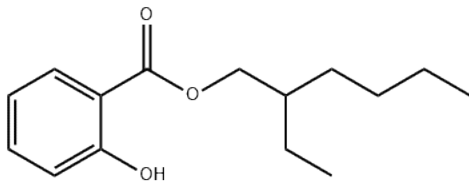


FACTSHEET 2-Ethylhexyl salicylate	Update¹ of the derivation of HBM values		
			
Substance	Octisalate, Octyl salicylate, 2-ethylhexyl salicylate		
Year of value derivation	2023		
Update	2026		
Underlying publication	Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz 66 https://doi.org/10.1007/s00103-023-03697-1 [1]		
Parameters	Value / Descriptor	Dimension	Comment
HBM values			
HBM-I value (men/children)	5OH-EHS: 8.2 5cx-EPS: 7.4	µg/L	Matrix: urine Biomarker: 5OH-EHS, 5cx-EPS
HBM-I value (women)	5OH-EHS: 7.0 5cx-EPS: 6.4	µg/L	
HBM-II value	Not derived		
General information			
CAS number	118-60-5		
IUPAC name	2-ethylhexyl 2-hydroxybenzoate		
Molar mass 2-ethylhexyl salicylate	250.3	g/mol	
HBM biomarker of exposure	5OH-EHS 5cx-EPS		Specific metabolites
Molar mass of metabolites	266.3 280.3	g/mol	5OH-EHS 5cx-EPS
Data base toxicology			
Key study/Author(s) (Year)	Symrise AG (2013) [2]		
Species	Rat		
Method of application/Type of study	Oral		OECD 421 and GLP
Duration of exposure	28 (♂) 14 (♀)	d	Before mating
Critical endpoint/Effect	Reproductive and developmental toxicity		
NOAEL	25	mg/kg bw/d	= POD
Assessment factors and external dose for deriving HBM values			
Factor for adjusting the duration of the study	3		
Interspecies factor	4		Allometric
	2.5		Dynamic
Intraspecies factor	10		General population, kinetic + dynamic
Total assessment factor (TAF)	300		

¹ The HBM values were updated on the basis of updated daily urine volumes normalised for body weight, and by systematically rounding the calculated values.

External tolerable dose (ETD) for calculating the HBM-I values	83	µg/kg bw/d	External tolerable dose (ETD) = TDI equivalent
Parameters for calculating HBM values using the mass balance approach			
Fue	5OH-EHS: 0.0028 5cx-EPS: 0.0024		Urinary excretion fraction, proportion of the active substance dose excreted in urine as a specific metabolite, on a molar basis [3]
Ratio of the molar mass of the metabolite to the molar mass of 2-ethylhexyl salicylate	5OH-EHS/EHS: 1.06 5cx-EPS/EHS: 1.12		5OH-EHS/EHS = 266.3 / 250.3 5cx-EPS/EHS = 280.3 / 250.3
Urine volume per kg bw per day	Men/Children: 0.030 Women: 0.035	L/ (kg bw · d)	Default values [4]
Calculation of HBM values in accordance with the mass balance approach ([5])			
Calculation formula			$[ETD \times (\text{molar mass Met} / \text{molar mass EHS}) \times \text{Fue}] / \text{urine volume per kg bw per day}$
HBM-I value (Men/Children) for 5OH-EHS	Rounded value: 8.2	µg/L	$[83 \times 0.0028 \times 1.06] / 0.030$
HBM-I value (Men/Children) for 5cx-EPS	Rounded value 7.4	µg/L	$[83 \times 0.0024 \times 1.12] / 0.030$
HBM-I value (Women) for 5OH-EHS	Rounded value: 7.0	µg/L	$[83 \times 0.0028 \times 1.06] / 0.035$
HBM-I value (Women) for 5cx-EPS	Rounded value: 6.4	µg/L	$[83 \times 0.0024 \times 1.12] / 0.035$

Reasoning

Octisalate (octyl salicylate, ethylhexyl salicylate, 2-ethylhexyl salicylate, EHS) is a derivative of salicylic acid which, due to its UV-absorbing properties, is used in sunscreens and UV absorbers, as well as an ingredient in fragrances in cosmetics, personal care products, household cleaners and laundry detergents.

The specific metabolites 2-ethyl-5-hydroxyhexyl salicylate (5OH-EHS) and 2-ethyl-5-carboxypentyl salicylate (5cx-EPS) are equivalent exposure biomarkers for octisalate (similar Fue and $t_{1/2}$ values). HBM values for these two metabolites were derived separately, so that an assessment of HBM results is possible even in cases where a metabolite cannot be analytically determined or its concentration is below the limit of quantification.

The NOAEL (*No Observed Adverse Effect Level*) of 25 mg/kg bw/d from an oral study in rats to assess reproductive and developmental toxicity was used as the starting point (POD; *Point of Departure*) for calculating HBM-I values [2]. As the male animals were exposed to octisalate for only 28 days prior to mating, and thus the full cycle of spermatogenesis in rats (48 to 53 days) was not fully covered, an additional assessment factor of 3 was taken into account; consequently, using a total assessment factor of 300, the tolerable daily intake for humans was calculated as 83 µg/kg bw/d.

Based on the mass balance approach, the HBM-I value for 5OH-EHS is 8.2 µg/L for children and men, and 7.0 µg/L for women. For the metabolite 5cx-EPS, HBM-I values of 7.4 µg/L urine for children and men, and 6.4 µg/L urine for women were derived.

References

1. Kommission Human-Biomonitoring des Umweltbundesamtes (2023) Stoffmonographie für Octisalate (Octylsalicylat, Ethylhexylsalicylat, EHS) – HBM-Werte für die Metaboliten 5OH-EHS und 5cx-EPS im Urin von Erwachsenen und Kindern. Bundesgesundheitsbl 66: 580–590.
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2. Symrise AG (2013) Unpublished study report 2012066. Reproduction/Developmental Toxicity Screening Test in the Han Wistar Rat. Study Number: D54861
3. Bury D, Griem P, Wildemann T, Brüning T, Koch HM (2019) Urinary metabolites of the UV filter 2-Ethylhexyl salicylate as biomarkers of exposure in humans. Toxicol Lett 309: 35–41
4. Kommission Human-Biomonitoring des Umweltbundesamtes (2025) Änderung des Leitwertes für die körpertgewichtsnormierte tägliche Urinausscheidung von Erwachsenen. Bundesgesundheitsbl 68: 830–837.
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5. Kommission Human-Biomonitoring des Umweltbundesamtes (2014) Grundsatzpapier zur Ableitung von HBM-Werten. Stellungnahme der Kommission Human-Biomonitoring des Umweltbundesamtes. Bundesgesundheitsbl Gesundheitsforsch Gesundheitsschutz 57(1): 138-147. <http://link.springer.com/article/10.1007/s00103-013-1867-2>