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Mapping and chemical analysis of preservatives in cleaning and washing products

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Title:

Mapping and chemical analysis of preservatives in cleaning and washing products

Purpose:

This project aims to build knowledge concerning the use of preservatives in cleaning and washing products and investigate whether the content of preservatives in selected products is safe for consumers. The project shall provide the EPA with knowledge about the preservatives used in cleaning and washing products and support the EPA in assessing whether there is a need for further regulation of preservatives in detergents under REACH

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Summary

The study examines the use of in-can preservatives in consumer washing and cleaning products for indoor use, maps the regulatory landscape, conducts chemical analysis of selected preservatives in a number of products of selected product types and discusses health-related concerns. The objective of the study is to build knowledge and support the Danish EPA in assessing whether there is a need for further regulation of preservatives in detergents under REACH (Regulation (EC) No 1907/2006). The study focuses on preservatives functioning during storage (Biocidal Product-Type 6 (PT 6)), drawing on Danish market data, EU approvals under the Biocidal Products Regulation (BPR) and targeted literature searches, and identifies where knowledge gaps remain.

The legislative framework spans the Detergent Regulation (Regulation (EC) No 648/2004), the Biocidal Products Regulation (Regulation (EU) 528/2012, “BPR”), and the Classification, Labelling and Packaging Regulation (Regulation (EC) No 1272/2008, “CLP”). Under the Detergent Regulation, intentionally added preservatives must be listed on consumer packaging with substance names, regardless of concentration (the regulation is under revision). Mixtures, substances, or articles treated with biocidal products fall under the BPR’s “treated articles” provisions (Article 58). Active substances used in biocidal products must be approved under the BPR. The CLP Regulation governs hazard classification of chemical substances and mixtures and was used in this project to prioritise substances for chemical analysis.

Methodologically, relevant preservatives for this study have been identified based on the following sources: the Danish EPA’s 2018 consumer survey of 429 products and the European Chemicals Agency’s list of PT 6 active substances approved or under assessment. A structured literature review (via Google Scholar) compiled data on occurrence and concentrations in European cleaning/washing products. Stakeholder input from manufacturers, importers, retailers and associations was used to validate findings and highlight data gaps.

Market information indicates that a small number of preservatives dominate PT 6 use: phenoxyethanol, ethanol (alcohol), methylisothiazolinone (MIT), benzisothiazolinone (BIT), and sodium benzoate occur in 9–39% of preserved products, while formic acid, sodium pyrithione, octylisothiazolinone (OIT), benzyl alcohol, and 2-bromo-2-nitropropane-1,3-diol also occur frequently. Phenoxyethanol, sodium benzoate, formic acid, and ethanol are often used as single preservatives, whereas isothiazolinones (BIT, MIT, OIT) are more commonly used in combination with other preservatives.

An initial hazard screening based on CLP classifications was conducted for all identified preservatives to help prioritize substances with severe human health hazards (CMR, Skin Sens. 1, Resp. Sens. 1, ED HH 1, STOT SE 1, STOT RE 1).

On this basis, BIT, MIT, OIT and benzyl alcohol were selected as target analytes for chemical analysis of purchased products. Two additional isothiazolinones (BBIT and CIT), were included in the analytical package for selected products, where their presence was indicated on the label of the purchased cleaning and washing products. This was reasoned by the severe health hazards of the isothiazolinones in general.

In total, 53 products were purchased. Approximately 60% of the products were bought in Denmark (physical stores and online shops), and the remaining 40% from online shops based in the EU (20%) and outside the EU (20%).

Given stakeholders' indications of undeclared MIT in final washing/cleaning products (e.g., introduced via in-can preservative for raw material), the ongoing substitution of MIT with BIT, and reports of increasing allergy incidences to BIT, the analysis of MIT and BIT was prioritised for all products irrespective of label declarations. The remaining isothiazolinones were analysed when they were listed on product labels.

