



SCIENTIFIC ADVISORY GROUP ON CHEMICAL SAFETY OF NON-FOOD AND NON-MEDICINAL CONSUMER PRODUCTS (SAG-CS)

Final Opinion on Orthophenylphenol (OPP) in Cosmetic Products.

1. Introduction

- 1.1 o-phenylphenol, or OPP (2-phenylphenol; CAS No. 90-43-7) is currently listed in Annex V (entry 7), “List of preservatives allowed in cosmetic products” of the UK Cosmetics Regulation No. 1223/2009¹, with a maximum use concentration of 0.2% for rinse-off products and 0.15% for leave-on products.

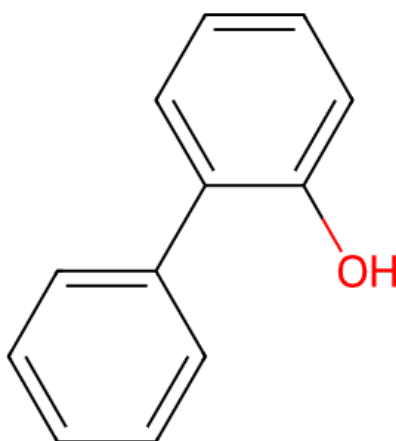


Figure 1) Structure of o-phenylphenol (OPP) (Source: ChemSpider)

¹ Cosmetics product (safety) Regulations currently consists of the Regulation UK No 1223/2009 as amended by [SI 696/2019 Product Safety and Metrology \(EU Exit\) Regulations](#). The full consolidated UK text will be available in due course.



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- 1.2 Under the GB Classification, Labelling and Packaging regulation No. 1272/2008 (as amended)², OPP currently has classifications for: Eye Irritation category 2, Specific Target Organ Toxicity (single exposure) category 3, Skin irritation category 2 and Aquatic acute toxicity category 1. OPP has also recently undergone classification as a category 2 carcinogenic substance. OPP is therefore included in the GB Mandatory Classification and Labelling (MCL) list³.
- 1.3 Following notification that OPP has been classified as a category 2 CMR substance in the UK, the UK Cosmetics Industry has provided a dossier of information and original studies to the OPSS to support the safety of OPP in cosmetic products. An exemption is requested under Article 15 of the UK Cosmetics Regulation, for OPP to continue to be permitted for use in cosmetic products.
- 1.4 OPSS requested that the members of the SAG-CS assess the safety of OPP intended to be used within cosmetic products at a maximum concentration of 0.2% in all rinse off products and 0.15% in all leave on products. Oral care products and products which lead to exposure by inhalation (i.e., spray products) are excluded from this assessment.
- 1.5 A summary of the key physicochemical, toxicological and pharmacokinetic information from the industry-submitted dossier was provided to the members of the SAG-CS.

2. Background

Intended function and uses of o-phenylphenol

- 2.1 OPP is used as a preservative in cosmetic products ([SCCS, 2024](#)).
- 2.2 OPP and its sodium and potassium salts are active ingredients in broad-spectrum biocidal products such as fungicides and antibacterial agents ([Bomhard et al., 2002](#)). Under the GB Biocidal Products Regulation (GB BPR)⁴, OPP is approved for use for several product types including human hygiene, disinfectants and algacides not

² The GB CLP Regulation No 1272/2008 as amended by The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019. The full consolidated UK text will be available in due course.

³ Available at: <https://www.hse.gov.uk/chemical-classification/classification/harmonised-classification-self-classification.htm>

⁴ The Biocidal Products Regulations 2001 [The Biocidal Products Regulations 2001](#)



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intended for direct application to humans or animals and preservatives for products during storage.

2.3 According to the [GB Approvals Register](#), OPP was approved for use as a pesticide (fungicide) in 2010, but this approval expired in December 2024. In the EU, OPP is still permitted for use as a pesticide under [Regulation \(EC\) No 1107/2009](#).

3. Previous Scientific Opinions on o-phenylphenol

3.1 In 1999, the International Agency for Research on Cancer (IARC) concluded that OPP was not classifiable as to its carcinogenicity to humans (Group 3) because of inadequate evidence in humans and limited evidence in experimental animals ([IARC, 1999](#)).

