] "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.

[4] "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act.*

which the exposure is well below levels that cause no effects in animal testing are considered acceptable for registration. A risk assessment for roctenol will be conducted upon receipt of an application for the technical in an end-use product.

Environmental Considerations

What Happens When Roctenol Is Introduced Into the Environment?

The PMRA expects roctenol to behave similarly to octenol in the environment, in that it is more target specific than conventional insecticides, is used at concentrations close to or lower than those occurring in nature, and dissipates rapidly. Based on octenol, roctenol is expected to be very soluble in water, indicating a potential for leaching into groundwater. The vapour pressure for roctenol is expected to be highly volatile, with the Henry's law constant indicating that it is volatile from a water surface. As well, the log K_{ow} indicates a limited potential for bioconcentration.

Semiochemicals generally dissipate rapidly in the terrestrial and aquatic environments, primarily by volatilization and degradation. Roctenol is expected to volatilize from soil and water surfaces rapidly.

For more information on the fate and behaviour of roctenol, refer to the published documents on octenol (Proposed Registration Decision Document PRDD2006-03, *Octenol* and Registration Decision Document RDD2007-01, *Octenol*).

Value Considerations

The value assessment for roctenol will be conducted upon receipt of an application for the technical in an end-use product.

Measures to Minimize Risk

Labels of registered pesticide products include specific instructions for use. Directions include risk-reduction measures to protect human and environmental health. These directions must be followed by law.

The key risk-reduction measures being proposed on the label of Roctenol address the potential risks identified in this assessment.

Next Steps

Before making a final registration decision on roctenol, the PMRA will consider all comments received from the public in response to this consultation document. The PMRA will accept written comments on this proposal up to 45 days from the date of publication of this document. Please forward all comments to Publications. The PMRA will then publish a Registration Decision, which will include its decision, the reasons for it, a summary of comments received on the proposed final decision and the Agency's response to these comments.

Other Information

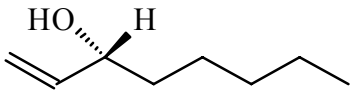
At the time the PMRA makes its registration decision, it will publish a Registration Decision on roctenol (based on the Science Evaluation of this consultation document). In addition, the test data referenced in this consultation document will be available for public inspection, upon application, in the PMRA's Reading Room (located in Ottawa).

Science Evaluation

Roctenol

1.0 The Active Ingredient, Its Properties and Uses

1.1 Identity of the Active Ingredient

Active substance	(3R)-1-octen-3-ol
Function	Insecticide
Chemical name	
1. International Union of Pure and Applied Chemistry (IUPAC)	(3R)-oct-1-en-3-ol
2. Chemical Abstracts Service (CAS)	(3R)-1-octen-3-ol
CAS number	3687-48-7
Molecular formula	$C_8H_{16}O$
Molecular weight	128.2
Structural formula	
Purity of the active ingredient	98.0%

1.2 Physical and Chemical Properties of the Active Ingredients and End-Use Product

Technical Product—Roctenol

Property	Result
Colour and physical state	Colourless to light yellow liquid
Odour	Earthy smell like mushrooms
Melting range	N/A
Boiling point	175°C
Density at 25°C	0.830 g/mL
Vapour pressure at 25°C	110 Pa (estimated from boiling point data)
Ultraviolet (UV)-visible spectrum	$^{*}_{max}$ = 288 nm (no significant absorption above 400 nm)
Solubility in water at 25°C	1836 mg/L (calculated)

Property	Result
Solubility in organic solvents	Soluble in 95% alcohol at a ratio of 1:1
n-Octanol-water partition coefficient (K_{ow})	log K_{ow}= 2.6 (calculated)
Dissociation constant (p*K*a)	N/A
Stability (temperature, metal)	Stable at room temperature and at 54ºC for 14 days. Stable in the presence of iron, iron acetate, aluminum foil and aluminum acetate.