All six targeted preservatives were detected above the quantification limits in multiple samples, with concentrations varying widely across the different active substances. MIT was the predominant preservative in the analysed products and accounted for all seven exceedances of the future *de facto* limits for consumer detergents set in the recent EU approval decisions for PT 6 (in-can preservation). These *de facto* limits mirror the CLP specific concentration thresholds for Skin Sens. 1A classification (H317): 15 mg/kg (15 ppm) for MIT and 360 mg/kg (360 ppm) for BIT. The *de facto* limit for MIT is applicable from 1st of February 2027 and the *de facto* limit for BIT is applicable from 1st of October 2026.

The highest MIT concentration (190 mg/kg) was observed in a hand-dishwashing liquid purchased in the EU. MIT was also detected in seven products, where it was not declared on the label; six of these contained low levels, while one contained 52 mg/kg (more than three times the future *de facto* limit).

BIT occurred less frequently but was detected in relatively high concentration in some cleaning products bought in Denmark. BIT concentrations did not exceed the 360 mg/kg classification threshold for Skin Sens. 1A (H317), although EUH208 labelling requirement would apply at concentrations at ≥ 36 mg/kg. The highest BIT concentration (74 mg/kg) was found in a bathroom/kitchen descaler purchased in Denmark.

Findings for benzyl alcohol are consistent with prior reports of relatively high use and inclusion in preservative blends. In the two products with the highest benzyl alcohol concentrations, the average concentration was 5550 mg/kg (0.56%), which would trigger the labelling requirement EUH208 but not the hazard statement H317 under CLP.

Occurrence of multiple in-can preservatives in cleaning and washing was common. Of the 53 products analysed, 29 contained two or more preservatives, with two products containing as many as four. The most common combination of preservatives in the analysed products was MIT and BIT, observed in 16 products in this project.

When comparing the analytical findings by region of purchase (Denmark vs. EU vs. non-EU), the Danish samples show the widest concentration ranges and higher maximum concentrations compared to the other regions for most substances. However, the single highest MIT concentration was found in a product from EU. All seven MIT exceedances of the 15 mg/kg *de facto* limit for MIT occurred in Danish or other EU products (five Danish products; two other EU products). As Danish products were overrepresented in the sample set, these observations should not be considered representative of the wider market. Only a few non-EU products were included in the analysis. Analytical results for these products indicate that levels of the tested active substances were typically low.

OIT and benzyl alcohol are currently under evaluation for PT 6 under the BPR. BIT, MIT, and C(M)IT/MIT (3:1) have been approved as active substances for PT 6 at Union level.

The analytical findings in this project are consistent with stakeholder information that multiple PT 6 active substances are used per product. Information from the Danish Knowledge Center for Allergy indicates clinical evidence of overlapping reactions to different isothiazolinones in sensitised individuals. Whether these reactions reflect true cross-reactivity or simultaneous exposure remains unresolved. Overall, the Danish Knowledge Center for Allergy conclude that

cross-reactivity between certain isothiazolinones cannot be excluded - especially between structurally related compounds, but most data indicates that simultaneous exposure plays a larger role in clinical practice. This is supported by several European surveys of eczema patients who have developed contact allergy primarily to MIT and BIT, as well as some older product analyses of MIT and BIT respectively.

At present, there is no validated methodology for assessing combined risk from co-present isothiazolinones, and no officially recognised quantitative model to risk assess skin sensitising substances. Quantitative Risk Assessment (QRA) frameworks were originally developed for fragrance allergens. An updated approach (QRA2), developed through an international initiative, was evaluated in 2018 by the Scientific Committee on Consumer Safety (SCCS), an advisory body to the European Commission. The SCCS concluded that QRA2 cannot yet be used to establish concentration levels at which induction of sensitisation is unlikely to occur. Overall, there is currently no fully recognised method for quantitative risk assessment of induction risk from skin-sensitising substances, including preservatives.

For the use as in-can preservatives of the isothiazolinones BIT, MIT, and C(M)IT/MIT (3:1), that have been approved at Union level, the Commission approval decisions include a concentration condition (*de facto* limit) for mixtures placed on the market for the general public. These are set to manage risks arising from their hazardous skin sensitising properties.

1. Introduction and objective

Preservatives are essential components in washing and cleaning products, ensuring that formulations remain stable and safe during storage. Preservatives can be present as intentionally added ingredients or as carry over from other ingredients (i.e. raw materials containing preservatives themselves).

