



Vanillin

Chemical Identity

<i>Brand names</i>	Vanillin , Rhovanil® product line	<i>CAS number</i>	121-33-5
<i>Chemical name (IUPAC)</i>	4-hydroxy-3-methoxybenzaldehyde	<i>Molecular formula</i>	C8H8O3
<i>Synonyms</i>	methyl vanillin, vanillic aldehyde	<i>Molecular weight</i>	152.15 g/mol

Applications

Vanillin imparts the popular “vanilla” flavour and aroma, used alone or in formulations vanillin is the world’s most widely used flavour and fragrance ingredient. It is essential in lots of various applications :

- Food flavours formulations, chocolate, confectionery, baking, beverages, dairy and fresh products
- Perfumes and fragrances, odour masking (tyres, plastics, ...), room and car fragrance
- Formulations for home and personal care, toiletries, detergency, ...
- Feed applications
- Pharmaceuticals and agrochemicals intermediates

Safety Assessment, Exposure and Risk Management Recommendations

Physical and Chemical properties

Property	Result
Form	Crystalline powder
Colour	Colourless to slight yellow
Odour	Vanilla
Melting point	80 – 83.5 °C
Flammability	Non flammable
Water solubility	Soluble
Octanol water partition	Low potential for bioaccumulation

Health effect



Vanillin is designed and formulated to meet requirements of European regulation for consumer applications.



Vanillin causes serious eye irritation. Safety measures have to be respected for industrial uses. For more details, consult the Safety Data Sheet.

Environmental effect



Readily biodegradable, Vanillin will not be persistent. The potential for bioaccumulation is low. Vanillin is not classified as dangerous for the environment.

Industrial emissions must comply with applicable regulations to preserve environment.

Regulatory information and certifications

Classification and labelling

EU regulation (EC) 1272/2008 (CLP)



Eye irritation, Cat. 2 H319 Causes serious eye irritation

Registration and certification

ISO 9001: 2008 certified
 HACCP as defined in EU regulation 852/2004
 and Codex Alimentarius
 EU regulation for chemicals (EC) 1907/2006 (REACH)

Vanillin meets all the requirements of European regulation for consumer applications.
 Extra pure vanillin can be safely used in food applications and is compliant with the most stringent food standards.

GPS Safety Summary

Vanillin

General Statement

Vanillin is the primary chemical component of the extract of the vanilla beans. Natural vanilla extract is a mixture of several hundred different compounds in addition to vanillin.

The demand for vanilla flavouring has long exceeded the supply of vanilla beans. As of 2010, the annual demand for vanillin was higher than 15,000 tons, but about 2000 tons of natural vanillin were produced. The remainder was produced by chemical synthesis.

Artificial vanilla flavouring is a solution of pure vanillin, usually of synthetic origin. If manufactured from an ex-Catechol integrated process, extra pure vanillin can be safely used in food applications and is compliant with the most stringent food standards.

Vanillin imparts the popular “vanilla” flavour and aroma. Used alone or in formulations, vanillin is the world’s most widely used flavour and fragrance ingredient. It is essential in confectionery, chocolates, baked goods, beverages and many other foods, as well as in perfumes, cosmetics, personal care products and detergents.

Vanillin has also interesting chemical properties and is used as a synthesis intermediate in agrochemicals and pharmaceuticals.

Chemical Identity

Name: Vanillin

Brand names: Rhovanil® Extra Pure, Rhovanil® Extra Pure Fine mesh, Rhovanil® Extra Pure Free Flow

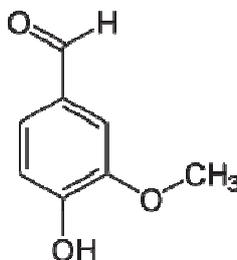
Chemical name (IUPAC): 4-hydroxy-3-methoxybenzaldehyde

Synonyms: methyl vanillin, vanillic aldehyde

CAS number(s): 121-33-5

Molecular formula: C₈H₈O₃

Structure:



Uses and applications

Sustainable development is at the top of Rhodia priorities and at the heart of its processes for the development of an environmentally friendly manufacturing process.

To manufacture its Vanillin products, Rhodia uses the Catechol route that is far more environmentally friendly than the ONCB route (o-nitrochlorobenzene). Most of the eco-advantages compared to the ONCB route come from the 'Green Guaiacol' made from Catechol, widely acknowledged as the Best Available Technology in terms of reduced water and energy consumption to obtain a chlorine-free extra pure vanillin product.

The Rhodia ex-Catechol vanillin made with a toluene-free process guarantees food safe usage though a full traceability of the industrial integrated chain.

Vanillin is used in lots of various applications:

- Food flavours formulations: chocolate, confectionery, baking, beverages, dairy and fresh products.
- Perfumes and fragrances, odour masking (tyres, plastics, ...), room and car fragrance
- Formulations for home and personal care, toiletries, detergency, ...
- Feed applications
- Pharmaceuticals and agrochemicals intermediates.

Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Form	Crystalline powder
Physical state	Solid at room temperature
Colour	Colourless to slight yellow
Odour	Vanilla
Melting Point	80 – 83.5°C
Boiling Point	284°C at atmospheric pressure
Relative density	1.06 g/cm ³ at 20°C
Flammability	Non flammable
Explosive properties	Non explosive
Self-ignition temperature	Not applicable (solid product at 20°C and melting point < 160°C)
Vapour pressure	0.0029 hPa at 25°C, low volatility potential
Molecular weight	152.15 g/mol
Water solubility	9 g/l at 25°C, soluble
Flash point	160°C at 1022 hPa (closed cup)
Octanol Water partition coefficient (log Kow)	1.21 at 25°C

Regarding Physico-chemical hazards, Vanillin is not classified according to EC 1272/2008 regulation.