1.3 Directions for Use

Not applicable to a technical grade active ingredient.

1.4 Mode of Action

Not applicable to a technical grade active ingredient.

2.0 Methods of Analysis

2.1 Methods for Analysis of the Active Ingredient

The methods provided for the analysis of the active ingredient and the impurities in roctenol have been validated and assessed to be acceptable for the determinations.

2.2 Methods for Residue Analysis

Not applicable to a technical grade active ingredient.

3.0 Impact on Human and Animal Health

3.1 Toxicology Summary

A critical review of the toxicological database for roctenol was conducted. The database consisted of an acute oral toxicity study, published scientific literature and scientific rationales to support requests to waive the data requirements for acute dermal and inhalation toxicity, dermal and eye irritation, skin sensitization, short-term toxicity, genotoxicity, and prenatal developmental toxicity. The acute oral toxicity study was carried out in accordance with currently accepted international testing protocols and Good Laboratory Practices. The scientific quality of the data is high and the database is considered adequate to define the potential toxic effects that may result from exposure to this chemical pest control product.

Roctenol was moderately acutely toxic via the oral route. The waiver requests for the remainder of the required toxicological studies were acceptable based on the anticipated low potential for exposure to the active. The dermal irritation and ocular irritation for a chemically similar active ingredient, octenol (a racemic mixture of R and S optical isomers), was considered applicable for the optically pure form, roctenol, as well.

An occupational, residential, and/or dietary risk assessment for roctenol will be conducted upon receipt of an application for the technical in an end-use product.

3.2 Determination of Acceptable Daily Intake

Not applicable to a technical grade active ingredient.

3.3 Determination of Acute Reference Dose

Not applicable to a technical grade active ingredient.

3.4 Occupational and Residential Risk Assessment

Not applicable to a technical grade active ingredient.

3.5 Food Residues Exposure Assessment

The active ingredient, roctenol, has been proposed for registration on non-food/feed uses.

4.0 Impact on the Environment

4.1 Fate and Behaviour in the Environment

Roctenol is the resolved isomer of the currently registered octenol (Registration Number 28439) and the PMRA expects roctenol to behave similarly to octenol in the environment. Based on octenol, roctenol is expected to be very soluble in water, indicating a potential for leaching into groundwater. The vapour pressure for roctenol is expected to be highly volatile, with the Henry's law constant indicating that it is volatile from a water surface. As well, the log K_{ow} indicates a limited potential for bioconcentration.

Octenol is a naturally occurring volatile alcohol produced by both plants and animals. Octenol is formed by common herbaceous plants and is present in the fruit bodies of edible mushrooms. Octenol is sometimes called "mushroom alcohol" and is produced and emitted by animals including humans, cows, and pigs. Octenol is a liquid at room temperature.

It is anticipated that the amount of roctenol pheromone potentially released into the environment will be below the 375 g a.i./ha/season threshold that the PMRA considers to be the limit, above which there may be concern for impacts on non-target organisms or the environment.

4.2 Effects on Non-Target Species

Roctenol use is not expected to result in increased roctenol exposure to non-target plants and animals compared to normal background exposures; consequently, adverse effect on these organisms is negligible.

5.0 Value

A value assessment for roctenol will be conducted upon receipt of an application for the technical in an end-use product.

6.0 Pest Control Product Policy Considerations

6.1 Toxic Substances Management Policy Considerations

The management of toxic substances is guided by the federal government's Toxic Substances Management Policy (TSMP), which puts forward a preventive and precautionary approach to deal with substances that enter the environment and could harm the environment or human health. The policy provides decision makers with direction and sets out a science-based management framework to ensure that federal programs are consistent with its objectives. One of the key management objectives is virtual elimination from the environment of toxic substances that result predominantly from human activity and that are persistent and bioaccumulative. These substances are referred to in the policy as Track 1 substances.