Preservatives are often associated with being allergenic or having other undesirable effects such as skin irritation, respiratory irritation, or as having carcinogenic, mutagenic or reprotoxic effects. The Danish Environmental Protection Agency (EPA) observed data from the Swedish Chemicals Agency's (KEMI) product registry, showing that there has been a significant increase in the use of preservatives during the period 1995-2018. This is assumed to be due to, among other factors, the use of preservatives in cleaning and washing products and increased market share of liquid washing products (having a higher demand for preservation). The widespread use of allergenic preservatives in non-cosmetic products can lead to skin sensitization and allergic contact dermatitis among consumers, workers, and patients who are in frequent contact with these products. The prevalence of contact allergy due to some of these substances has been shown to be increasing¹, thus action is needed to mitigate this development.

The Danish EPA assesses that there is a lack of knowledge about the extent of use, and content of in-can preservatives used in indoor cleaning and washing products for consumer use on the Danish market.

This project aims to build knowledge concerning the use of preservatives in cleaning and washing products and investigate whether the content of preservatives in selected products is safe for consumers. The project shall provide the EPA with knowledge about the preservatives used in cleaning and washing products and support the EPA in assessing whether there is a need for further regulation of preservatives in detergents under REACH².

¹ Lidén, C, White, IR. Increasing non-cosmetic exposure and sensitization to isothiazolinones require action for prevention: Review. *Contact Dermatitis*. 2024; 90 (5): 445-457

² Regulation (EC) No 1907/2006 of The European Parliament and of The Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

2. Survey of preservatives in detergents

2.1 Objective

The specific objectives of the survey are to

- Identify the types of in-can preservatives³ commonly used in consumer cleaning and washing products
- Determine in which product categories these preservatives are used, and how frequently they occur
- Investigate the use of multiple preservatives in single products and how preservative use varies across product types
- Review existing legislation and regulatory frameworks relevant to the use of preservatives in such products, at both Danish and international level
- Conduct an initial screening of the hazardous properties of identified preservatives based on existing toxicological and environmental data
- Examine available data on consumer purchasing patterns, including the origin of products (Danish market, EU, or non-EU/EEA)
- Identify and purchase products for chemical analysis in phase 2

The survey focuses on mapping the in-can preservatives used in indoor cleaning and washing products intended for Danish consumer users. The investigation emphasizes products where direct skin contact or inhalation exposure is likely.

2.2 Methods

Collection of information includes literature research, stakeholder consultation as well as extraction of relevant information from consumer product databases and other databases about products and substances (i.e. Statistics Denmark and the SPIN database).

2.2.1 Literature research

The starting point for the research were both the findings from the previous Danish EPA-consumer survey on preservatives in washing- and cleaning products conducted by Kjølholt et al. (2018), which identified the most used preservatives in 429 laundry and cleaning products sold on Danish market, as well as ECHA's list of PT 6 active substances.

In the next step, a structured literature review was conducted to gather data on the presence and concentration of preservatives in cleaning and washing products. The primary search was carried out using Google Scholar, applying the following search string:

("preservative*" OR "biocide*" OR "in-can preservative*") AND ("cleaning agent*" OR "cleaning product*" OR "washing product*" OR "washing agent*") AND ("presence" OR "occurrence*" OR "concentration*" OR "content*") AND ("Denmark" OR "Danish" OR "Europe*").

To ensure relevance and recency, the search was limited to publications from 2018-present (as of May 2025). Preference was given to studies involving Danish consumers and those from other Nordic countries due to their relevance to Danish consumer behaviour. Where data

³ Preservatives for products during storage, Product type 6 as listed in Annex V of Regulation (EU) No 528/2012 of The European Parliament and of The Council of 22 May 2012 concerning the making available on the market and use of biocidal products (BPR)

specific to Danish consumers was limited, studies from other European countries were also considered. The literature search thus focused on cleaning and washing products, which Danish and European consumers may be exposed to, acknowledging that Danish consumers may purchase products both within and outside the Danish market.