Health Effects

Human Health Safety Assessment

Effect Assessment	Result
Acute Toxicity Oral /inhalation /dermal	- Oral and dermal routes : not classified - Inhalation route : no data
Irritation / corrosion Skin/eye	- Not classified for skin irritation - Causes serious eye irritation
Sensitisation	Not classified for sensitisation
Toxicity after repeated exposure Oral/inhalation/dermal	- Oral route : not classified for repeated toxicity - Dermal and inhalation routes : no data
Genotoxicity / Mutagenicity	Not classified for either mutagenicity nor genotoxicity
Carcinogenicity	Not classified for carcinogenicity
Toxicity for reproduction	Not classified : no effect on fertility and no teratogenic effect

All these results are based on available data and classification is in accordance with EC 1272/2008 regulation criteria.

Environmental Effects

Environment Safety Assessment

Effect Assessment	Result
Aquatic Toxicity	Harmful to fish, algae and invertebrates

Fate and behaviour	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not potentially bioaccumulative (log Kow = 1.21)
PBT / vPvB conclusion	Not considered to be either PBT or vPvB.

Based on available data, Vanillin is considered to be harmful towards aquatic organisms but as it is readily biodegradable and not potentially bioaccumulative, it is not classified as dangerous for the environment, according to EC 1272/2008 regulation.

Exposure

Human health

Considering the life cycle of the substance (manufacture, intermediate for synthesis or ingredient for formulation and final product), workers and consumers, at a low level, may come in contact with Vanillin.

Consumer is likely to be exposed to Vanillin in food, confectionery, bakery, beverages or when using cosmetics, perfume, home or personal care products.

Vanillin substance meets the requirements of the European regulation concerning the consumer applications.

In industry, Vanillin is manufactured in a closed, continuous and automated process which gives the substance a high level of purity and minimizes the workers exposure potential.

However when workers have a risk of exposure to the pure substance, during handling, loading, mixing, sampling or maintenance operations, it is controlled by the use of appropriate risk management measures, as Vanillin is eye irritating.

Environment

Based on its physical and chemical properties, if Vanillin is released into the environment, it would be mainly distributed in water and poorly in soil. Vanillin is readily biodegradable and will not be persistent. Vanillin has no potential for volatilization, the emission in the air is very low. In addition, Vanillin has a very low potential for adsorption and bioaccumulation.

On the Vanillin manufacturing site and for uses as intermediate for synthesis or in formulation, effluents are directed to a (biological) water treatment plant.

The indirect risk of human exposure via the environment can't be expected for synthetic Vanillin and the risk assessment showed it will have no effect on the food chain.

Risk Management Recommendations

Human health

Risk management is an unconditional priority for Rhodia and is in compliance with HACCP (Hazard Analysis Critical Control Point), systematic preventive approach to food safety. Vanillin is manufactured in compliance with the most stringent food standard and the final product can be used safely by the consumer.

For industrial uses of Vanillin substance, workers must be well informed and trained and must refer to the extended Safety Data Sheet (eSDS). Where there is a risk of exposure to Vanillin (during (un)loading, mixing, sampling, analysis or maintenance operations), handling must be under an adequate and efficient ventilation, appropriate personal protective equipment (PPE) must be worn (safety goggles, gloves, protective suit) as recommended in the eSDS, and hygiene measures must be respected (accessible emergency equipment, well-maintained PPE, wash hands and skin following contact, do not eat, drink or smoke on the workplace).

Environment

All effluent releases that may contain the substance must be directed to a waste water treatment plant to avoid discharge of product in the environment.

State Agency Review

Vanillin has been registered under EU regulation (EC) 1907/2006 (REACH)
reviewed in High Production Volume chemicals program, published by UNEP in 2002

Vanillin substance meets the requirements of the European regulation concerning the consumer applications.

Regulatory Information / Classification and Labelling

Substance classification and labelling according to EU regulation (EC) 1272/2008 (CLP) :

Classification

Eye irritation, Category 2

H319 Causes serious eye irritation

Labelling

Pictogram :



Signal word :

WARNING

Hazard statements :

Precautionary statements :

H319 Causes serious eye irritation

P305 + P351 + P338 IF ON EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Conclusion

Synthetic vanillin is the most available alternative aroma chemical to natural vanilla. Food safe vanillin must be manufactured through fully integrated process from catechol using “green” guaïacol, in compliance with the most stringent food standards.

Contact information within company

For further information on this substance or product safety summaries in general, please contact:

Rhodia Global product Strategy: http://www.rhodia.com/en/sustainability/global_product_strategy/index.tcm

Contact: globalproductstrategy@eu.rhodia.com

Additional information

ICCA Global Product Strategy: <http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

(extended) Safety Data Sheet available on demand: http://www.rhodia.com/en/contact/contact_form_business.tcm

Glossary of technical terms: http://www.rhodia.com/en/sustainability/global_product_strategy/glossary/index.tcm

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Disclaimer

The information provided in the present Safety Summary is based on European data available in REACH regulatory dossier (EC N°1907/2006) and is correct to the best of our knowledge, information and belief at the date of its publication. Such information is only intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy and is not to be considered as a warranty or quality specification. It does not replace the safety data sheet and technical sheets. Thus, the information provided in this Safety Summary only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.