During the review process, roctenol was assessed in accordance with the PMRA Regulatory Directive DIR99-03, *The Pest Management Regulatory Agency's Strategy for Implementing the Toxic Substances Management Policy*. Roctenol was evaluated against the following Track 1 criteria: persistence in soil ≥182 days; persistence in water ≥182 days; persistence in sediment ≥365 days; persistence in air ≥2 days; bioaccumulation log K_{ow} ≥5 or BCF ≥5000 (or BAF ≥5000). In order for roctenol or its transformation products to meet Track 1 criteria, the criteria for both bioaccumulation and persistence (in one media) must be met. The technical product, including formulants, were assessed against the contaminants identified in the *Canada Gazette*, Part II, Volume 139, Number 24, pages 2641 to 2643: *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern, Part 3 Contaminants of Health or Environmental Concern.* The PMRA has reached the following conclusions.

- Roctenol is a semiochemical which modifies the behaviour of the pest species rather than killing them, is more target specific than conventional insecticides, is used at concentrations close to those occurring in nature, and dissipates rapidly. For these reasons, roctenol is not expected to be a TSMP Track 1 substance. Roctenol is a naturally occurring substance and is not expected to be persistent or bioaccumulative in the environment.

- Roctenol does not form any transformation products that meet the Track 1 criteria.

- There are no Track 1 formulants in the technical product.

- There are no Track 1 contaminants in the technical product.

6.2 Formulants and Contaminants of Health or Environmental Concern

During the review process, formulants and contaminants in the technical were assessed against the formulants and contaminants identified in the *Canada Gazette*, Part II, Volume 139, Number 24, pages 2641 to 2643: *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern*. This list of formulants and contaminants of health and environmental concern are identified using existing policies and regulations including: the federal Toxic Substances Management Policy; the Ozone-depleting Substance Regulations, 1998, of the *Canadian Environmental Protection Act* (substances designated under the Montreal Protocol); and the PMRA Formulants Policy as described in the PMRA Regulatory Directive DIR2006-02, *Formulants Policy and Implementation Guidance Document*. The *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern* is maintained and used as described in the PMRA Notice of Intent NOI2005-01, *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern under the New Pest Control Products Act*.

The *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern* consists of three parts:

- Part 1: Formulants of Health or Environmental Concern;
- Part 2: Formulants of Health or Environmental Concern that are Allergens Known to Cause Anaphylactic-Type Reactions; and
- Part 3: Contaminants of Health or Environmental Concern.

The contaminants to which Part 3 applies meet the federal Toxic Substances Management Policy criteria as Track 1 substances, and are considered in Section 6.1. The following assessment refers to the formulants and contaminants in Part 1 and Part 2 of the list.

Technical grade roctenol does not contain any formulants or contaminants of health or environmental concern identified in the *Canada Gazette*, Part II, Volume 139, Number 24, pages 2641 to 2643: *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern*.

7.0 Summary

7.1 Human Health and Safety

The available information for roctenol is adequate to qualitatively define the majority of toxic effects associated with this compound. Roctenol is moderately acutely toxic via the oral route and will likely result in irritation when exposed to the eye and/or skin. No other toxicologically significant effects were observed in any other available information. As such, roctenol is not expected to be acutely toxic via the dermal or inhalation route of exposure, nor is it expected to cause skin sensitization, short-term toxicity, genotoxicity, and prenatal developmental toxicity.

7.2 Environmental Risk

Roctenol is a semiochemical, derived from natural plant oils. Semiochemicals act by modifying behaviour of the pest species rather than killing them, are more target specific than conventional insecticides, are used at concentrations close to or lower than those occurring in nature, and dissipate rapidly. Roctenol is introduced into the air in the vapour phase.

Roctenol use is not expected to result in increased roctenol exposure to non-target plants and animals compared to normal background exposures; consequently, adverse effect on these organisms is negligible.