The literature was initially screened at the abstract level to determine relevance. Those publications deemed potentially relevant were then examined in full for detailed information on the occurrence and types of preservatives used. In addition to academic sources, targeted keyword searches were also performed through Google to capture grey literature and reports not published in academic databases. A few agency and industry reports containing relevant information were identified. The information in such reports is reviewed for relevancy and plausibility, but these reports are not subjected to a formal quality or reliability assessment. Main findings from the identified studies in regard to the most commonly used preservatives in cleaning and washing products are provided in section 2.4.

2.2.2 Stakeholder consultation

The stakeholder consultation aimed to:

- Validate and supplement findings from the literature review with practical insights
- Gather up-to-date information from manufacturers, importers, retailers, and industry associations on the use of preservatives in relevant products
- Identify current industry practices and potential knowledge gaps related to preservative use and regulation
- Support the selection of representative products for chemical analysis in Phase 2 of the project

Stakeholders from the cosmetic manufacturing industry and manufacturer's industry associations were contacted during May and June 2025. Meetings were held in the beginning of the project with the two relevant Danish industry associations, 'Dansk Vask-, Kosmetik- og husholdningsindustri' (VKH) and 'Kosmetik- og hygiejnebranchen', to inform about the project and plan data collection from manufacturers. The industry associations sent out a questionnaire to their members on behalf of this project. The questionnaire contained question regarding the use, frequency and concentration of in-can preservatives in detergents from the product categories listed in TABLE 2-1. Additionally, seven international manufacturers with relevant market shares in Denmark were contacted directly and asked to fill-out the questionnaire, upon recommendation from the Danish industry associations.

TABLE 2-1. Product categories mentioned in the stakeholder questionnaires.

Product category
Dishwashing rinse aid
Bathroom cleaning
Glass ceramic cleaning
Glass cleaning
Surface cleaner
Floor cleaning
Kitchen cleaning
Dishwasher/Washing machine cleaner
Metal cleaning
Dishwashing detergent
Oven cleaning
Scouring cream
Soap

Product category

Laundry detergent (solid/powder)

Laundry detergent (liquid)

Toilet cleaning

Carpet cleaning

All-purpose cleaning

Wipes

Besides the industry associations and manufacturers, the following organisations have been contacted:

- National Allergy Research Center (Videncenter for Allergi)
- Asthma-Allergy Denmark
- Allergy Certified
- CodeCheck (German (commercial) consumer organisation behind the app “codecheck”)
- Danish Consumer Council THINK Chemicals (that is behind the app “Kemiluppen”)

The stakeholders were contacted by phone and/or email, and stakeholder-specific questionnaires were distributed or used for telephone interviews.

The National Allergy Center, Asthma-Allergy Denmark and Allergy Certified were asked about their knowledge concerning trends and development in the use of in-can preservatives in washing- and cleaning products, their specific focus on some of these preservatives (if any), increasing/decreasing incidence of contact allergy etc., while CodeCheck and The Danish Consumer Council THINK Chemicals were asked for extracts of data from their databases.

2.2.3 Data extraction from other relevant databases

The following databases were consulted to obtain information about preservatives and their use in detergents

- The SPIN (Nordic product register database)⁴ contains data about substances used in the Nordic countries. The database contains information on yearly amounts of substance used in different industries and use categories. By applying the Industrial Use (National) Code C204100 as filter, extraction of data concerning the use of PT 6 preservatives in Denmark for the manufacturing of soap and detergents, cleaning and polishing preparations were gathered.
- Statistic Denmark⁵ is the national provider of independent statistics and data to society. The database contains statistics about the shopping patterns of the Danish consumers and the National economics, among others. However, specific information regarding the purchase pattern of detergents is not available.

2.2.4 Screening of the hazardous properties

An overview of the preservatives' hazard properties is obtained through an initial hazard screening.

The initial hazard assessment is based on a screening of information on hazard properties that is available from applicable EU legislation. The screening is performed by use of an Excel-based tool developed by the Health Science unit in Ramboll. The tool can extract the current and planned regulatory status of chemical substances in several regulatory lists (e.g. SVHC, REACH Annex XVII, classification under CLP, POP, CoRAP etc.). The data extraction is based on the identification of substances by CAS or EC number. The tool is updated several times a year.