3.2 In 2006, the US Environmental Protection Agency (US-EPA) published a human health and environmental risk assessment for OPP and its salts, to determine their eligibility for re-registration for use as pesticides. For short-term oral exposure, a NOAEL (maternal) of 100 mg/kg bw/day was established for use in the risk assessment, based on two oral developmental toxicity studies, one in rats and one in rabbits (John et al., 1978, reformatted 1990; Zablony et al., 1991). For intermediate-term and chronic oral exposure, a NOAEL of 39 mg/kg bw/day was established from a combined oral toxicity and carcinogenicity study in rats (Wahle and Christenson, 1996). This NOAEL was also used for the dermal route, with a dermal absorption value of 43% applied from a study by Timchalk, 1996. OPP was classified as 'Not likely to be carcinogenic below a specific dose range' and the risk was, therefore, not quantified. Several exposure scenarios were considered to calculate Margin of Exposure (MoE) values, covering the oral, dermal and inhalation routes. An aggregate scenario for the intermediate-term exposure of OPP to children was calculated with an MoE of 130, which was greater than the acceptable target of 100, below which would be considered a concern for health. A chronic aggregate risk assessment including chronic dietary exposure and inert uses from OPP, estimated risk for OPP and its salts to be well below the US-EPA's level of concern. Overall, OPP and its salts were eligible for re-registration, with some risk mitigations to be put in place as outlined in the document ([US-EPA, 2006](#)).

3.3 A preliminary workplan by the US EPA was published in 2013 ([US EPA, 2013](#)). Since then, a draft human health and ecological risk



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assessment for OPP and its salts has been published. This includes updated toxicity endpoints and Point of Departures (PoDs) following the re-registration eligibility decision document from 2006 ([US-EPA, 2006](#)). For the non-dietary risk assessment of antimicrobial uses of OPP, several PoDs have been established for different exposure routes. For incidental, oral exposure (short and intermediate term) a NOAEL (parental) of 100 mg/kg bw/day was derived from a two-generation dietary reproductive toxicity study in rats (Eigenberg and Lake, 1995). For short, intermediate and long-term dermal exposure, a NOAEL (dermal) of 100 mg/kg bw/day was derived from a 21-day dermal toxicity study in rats (Zempel and Szabo, 1993). Quantification of cancer risk was performed using the chronic Reference Dose of 1.0 mg/kg/day. Margins of Exposure were calculated for multiple exposure scenarios for different population subgroups, some of which were below the target value. ([US EPA, 2019](#)).

3.4 A dietary risk assessment evaluating the potential health hazards caused by OPP and SOPP⁵ in food residues was published by the Department of Pesticide Regulation of the California Environmental Protection Agency (Cal EPA), in 2007. Both OPP and SOPP may be used as fungicides in the post-harvest treatment of fruit and vegetables, therefore their residues may be ingested by consumers. For acute exposure, a critical NOAEL of 25 mg/kg bw/day was established for women in their child-bearing years, and a NOAEL of 150 mg/kg bw/day was established for the general population, including children (Zablotny et al., 1991; Kaneda et al., 1978). For chronic exposure, critical NOAELs of 39 mg/kg bw/day were established for males and 49 mg/kg bw/day for females (Wahle and Christenson, 1996). Taking into account dietary exposure estimates covering the average US population and 15 selected population subgroups, Margin of Safety (MoS) calculations for both acute and chronic exposures resulted in values greater than 100, which was sufficient for non-carcinogenic effects. Because OPP showed carcinogenic activity in experimental animals, the risk calculation undertaken for humans included excess cancer risk due to the lifetime exposure. The estimated lifetime risk of the average US population was calculated to be 2.4×10^{-7} . This risk was considered to be negligible for cancer risk and therefore, lifetime dietary exposure to foods with legally allowed residues of OPP was not thought to pose a significant carcinogenic concern. Overall, it was concluded that, based on the total weight-of-evidence, there were no appreciable health concerns,

⁵ Sodium o-phenylphenate (the sodium salt of OPP)



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including for cancer, resulting from exposure to food with legally allowed residues of OPP under acute and chronic conditions (Cal EPA, 2007).

