

METHYL EUGENOL

CAS N°: 93-15-2

Empirical formula: $C_{11}H_{14}O_2$
 $CH_3O-C_6H_3(OCH_3)-CH_2-CH=CH_2$

Synonyms: Eugenyl methyl ether; Methyl eugenol ether; Allylveratrole; Veratrole methyl ether; 4-Allyl-1,2-dimethoxybenzene, Benzene, 1,2-dimethoxy-4-(2-propenyl)-; 1,2-Dimethoxy-4-allylbenzene; 1,2-dimethoxy-4-(2-propenyl)-benzene

History: Initial reviews: Not applicable, **new Standard**

Current revision date: Not applicable

Implementation date: for new submissions*: July 3, 2002
for existing fragrance compounds*: July 3, 2003

Next review date: July 2007

* This date applies to the supply of fragrance compounds (formulas) only, not to the finished products in the marketplace

STANDARD: RESTRICTED

Limits in the finished product:

Skin contact products:	Non skin contact products: see note box
Leave-on products: see note box	Purity: Not applicable
Rinse-off products: see note box including household cleaning products	Others: Not applicable

Note box: The Standard is based on long-term systemic effects and will therefore have a wider range of product type limitations as follows:

Fine fragrance:	0.02%
Eau de toilette:	0.008%
Fragrancing cream:	0.004%
Other leave on:	0.0004%
Rinse-off:	0.001%
Non skin (as defined in the introduction to the Standards):	0.02%*
Other non cosmetic products not covered above:	0.001%

*The limit of 0.02% applies to the concentration in the fragrance compound (see exposure calculation)

The limitations apply to Methyleugenol (ME) originating from all sources. Contributions from essential oils can be significant. Names of essential oils, which should also be considered in the application of the Standard, are given below. Maximum percentage of the reference material is included for use when no analytical data is available.

METHYL EUGENOL

Contribution from other sources: contributions from essential oils

Pimenta berry oil or leaf oil	< 15%	Basil oil	< 6%
Bay oil	< 4%	Rose oil	< 3.5%
Citronella oil	< 2%	Estragon oil	< 1.5%
Lovage leaf oil	< 1.5%	Cascarilla oil	< 1%
Hyssop oil	< 1%	Savory winter oil	< 1%
Nutmeg oil	< 1%	Calamus oil	< 1%
Clove oil	< 0.5%	Cananga oil	< 0.5%
Carrot oil	< 0.5%	Mace oil	< 0.5%
Cassia oil	< 0.1%		

This list is only indicative and should not be regarded as comprehensive. Maximum limits have been given. Variations to lower levels can result due to variations of species and time of harvest etc. It is recommended to base calculations on analytical data.

Critical effect: Potential carcinogenic activity in animals

RIFM summaries:

The currently available metabolic, biochemical and toxicological data found for ME in laboratory species provide clear evidence of non-linearity in the dose-response relationship for ME with respect to metabolic activation and mechanisms associated with carcinogenic effects. Consideration of these data indicates a No-observed-Effect-Level for ME in the rat in the dose-range of 1-10 mg/kg body weight/day.
(Position Statement on Methyl Eugenol and Estragole as attached)

Rexpan Rationale / Conclusion:

Based on the lower end of the NOEL and applying a 1000 times safety factor for systemic effects a daily dose for ME of 60 µg/day is supported. Taking into account a dermal penetration factor of 40% leads to an acceptable dose of 150 µg/day.

This daily dose, applying the calculation table for dermal exposure as given below (contained in the Criteria Document), results in the maximum concentrations for ME in certain product categories as outlined in the section 'limits' of this Standard.

METHYL EUGENOL

PRODUCT TYPE	Quantity per application g	Exposure events/day	Estimated retention factor	Skin surface residue of product g per day	Perfume level %	Skin surface residue of fragrance mg/event	Skin surface residue of fragrance mg/day	Skin surface residue in body weight µg/kg b.w./d
BODY LOTION	8.00	0.71	1	5.68	0.40	32.0	22.7	378.0
FACE CREAM	0.80	2.0	1	1.60	0.30	2.4	4.8	80.0
EAU DE TOILETTE*	0.75	1.0	1	0.75	8.00	60.0	60.0	1000.0
PERFUME EXTRACTS*	0.30	1.0	1	0.30	20.0	60.0	60.0	1000.0
FRAGRANCING CREAM**	5.00	0.29	1	1.45	4.00	200.0	58.0	967.0
ANTI-PERSPIRANT/DEODORANT	0.50	1.0	1	0.50	5.00	5.0	5.0	83.0
SHAMPOO	8.00	1.0	0.01	0.08	0.50	0.4	0.4	7.0
BATH PRODUCTS	17.00	0.29	0.001	0.005	2.00	0.34	0.1	2.0
SHOWER GEL	5.00	1.07	0.01	0.0535	1.20	0.6	0.6	10.0
TOILET SOAP	0.80	6.0	0.01	0.048	1.50	0.12	0.7	12.0
HAIR SPRAY	5.00	2.0	0.01	0.1	0.50	0.25	0.5	8.0
TOTAL				10.566				2547.0

*not used concurrently

**a cream designed for fragrance delivery

References:

Criteria for development of a database for safety evaluation of fragrance ingredients, R.A. Ford, B. Domeyer, O. Easterday, K. Maier and J. Middleton, Regulatory Toxicology and Pharmacology 31, 166-181 (2000)

Enclosure:

Position Statement on Methyl Eugenol and Estragole: Safety with respect to use as fragrance ingredients (added as such and as components of natural oils), RIFM/REXPAN May 7, 2001

Calculation of finished product concentration for Methyl Eugenol