⁴ [SPIN \(Nordic product register database\)](#)

⁵ [Statistics Denmark](#)

The preservatives identified in the literature study and those located on the gross list have been included in the screening.

The classification of the preservatives according to CLP concerning health hazards form the basis for the initial hazard assessment in the project and are used for the selection of products and preservatives for chemical analysis in this project. Thus, only substances with 'severe' health hazard classifications, either with harmonised or notified classifications, are considered relevant candidates for the chemical analyses in this project. The following categories are recognized as severe hazards in this project context: CMR, Skin Sens. 1, Resp. Sens. 1, ED HH 1, STOT SE 1 and STOT RE 1. Preservatives having received a non-approval decision, expired approval or not allowed for use as in-can preservatives (PT 6) were not selected.⁶

2.3 Legislation and regulation of preservatives in cleaning and washing products

The project concerns biocides designed to function as "preservatives for products during storage", also known as "in-can" preservatives. The relevant legislation in this area is harmonized at EU-level through the Detergent Regulation⁷, the Biocidal Products Regulation (BPR)⁸, and the CLP Regulation⁹. This subchapter reviews the legislation and regulations applicable to "in-can" preservatives (active substances) in the EU, with a focus on classification and labelling and the rules for treated articles.

If mixtures, substances, or articles are treated with biocidal products, they are termed "treated articles" according to the definition in the BPR. The biocidal products protect the articles against harmful organisms such as pests, mold and bacteria. The rules concerning the marketing of treated articles are specified in Article 58 of the BPR.

2.3.1 Preservatives used in washing and cleaning products

At the homepage of European Chemicals Agency (ECHA) it is listed which active substances for preservation are approved for use in the EU according to the rules of the BPR as well as which substances are under assessment for approval. These substances constitute the gross list of preservatives considered in this project. The gross list is attached in Appendix 1.

2.3.2 The CLP Regulation

The CLP Regulation is based on the United Nations' (UN) Globally Harmonized System (GHS) for classifying and labelling chemicals and aims to ensure a high level of protection for human health and the environment, as well as free movement of substances, mixtures, and articles. CLP is legally binding in all EU member states and applies directly to all industrial sectors. The Regulation requires manufacturers, importers, and downstream users of substances and mixtures to classify, label, and package their hazardous chemicals appropriately before marketing them.

Washing and cleaning agents in this context are to be understood as "mixtures". Therefore, suppliers of washing and cleaning agents are obliged to assess whether the products should

⁶ With the exception of 5-Chloro-2-methyl-2H-isothiazol-3-one (CIT or MCIT) which due to a recent non-approval decision (Commission Implementing Decision (EU) 2025/357 of 21 February 2025) still is present in many detergent products on the market.

⁷ Regulation (EC) No 648/2004 of the European Parliament and of the Council of 31 March 2004 on detergents.

⁸ Regulation (EU) No 528/2012 of The European Parliament and of The Council of 22 May 2012 concerning the making available on the market and use of biocidal products (BPR).

⁹ Regulation (EC) No 1272/2008 on classification, labelling, and packaging (CLP).

be classified and labelled as hazardous to health, the environment, and/or for physical hazards. Classification is made either based on the knowledge of the hazards (classification) of the individual ingredients combined with their concentration in the product, and/or based on knowledge of the hazardous properties of the finished product. Washing and cleaning agents are, for example, often tested to assess the product's potential irritating or corrosive properties.

Chemical substances and mixtures that must be classified as hazardous must be labelled with standardized hazard information, including pictograms, hazard and precautionary statements, and signal words, so the user is informed about the hazardous properties and can handle the chemical safely. Hazardous substances and mixtures must also be appropriately packaged. This includes, for example, that substances or mixtures classified for certain health hazards (such as corrosion) and sold to consumers must be equipped with child-resistant closures and tactile warnings.

Preservatives are often classified as hazardous, for example, due to their allergenic and/or environmentally hazardous properties. This can affect the classification and labelling of washing and cleaning agents depending on which preservative(s) is/are used and in which concentration(s). For example, the use of preservatives with allergenic properties may result in a product being classified and labelled as allergenic with the hazard statement H317: "May cause an allergic skin reaction", along with the corresponding pictogram, signal word, precautionary statements, etc. In other cases, a product may only need to be labelled with a notification of the content of the allergenic substance using the supplementary hazard statement EUH208: "Contains [name of sensitizing substance], May produce an allergic reaction." Conversely, there will also be instances where the preservative used does not lead to classification and/or labelling of the product.