- 3.5 A proposed re-evaluation decision for OPP and its salts for use only in the post-harvest treatment of pears and as a material preservative for a range of non-cosmetic consumer goods was published by the Health Canada Pest Management Regulatory Agency in 2008. The available scientific information was evaluated, and it was concluded that products containing OPP and its salts do not present unacceptable risks to human health or the environment when used according to label directions. Therefore, the proposal was for continued registration with implementation of risk-reduction methods ([Health Canada, 2008](#)).
- 3.6 A peer review of a pesticide risk assessment for OPP as an active substance was undertaken by the European Food Safety Authority (EFSA) in 2008. An acceptable daily intake (ADI) of 0.4 mg/kg bw/day was established based on a NOAEL of 39 mg/kg bw/day from a combined chronic toxicity/carcinogenicity study (Wahle and Christenson, 1996). A safety factor of 100 was applied to the NOAEL ([EFSA, 2008](#)).
- 3.7 EFSA published a review of the maximum residue levels in Europe for OPP as a pesticide in 2017 which included estimations for chronic consumer exposure. The highest chronic consumer exposure resulting from authorised uses of OPP as a pesticide was calculated for the diet of Dutch children and represented 0.4% of the ADI. Using Codex Maximum Residue Levels (CXL)⁶ a higher chronic exposure of 4.5% of the ADI was calculated for the diet of German children. Overall, no apparent risk to consumers was identified ([EFSA, 2017](#)).
- 3.8 In 2013, a re-evaluation of the developmental and reproductive toxicity of OPP and SOPP was published by [Kwok and Silva, 2013](#) of the Cal-EPA. In this re-analysis of published studies, a pattern for developmental effects, due to OPP and SOPP treatment, was determined in rats, mice and rabbits. Foetal effects were observed in the absence of maternal toxicity which contradicted previously published reviews stating that developmental effects would only be induced at doses where maternal effects were also observed ([FAO, 2000](#); [US-EPA, 2006](#); [Bomhard et al., 2002](#)). It was recommended that

⁶ Internationally agreed food standards covering pesticide residues in or on food and feed.



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the effects identified in this re-evaluation be considered in regulatory strategy for public health protection.

3.9 A human health assessment for OPP and SOPP was carried out by the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) of Australia in 2015. Systemic acute effects following oral exposure to SOPP, local effects of corrosivity, potential to be carcinogenic at high doses following long-term repeated exposure, potential for a genotoxic mode of action and potential to cause respiratory irritation were noted as critical health effects. The NICNAS recommended additional classifications for both OPP and SOPP for mutagenicity category 3 (possible risk of irreversible effects) and carcinogenicity category 3 (limited evidence of carcinogenic effect) in accordance with the Approved Criteria for Classifying Hazardous Substances (Safe Work Australia) ([NICNAS, 2015](#)).

3.10 OPP has been evaluated, and approved, as an active substance in several product types by the Biocidal Products Committee (BPC) of ECHA in 2015. In their opinions it was noted that OPP is a skin irritant and may cause serious irritation to the eye. OPP was not concluded to be genotoxic, mutagenic or a reproductive or a developmental toxicant. Tumours were identified in the bladder of male rats in repeated exposure studies, of which the relevance to humans could not be completely excluded. Overall, the exclusion criteria as laid down in Article 10 of Regulation (EU) No. 528/2012 was not met and OPP was approved for use in several product types including for human hygiene and as a preservative for products during storage ([BPC, 2015a](#), [2015b](#), [2015c](#), [2015d](#), [2015e](#) and [2015f](#)).