8.0 Proposed Regulatory Decision

Health Canada's PMRA, under the authority of the *Pest Control Products Act* and Regulations, is proposing full registration for the sale and use of the technical grade active ingredient roctenol, containing (3R)-1-Octen-3-ol.

An evaluation of available scientific information supports the full registration of the technical grade active ingredient roctenol.

List of Abbreviations

µg	micrograms
a.i.	active ingredient
ADI	acceptable daily intake
ArfD	acute reference dose
bw	body weight
CAS	chemical abstracts service
g	gram
kg	kilogram
L	litre
LC_{50}	lethal concentration 50%
LD_{50}	lethal dose 50%
LOAEL	lowest observed adverse effect level
m^3	metre(s) cubed
mg	milligram
mm	millimetre(s)
MOE	margin of exposure
NOAEL	no observed adverse effect level
PMRA	Pest Management Regulatory Agency
ppm	parts per million
Q1*	cancer potency factor
TSMP	Toxic Substances Management Policy

Appendix I Tables and Figures

Table 1 Toxicology Summary Table

Study	Species, Strain and Doses	NOAEL & LOAEL mg/kg bw/day	Target Organ, Significant Effects, Comments
Acute Studies – Technical			
Oral	Albino rats (♀) (*Rattus norvegicus*) Dose: 175, 310, 550 and 990 mg/kg bw	LD_{50} 550 mg/kg bw	Moderate acute toxicity.
Dermal	An acceptable waiver request was submitted by the applicant.		As per octenol, low acute toxicity.
Inhalation	An acceptable waiver request was submitted by the applicant.		Not expected to exceed the acute oral toxicity findings of moderate toxicity.
Skin Irritation	An acceptable waiver request was submitted by the applicant.		As per octenol, mildly irritating.
Eye Irritation	An acceptable waiver request was submitted by the applicant.		As per octenol, mildly irritating.
Skin Sensitization	An acceptable waiver request was submitted by the applicant.		As per octenol, not a skin sensitizer.
Short-term Toxicity			
90-day dietary	An acceptable waiver request was submitted by the applicant.		
Reproduction and Developmental Toxicity			
Prenatal Developmental Toxicity	An acceptable waiver request was submitted by the applicant.		
Genotoxicity			
Study	**Species and Strain or Cell Type and Concentrations or Doses**		**Results**
Gene Mutations in Bacteria	*Salmonella typhimurium* strains TA98, TA100, TA102, TA1535, TA1537, and TA1538 0–1000 μg/plate; with and without activation		Negative using 1-decen-3-ol, a structurally similar compound, as the test compound.
Gene Mutations in Mammalian Cells in vitro	An acceptable waiver request was submitted by the applicant.		
Compound-Induced Mortality: Mortality was not observed as a compound-induced effect in any study other than the acute oral toxicity study.			

Recommended ARfD: Not applicable.
Recommended ADI: Not applicable. **MOE for other critical endpoint(s):** Not applicable.
Tox Endpoints for Occupational Risk Assessment: A risk assessment could not be performed therefore identifying toxicological endpoints was not necessary.

References

A. List of Studies/Information Submitted by Registrant

1.0 Chemistry

PMRA Document Number: 1081835
Reference: Appendix D: Data From Aldrich Compilation In : Boiling Point Of 1-octen-3-ol. Data Numbering Code: 2.14.5, 2.14.6 Confidential Business Information

PMRA Document Number: 1081837
Reference: Appendix F: Water Solubility Of 1-octen-3-ol, In: RIFM Monograph #492, Data Numbering Code: 2.14.11, 2.14.7 Confidential Business Information

PMRA Document Number: 1081838
Reference: N/s, Appendix G: Solubility Of 1-octen-3-ol In Organic Solvents. Fenaroli's Handbook Of Flavor Ingredients, Data Numbering Code: 2.14.8 Confidential Business Information

PMRA Document Number: 1081839
Reference: Appendix H: Estimation Of Vapor Pressure Of 1-octen-3-ol. Data Numbering Code: 2.14.9 Confidential Business Information