The CLP regulation does not restrict the use of hazardous substances but solely focuses on the identification and communication of hazards. Restrictions on the use of problematic substances are set, for example, under the REACH Regulation and in the inclusion regulations for certain biocidal active substances.

2.3.3 Biocidal Products Regulation (BPR)

The EU Biocidal Products Regulation from 2012 concerns the marketing and use of biocidal products, which are used to protect humans, animals, materials, or articles against harmful organisms, such as pests or microorganisms, through the action of the active substances contained in the biocidal product.

According to Annex V of the BPR, biocidal products are classified into 22 product types (PT), divided into four main groups. Preservatives for use in washing and cleaning agents are covered by PT 6 in the second main group: "Preservatives for products during storage".

The BPR also introduced requirements for articles that have been treated with biocides, such as disinfectants or preservatives. Washing and cleaning agents can be biocide-treated articles, if, for example, preservatives are added to prevent bacterial growth during storage. However, if the washing or cleaning agent is marketed with a claim of biocidal effect (such as disinfecting), the product may need to be categorized as a biocidal product instead. The rules regarding treated articles are described in Article 58 of the BPR.

Under the BPR, the EU approval of individual active substances (active substance approving or implementing regulation) may require that articles treated with the active substance are labelled with which active substance is included and any relevant instructions for use. There may also be more specific requirements listed concerning treated articles. This is the case, for

example, for the active substance C(M)IT/MIT (3:1)¹⁰ and its use for preservation of mixtures. It is specified as a requirement that the content must not exceed the specific concentration limit that will trigger the classification of the product as skin sensitizing (H317) unless it can be guaranteed that the consumer is not exposed to danger. The mandated use of personal protective equipment, such as gloves, is NOT considered an acceptable risk mitigation measure.

Additionally, companies must be ready to inform consumers about the biocidal treatment of the article they sell. If a consumer requests information about a treated article, the supplier must provide this information free of charge within 45 days.

The labeling requirements for treated articles do not apply if other relevant legislation already sets at least equivalent labeling requirements to meet the information requirements concerning active substances.

Treated articles may only be treated with active substances that are either approved under the BPR in the relevant product type or are under assessment. This also applies to imported articles, i.e., articles imported into an EU/EEA country from a third country (e.g., China).

Since 1st of March 2017, companies can no longer place articles (e.g., washing and cleaning agents) on the market in the EU if they are treated with (or subject to an intentional incorporation of) an active substance that is not either already approved, under assessment, or listed in Annex I to the BPR.

Whether a treated article can be placed on the market depends on the status of the active substance. Four scenarios are possible:

1. A treated article can be placed on the market if the active substance has been assessed and approved for the biocide used to treat the article.
2. A treated article can be placed on the market if the active substance is under assessment in the review programme¹¹, but the decision has not yet been published.
3. If the active substance is not covered by the review programme, a treated article can be placed on the market if an application for approval of the active substance was submitted before September 1, 2016. If an application was not submitted before this date, the treated article cannot be marketed after March 1, 2017.
4. A treated article can be placed on the market if the active substance is listed in Annex I to the BPR - the list of substances that do not give rise to concern.

ECHA has prepared a list (the "[Article 94 list](#)") to help companies identify which active substance-product type combinations are legally permissible to use. The list is updated continuously but it is not legally binding.

2.3.4 Detergent Regulation

The EU's regulation on washing and cleaning agents (the Detergent Regulation (EC) No 648/2004) sets forth rules for the declaration of ingredients on packaging for products sold to ordinary consumers. A number of substances and groups of substances must be declared in specified weight percentage intervals if they are present above 0.2 weight percent. Enzymes, disinfectants, optical brighteners, and perfumes have had to be declared in accordance with the Detergent Regulation since 2004, regardless of concentration, but without the requirement to specify the name of the substance. Since then, stricter requirements have been imposed for

¹⁰ Commission Implementing Regulation (EU) 2016/131 of 1 February 2016 approving C(M)IT/MIT (3:1) as an existing active substance for use in biocidal products for product-types 2, 4, 6, 11, 12 and 13.