3.11 The Scientific Committee on Consumer Safety (SCCS) first published an opinion on OPP in 2015. This opinion also looked at the sodium salt of OPP (sodium o-phenylphenate, or SOPP) and the potassium salt of OPP (potassium o-phenylphenate, or POPP). The SCCS concluded that OPP was not safe in leave-on products at a maximum concentration of 0.2% and recommended a lower level of 0.15% when considering further exposures from non-cosmetic uses in relation to a report by [ANSES, 2014](#)⁷. In rinse-off products, a maximum concentration of 0.2% was considered to be safe. For SOPP and

⁷ Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (French Agency for Food, Environmental and Occupational Health and Safety)



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POPP, no conclusions were able to be made due to a lack of specific information ([SCCS, 2015](#)).

3.12 The most recent opinion on OPP and SOPP by the SCCS was published in 2024 ([SCCS, 2024](#)). The SCCS used a dermal absorption value of 45% in their safety assessment based on a study by Selim, 1996 using OPP as the test substance. A Point of Departure (PoD) of 25 mg/kg bw/day was used in the safety assessment based on an oral developmental toxicity study in rabbits with OPP which derived the lowest NOAEL value out of all the repeated dose and long-term toxicity studies considered in the opinion (Zablotny et al., 1991; re-analysis by [Kwok and Silva, 2013](#)). Overall, the SCCS concluded that both OPP and SOPP are safe at a maximum concentration of 0.15% in leave-on products and 0.2% in rinse-off products when dermally applied as the SCCS did not consider oral and inhalation routes. However, when the SCCS did include oral care products, the Margin of Safety (MoS) values for both OPP and SOPP were above the acceptable MoS of 100. The SCCS also concluded that when OPP and SOPP are used together, the total concentration must not exceed the maximum concentrations of 0.15% in leave-on products and 0.2% in rinse-off products ([SCCS, 2024](#)).

3.13 The European Chemical Agency Committee for Risk Assessment (RAC) Opinion from 2022 proposed amendments to the previous hazard classifications for OPP in accordance with CLP (Regulation (EC) 1272/2008). The existing category 2 classification for skin irritation was upgraded to category 1 for skin corrosion based on an OECD guideline and GLP compliant study in rabbits. The category 2 classification for eye irritation was also therefore upgraded to a category 1 classification for eye damage, which was supported by two OECD compliant studies in rabbits. These studies have been summarised in the ECHA RAC opinion. The RAC agreed that a category 2 classification for carcinogenicity should be added for OPP based on the detection of urinary bladder tumours in rats, although noted that evidence for carcinogenicity is limited but the relevance of bladder tumours for humans could not be ruled out. Classifications were also added for skin sensitisation (Category 1B) and aquatic chronic toxicity (Category 1). The classification for STOT SE (Specific Target Organ Toxicity- Single Exposure) category 3 was removed ([ECHA RAC, 2022](#)).



4. Discussion by the Scientific Advisory Group on Chemical Safety of Non-Food and Non-Medicinal Consumer Products (SAG-CS)

- 4.1 At their April 2025 meeting, the members of the SAG-CS discussed a paper which focused on the risks posed to human health by o-phenylphenol (OPP) when used as a preservative in cosmetic products.
- 4.2 Members discussed the analytical methods available for the detection and quantification of OPP in cosmetic products. Methods were not readily available in the literature. Published LC and LC-MS methods for OPP in food matrices (e.g., citrus fruit peel) of low or medium (e.g., human breast milk, pollen) analytical difficulty, respectively, may be capable of adaptation for cosmetic products (Saad et al., 2004; Ye et al., 2008; Parrilla Vázquez et al., 2015). This would require suitable method development paying attention to equilibration between OPP and its sodium salt as a function of pH, phase partitioning and extraction clean up. Members were thus content that analytical methods could be developed for routine application following appropriate validation.
- 4.3 Members discussed the study by Timchalk et al., (1998) as the key study submitted to derive the dermal absorption of OPP. In this study, a single 8-hour dermal dose of approximately 6 µg radioactive OPP/kg bodyweight was applied to the forearm of 6 healthy male volunteers. A one-compartment pharmacokinetic model was used to describe the time-course of OPP absorption and clearance. OPP was rapidly eliminated via the urine following absorption through the skin. An approximate average of 43% of the applied dose was calculated as being absorbed by comparing the amount of radioactivity in the urine and faeces versus swabs, skin rinses, and protective enclosures. Members agreed based on this study that a dermal absorption of 45% would be taken forward for the safety assessment, caveating that this study has used a pharmacokinetic model of which not all the details have been made available.
- 4.4 Members noted that the data package for the genotoxicity and mutagenicity of OPP is large, exhibiting mixed results particularly *in vitro*. The metabolites of OPP, phenylhydroquinone (PHQ) and phenylbenzoquinone (PBQ) showed clear genotoxic potential *in vitro*, however the data was less clear for OPP. Several chromosome