PMRA Document Number: 1081867
Reference: Appendix D: Data From Aldrich Compilation In : Boiling Point Of 1-octen-3-ol. Data Numbering Code: 2.14.5, 2.14.6 Confidential Business Information

PMRA Document Number: 1081869
Reference: N/s, Appendix F: Water Solubility Of 1-octen-3-ol, In: Material Information On 1-octen-3-ol. RIFM Monograph #492, Data Numbering Code: 2.14.11, 2.14.7 Confidential Business Information

PMRA Document Number: 1081870
Reference: Appendix G: Solubility Of 1-octen-3-ol In Organic Solvents. Data Numbering Code: 2.14.8 Confidential Business Information

PMRA Document Number: 1081871
Reference: Appendix H: Estimation Of Vapor Pressure Of 1-octen-3-ol. Data Numbering Code: 2.14.9 Confidential Business Information

PMRA Document Number: 1565362
Reference: 2006, Preliminary Analysis And Certified Limits, Data Numbering Code: 2.12.1, 2.12.2, 2.13.1, 2.13.2, 2.13.3, 3.3.1, 3.3.2

PMRA Document Number: 1565363
Reference: 2006, Preliminary Analysis And Certified Limits, Data Numbering Code: 2.12.1, 2.12.2, 2.13.1, 2.13.2, 2.13.3, 3.3.1, 3.3.2, Confidential Business Information

PMRA Document Number: 1652666
Reference: 2008, Specific Response To Clarification Request, Data Numbering Code: 2.11.3, 2.12.2, 2.13.1, 2.14.13, 2.14.7, 2.15

PMRA Document Number: 1652667
Reference: 2008, Specific Response To Clarification Request, Data Numbering Code: 2.11.3, 2.12.2, 2.13.1, 2.14.13, 2.14.7, 2.15 Confidential Business Information

PMRA Document Number: 1700938
Reference: 2009, Specific Response To Clarification Request, Data Numbering Code: 2.14.13

PMRA Document Number: 1711105
Reference: 2006, Enforcement Analytical Method, Data Numbering Code: 2.13.1

PMRA Document Number: 1711106
Reference: 2009, Response To Request For Clarification: Chromatograms, Data Numbering Code: 2.13.1 Confidential Business Information

2.0 Human and Animal Health

PMRA Document Number: 1061413
Reference: 2005, Waiver Request For Genotoxicity:, Data Numbering Code: 4.5.4,4.5.5,4.5.6

PMRA Document Number: 1061414
Reference: 2000, Cadby, P. The Risk Assessment Of Flavoring Agents. The Toxicology Forum-European Meeting 2000, Data Numbering Code: 4.5.4

PMRA Document Number: 1061415
Reference: 1995, Reverse Mutation Assay Ames Test Using Salmonella Typhimurium, Data Numbering Code: 4.5.4

PMRA Document Number: 1061416
Reference: 2000, International Life Sciences Institute, Threshold Of Toxicological Concern For Chemical Substances Present In The Diet, Data Numbering Code: 4.5.4

PMRA Document Number: 1061417
Reference: 2001, Micronucleaus Test In Bone Marrow Cells Of The Mouse With Linalool, Data Numbering Code: 4.5.4

PMRA Document Number: 1061418
Reference: Williams. G. World Health Organization Food Additive Series: 52. Aliphatic, Alycyclic, Linear, Alpha, Beta- Unsaturated, Di- And Trienals And Related Alcohols, Acids And Esters, Data Numbering Code: 4.5.4

PMRA Document Number: 1565365
Reference: 2005, Acute Oral Toxicity, 05-3256-g1, MRID: 46835404, Data Numbering Code: 4.2.1,4.6.1,870.1100

PMRA Document Number: 787419
Reference: Waiver Request For Genotoxicity: Microbial Point Mutation. Data Numbering Code: 4.5.4