¹¹ Commission Delegated Regulation (EU) No 1062/2014 of 4 August 2014 on the work programme for the systematic examination of all existing active substances contained in biocidal products referred to in Regulation (EU) No 528/2012 of the European Parliament and of the Council.

the declaration of disinfectants via the BPR. If preservatives are used, they must be indicated regardless of concentration and with the name of the substance. The Detergent Regulation is currently being revised.

Additionally, the manufacturer must provide a website address on the packaging where consumers can access a list of the product's ingredients. For washing and cleaning agents used exclusively for professional purposes and not sold to ordinary consumers, the labelling requirements do not need to be met if equivalent information is available in the form of technical sheets, safety data sheets, or similar suitable means.

Besides the rules for information on packaging, the regulation also imposes other requirements, including the maximum phosphate content and the biodegradability of the surfactants.

2.4 Identification of preservatives in detergents in the literature review

The literature research performed as part of this project identified a range of in-can preservatives commonly used in indoor cleaning and washing products for consumer use, including both standalone preservatives and preservative blends. Standalone preservatives refer to single active substances used independently in product formulations, while preservative blends consist of two or more active substances combined to enhance efficacy or provide antimicrobial protection in a broader spectrum.

These substances have been examined with a focus on their application, regulatory status, and potential hazardous properties. Compilation of information is summarized in TABLE 2-15 and TABLE 2-16 as well as in sections below. Please note that only preservatives for which relevant information could be found are presented below.

2.4.1 Phenoxyethanol (2-phenoxyethanol)

Phenoxyethanol (CAS No. 122-99-6; EC No. 204-589-7) is widely recognized as one of the most commonly used preservatives in detergent formulations. Multiple sources, including International AISE 2018, Razenberg et al., 2020, Kjølholt et al., 2018 mention phenoxyethanol is frequently used as preservative in detergent formulations, although typical use concentrations are not specified by these sources.

In the former consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018, phenoxyethanol was found in 42 out of 429 liquid laundry and cleaning products on the Danish retail market, across various detergent and cleaning product categories. Its presence was most notable in textile detergents (found in 28 out of 86 products), scouring creams (found in two out of five products), dishwashing liquids (five out of 39 products), universal (all-purpose) cleaners (four out of 40 products), machine cleaners (one out of 10 products), metal cleaners (one out of eight products), rinse aids (one out of 13 products), wood cleaners (one out of 14 products). It was identified in approximately 10% of all surveyed products and approximately 20% of those containing any preservatives. Based on an assumed concentration of 1.0%, the annual consumption in Denmark was estimated between 20-60 t/a, depending on whether the estimate is based solely on the results from the store survey or also includes information provided by contacted stakeholders in the Danish market.

Recent data from the review study on usage patterns and regulatory implications by Lidén et al., 2022 further support a growing trend in the use of phenoxyethanol, both in tonnes and number of products reported in Sweden's national chemical register (see FIGURE 2-1.) In 2018, 1,073 tonnes were used across 813 non-cosmetic products, including 252 cleaning and washing agents, placing phenoxyethanol among the highest-volume preservatives in non-

cosmetic applications. Reported concentrations of phenoxyethanol in these products had a median of 0.7%, with a broad range spanning from 0.0002% to 100% (Lidén et al., 2022).