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aberration and sister chromatid exchange assays were positive for OPP, mostly at high doses and/or in the presence of metabolic activation. Most other *in vitro* studies were negative. One *in vivo* micronucleus assay was positive at very high concentrations (8000 and 12500 ppm) of OPP (Balakrishnan and Eastmond, 2006). However, the majority of *in vivo* studies available for OPP were negative. Weakly positive results for DNA damage were observed for both metabolites PHQ and PBQ *in vivo*.

4.5 Members also discussed, in detail, an *in vivo* bladder micronucleus assay in F344 male rats by Balakrishnan et al., (2016). This study compared the frequency of micronuclei observed under neutral, acidic and alkaline conditions at doses of 4000 ppm and 8000 ppm OPP. Significantly increased numbers of micronuclei due to chromosomal breakage and chromosomal loss were observed at 4000 ppm with NaHCO₃ (alkaline conditions), 8000 ppm OPP (neutral conditions) and at 8000 ppm with NaHCO₃ (alkaline conditions). This was not observed under neutral conditions at the lower dose (4000 ppm) or at the low or high doses (4000 ppm and 8000 ppm) under acidic conditions. This indicated that OPP has genotoxic potential at higher doses and under alkaline conditions, but not at lower doses or under acidic conditions. The study linked these results with the induction of cytotoxicity by the OPP metabolites PHQ and PBQ, which members noted as plausible given their genotoxicity observed *in vitro*. It was also suggested in this study that reactive oxygen species (ROS) generated from the pH-dependent autooxidation of PHQ in the urine play a key role in the development of bladder lesions. The genotoxicity of the metabolites PHQ and PBQ is therefore considered indirect. This study was not carried out in accordance with OECD test guidelines however members expressed that it should not be dismissed for this reason. Additionally, this study was carried out post the 2013 cosmetics animal testing ban⁸ but may be included in the assessment as it was conducted for purposes other than for cosmetics, with the study's grant sponsorship being from the US EPA.

4.6 Overall, members agreed that OPP has genotoxic potential, however, when considering the expected low exposure from cosmetic products and the mechanisms by which genotoxicity may arise, OPP is unlikely

⁸ [Regulation \(EC\) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products \(recast\) \(Text with EEA relevance\)](#)



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to pose a genotoxic risk at the maximum concentrations intended to be used in cosmetic products.

4.7 Members discussed the carcinogenicity of OPP, in light of the CMR category 2 classification for carcinogenicity. Several studies were identified which indicated that OPP may induce cancer, primarily of the bladder, via the oral route in rats and mice. An OECD TG 453 and GLP compliant combined chronic toxicity and carcinogenicity dietary study by Quast and McGuirk (1995) considered OPP to be carcinogenic in mice. A NOAEL for carcinogenicity of 250 mg/kg bw/day was established in this study. Another OECD TG 453 and GLP compliant combined chronic toxicity and carcinogenicity dietary study in rats, by Wahle et al., (1996) established a NOAEL for systemic toxicity and carcinogenicity of 39 mg/kg bw/day for male rats and 49 mg/kg bw/day for female rats. In this study, an increased incidence of transitional cell carcinomas was observed in the urinary bladder of male rats. A study by Hiraga and Fuji (1984) also reported nephritic lesions and urinary bladder tumours (mainly transitional cell papilloma and carcinoma) in male rats following OPP exposure. Renal damage was observed at a high concentration of OPP in a 2-year combined toxicity and carcinogenicity study in rats (Hodge et al., 1952). The study by Balakrishnan et al., (2016), discussed in paragraph 4.5, hypothesises the mode of action of carcinogenicity of OPP to be linked with the generation of a reactive species from the pH-dependent autoxidation of PHQ in the urine.