PMRA Document Number: 787420
Reference: Waiver Request For Genotoxicity: Mammalian (cell) Point Mutation. Data Numbering Code: 4.5.5

PMRA Document Number: 787421
Reference: Waiver Request For Genotoxicity: In Vitro Chromosomal Aberrations. Data Numbering Code: 4.5.6

3.0 Environment

PMRA Document Number: 1576934
Reference: 2004. Summary of Environmental Toxicology of Bedoukian Octenol Technical Comments: Waiver Request

B. Additional Information Considered

i) Published Information

1.0 Impact on Human and Animal Health

PMRA Document Number: 1743249
Reference: 2003, US EPA 1-octen-3-ol (067037) Fact Sheet. Data Numbering Code: 4.8

PMRA Document Number: 1743255
Reference: 2007, US EPA Octenol Fact Sheet: 1-octen-3-ol (069037) & R-(-)-1-octen-3-ol (069038) Fact Sheet. Data Numbering Code: 4.8

PMRA Document Number: 1743283
Reference: 2009, Chemical Properties Of Attractants - Catching Tsetse. Data Numbering Code: 4.8

PMRA Document Number: 1743328
Reference: 2009, World Health Organization Food Additives Series: 50, Annex 4, Acceptable Daily Intakes, Other Toxicological Information, And Information On Specifications, Jecfa Food Additives Series 50. Data Numbering Code: 4.8

PMRA Document Number: 1743259
Reference: Borg-Karlson, A.K. And I. Groth,, 1985, Volatiles From The Flowers Of Four Species In The Sections Arachnitiformes And Araneiferae Of The Genus Ophrys As Insect Mimetic Attractants, *Phytochemistry*, Vol. 25, No. 6, pp. 1297-1299, 1986, Data Numbering Code: 4.8

PMRA Document Number: 1743266
Reference: Hall, D.R. Beevor, P.S. Cork, A. Nesbitt, B.F. And G.A. Vale, 1983, 1-octen-3-ol - A Potent Olfactory Stimulant And Attractant For Tsetse Isolated From Cattle Odours, *Insect Science Application*, Vol. 5, No. 5. pp 335-339, 1984, Data Numbering Code: 4.8

PMRA Document Number: 1743277
Reference: Kawasaki, W. Matsui, K. Akakabe, Y. Itai, N. And T. Kajwara, 1997, Volatiles From Zostera Marina, *Phytochemistry*, Vol. 47, No. 1, pp. 27-29, 1998, Data Numbering Code: 4.8

PMRA Document Number: 1743357
Reference: Sipes, I.G. Renwick, A.G. World Health Organization Food Additives Series: 50, Aliphatic Secondary Alcohols, Ketones And Related Esters, Jecfa Food Additives Series 50. Data Numbering Code: 4.8

PMRA Document Number: 1743324
Reference: Stumpe, M. Bode, J. Gobel, C. Wichard, T. Schaaf, A. Frank, W. Frank, M. Reski, R. Pohnert, G. And I. Feussner, 2006, Biosynthesis Of C9-aldehydes In The Moss Physcomitrella Patens, *Biochimica Et Biophysica Acta* 1761 (2006) 301-312, Data Numbering Code: 4.8

PMRA Document Number: 1743322
Reference: Walinder, R. Erstgard, L. Norback, D. Wieslander, G. And G. Johanson, 2008, Acute Effects Of 1-octen-3-ol, A Microbial Volatile Organic Compound (mvoc)-an Experimental Study, *Toxicology Letters* 181 (2008) 141-147, Data Numbering Code: 4.8

PMRA Document Number: 1743270
Reference: Zawirska-wojtasiak, R. 2003, Optical Purity Of (r)-(-)-1-octen-3-ol In The Aroma Of Various Species Of Edible Mushrooms, *Food Chemistry*, 86 (2004) 113-118, Data Numbering Code: 4.8