4.8 Members recognised that OPP is carcinogenic in rats and mice via the oral route, however, the key factor for the safety assessment is whether the threshold for genotoxicity, and the mode of action of carcinogenicity is met when considering the potential exposure. At the maximum concentrations intended to be used in cosmetic products, taking into account that OPP is only requested for use in dermally applied products, and considering the conclusions that OPP is unlikely to pose a genotoxic risk, members were also content that the carcinogenic risk is negligible. The Point of Departure selected for the safety assessment will be sufficiently protective of such carcinogenic effects which are observed predominantly at very high doses.

4.9 A Point of Departure of 25 mg/kg bw/day was selected for the safety assessment, derived from an oral developmental toxicity study in



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rabbits by Zablony et al., (1991), which was re-analysed by Kwok and Silva, (2013). The full original study was not available and therefore members relied on the details set out in the re-analysis and in other scientific reviews. Members agreed that based on this study, developmental toxicity is the most sensitive endpoint for OPP and therefore is also sufficiently protective of any genotoxic and carcinogenic effects as discussed in paragraphs 4.4-4.8. A NOAEL for systemic toxicity and carcinogenicity of 39 mg/kg bw/day for male rats was identified as the lowest value for carcinogenic effects which is higher than the selected PoD of 25 mg/kg bw/day.

- 4.10 Overall, an acceptable Margin of Safety of 156 has been achieved when considering the aggregate dermal exposure to OPP in cosmetic products at maximum concentrations of 0.2% in rinse-off products and 0.15% in leave-on products. Oral care products and products which lead to exposure by inhalation are excluded. The full safety assessment calculations can be found in the Appendix.
- 4.11 No children -specific safety assessment was submitted by industry at this time. Members were of the opinion that a full risk assessment should be conducted for children and adolescents when adequate data becomes available, and an appropriate methodology has been subsequently agreed.
- 4.12 The SAG-CS have separately reviewed the safety of SOPP in cosmetic products. Although the combined use of OPP and SOPP was not considered, members agreed with the advice of the SCCS that when OPP and SOPP are used together, the total combined concentrations should not exceed the maximum concentrations of 0.15% in leave-on products and 0.2% in rinse-off products.



5. Conclusions

Members were content that a reasonable analytical method could be developed for o-phenylphenol, subject to matrix specific validation.

Members agreed that OPP has genotoxic potential, however when considering the likely mechanisms by which genotoxicity occurs and the low concentrations found in cosmetic products, OPP is unlikely to pose a genotoxic risk.

Members recognised the carcinogenic potential of OPP as observed in rodents. However, considering the likely mechanisms by which carcinogenicity arises, the unlikely potential to pose a genotoxic risk, and the low exposure to OPP from cosmetic products via the dermal route only, members agreed that OPP is unlikely to pose a carcinogenic risk when used in cosmetic products at the proposed concentrations and conditions of use.

Overall, members concluded that o-phenylphenol (OPP) is acceptable for use in the following cosmetic product types and at the following concentrations:

- All rinse off products-0.2%*
- All leave on products-0.15%*

Members have separately considered the safety of sodium o-phenylphenate, the sodium salt of o-phenylphenol, in cosmetic products. When used together, the concentration of o-phenylphenol and sodium o-phenylphenate should not exceed the maximum concentrations of:

- 0.2%- all rinse off products*
- 0.15%-all leave on products*

Oral care products and spray products are excluded from this safety assessment.

Members were of the opinion that a full risk assessment should be conducted for children and adolescents when adequate data becomes available, and an appropriate methodology has been agreed.

Scientific Advisory Group on Chemical Safety of Non-Food and Non-Medicinal Consumer Products

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Abbreviations

ADI	Acceptable Daily Intake
BPC	Biocidal Products Committee of ECHA
BPR	Biocidal Products Regulation
Cal EPA	California Environmental Protection Agency
CLH	Harmonised classification and labelling (ECHA)
CLP	Classification, Labelling and Packaging
CMR	Carcinogenic, mutagenic or reprotoxic
EC	European Commission
ECHA	European Chemicals Agency
EFSA	European Food Safety Authority
IARC	International Agency for Research on Cancer
LC-MS	Liquid Chromatography Mass Spectrometry
MCL	Mandatory Classification and Labelling
MoE	Margin of Exposure
MoS	Margin of Safety
NOAEL	No Observed Adverse Effect Level
OPP	Ortho-phenylphenol
PoD	Point of Departure
RAC	The Committee for Risk Assessment of ECHA
ROS	Reactive oxygen species
SCCS	Scientific Committee on Consumer Safety
SED	Systemic Exposure Dose
SOPP	Sodium ortho-phenylphenate
US EPA	United States Environmental Protection Agency



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Safety Assessment

The full industry dossier, key unpublished studies and other references have been supplied to the committee.

An estimate of exposure and calculations of Margin of Safety (MoS) have been undertaken using the maximum use levels for OPP in dermally applied products of:

- 0.2% for all rinse-off products
- 0.15% for all leave-on products

Exposure has been estimated using the default values for product use amounts, and the methodology, as defined in the [SCCS Notes of Guidance \(2023\)](#).

A dermal absorption value of 45% has been applied based on the key human volunteer pharmacokinetic study by Timchalk et al., 1998.

A point of departure (POD) of 25 mg/kg bw/day is used for OPP based on a NOAEL of 25 mg/kg bw/day derived from the re-analysis of a developmental toxicity study in rabbits by Zablony et al., 1991 (re-analysis by [Kwok and Silva, 2013](#)).

No bioavailability adjustments have been made to the POD values as oral absorption is rapid and complete.

Data was not presented for children's exposure, therefore no safety assessment in children has been carried out.

The required Margin of Safety is 100 (default).



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Table 1) Worst case deterministic aggregate Tier 1 exposure assessment (SCCS) for all dermally applied products to calculate SED_{dermal} and Margin of Safety (MoS) for OPP.

Product category	Individual products	Relative daily exposure (mg/kg bw/day) ¹	OPP concentration (%)	Dermal absorption (%) ²	SED (mg/kg bw/day) ³	MoS ⁴
Rinse off skin and hair cleansing products	Shower gel	2.79	0.2	45	0.00251	9956
	Hand wash soap	3.33	0.2	45	0.00300	8342
	Shampoo	1.51	0.2	45	0.00136	18396
	Hair conditioner	0.67	0.2	45	0.00060	41459
Leave on skin and hair cleansing products	Body lotion	123.2	0.15	45	0.08316	301
	Face cream	24.14	0.15	45	0.01629	1534
	Hand cream	32.7	0.15	45	0.02207	1133
	Deodorant (non-spray)	22.08	0.15	45	0.01490	1677
	Hair styling products	5.74	0.15	45	0.00387	6452
Make-up products	Liquid foundation	7.9	0.15	45	0.00533	4688
	Make-up remover	8.33	0.15	45	0.00562	4446
	Eyeshadow	0.33	0.15	45	0.00022	112233
	Mascara	0.42	0.15	45	0.00028	88183
	Eyeliner	0.08	0.15	45	0.00005	462963
	Lipstick/lip salve	0.9	0.15	100	0.00135	18519
Aggregate					0.16064	156

SED – Systemic exposure dose

MoS – Margin of safety

1 – The effective exposure to a product category calculated by dividing the calculated daily exposure by the specific body weight of the persons in the study and taking into account the product specific retention factor as in the [SCCS Notes of Guidance \(2023\)](#).

2- A dermal absorption factor of 45% is applied in the calculation of SED. As a conservative approach, 100% has been applied for lip products.

3- SED= Relative daily exposure x Concentration (%) x Dermal absorption (%)

4- MoS is calculated by dividing the PoD (25 mg/kg bw/day) by the SED

Overall: Margin of Safety is 156 for aggregate exposure to dermally applied products. This is > 100 and therefore is acceptable.