Frequent use of phenoxyethanol in detergent formulations was also noted by the preservative manufacturer Vink Chemicals, which reports its use both as a standalone ingredient and as a component of preservative blends. Specifically, this manufacturer uses phenoxyethanol in combination with 2-n-butyl-benzo[d]isothiazol-3-one (BBIT), N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine (BDA) (marketed under name parmetol® BPX) as well as with benzisothiazolinone (BIT) (marketed under name Vinkocide® BIT PE) (Vink Chemicals, 2024)

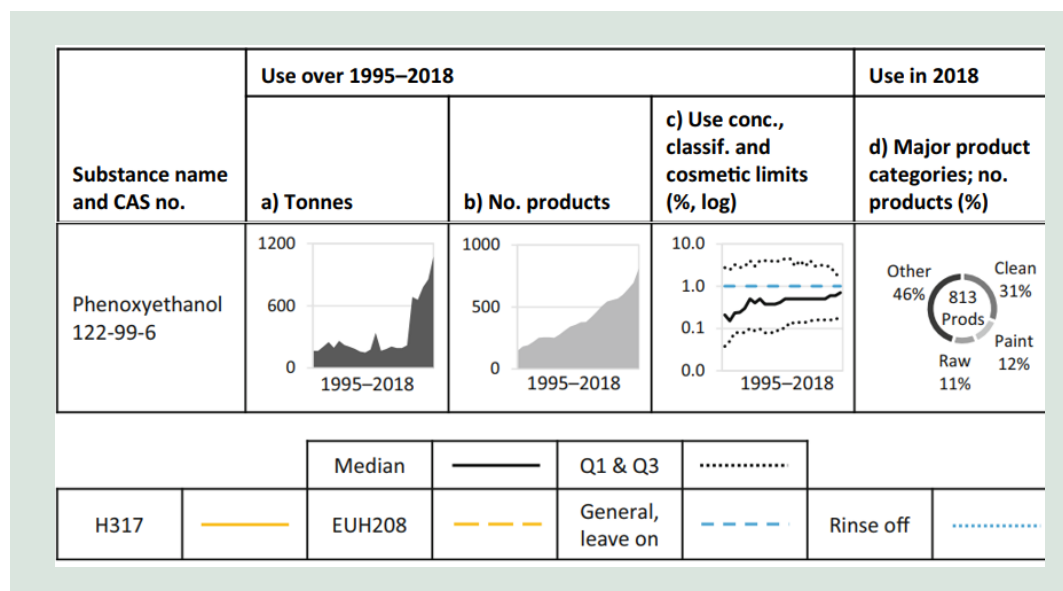


FIGURE 2-1. Data on use of phenoxyethanol in non-cosmetic products since 1995-2018, based on annual reports by companies to the Swedish Products Register (as provided in Lidén et al., 2022). Note: ‘Clean’ stands for the cleaning products (cleaning/washing agents).

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for phenoxyethanol is provided in TABLE 2-2 below.

TABLE 2-2. CLP classification, status concerning PT 6 and use in treated articles for phenoxyethanol.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Phenoxyethanol	122-99-6	Acute Tox. 4; H302 STOT SE 3; H335 Eye Dam. 1; H318 CLP00/ATP17 (shall apply from 17 December 2022)	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.2 Isothiazolinones

Isothiazolinones are a common group of preservatives used in PT 6 (in-can preservation for cleaning and washing agents), valued for their broad-spectrum antimicrobial efficacy, stability across a wide pH range, and compatibility with enzymes in liquid detergents.

Scientific publications identified in the literature research conducted as part of this project showed that the following isothiazolinones are commonly used in PT 6 (Havmose et al., 2021; King et al., 2021; Paun et al., 2022; Marrero-Alemán et al., 2019; Hofmann et al., 2018; Marrero-Alemán et al., 2021):

- Benzisothiazolinone (BIT)
- Methylisothiazolinone (MIT)
- MIT/Methylchloroisothiazolinone (MCI or CIT)
- Octylisothiazolinone (OIT)

In a research study aimed at analysing temporal trends in contact allergy to MIT among Danish patients, Havmose et al., 2021 found that household products were a minor but consistent source of MIT exposure, accounting for approximately 6.3% of cases. However, between 2010-2013 and 2017-2019, there was **a significant decline in MIT allergy cases linked to household products**, dropping from 11.7% to 3.7%. Authors of the study suggest this may be due to voluntary product reformulations by manufacturers or increased consumer awareness reducing the overall exposure.

Similarly, King et al., 2021 conducted a retrospective study of consecutively patch-tested patients in Denmark between 2011 and December 2019, aiming to identify emerging trends in preservative contact allergy as MIT was being phased out. The authors found **a significant increase in allergic contact dermatitis caused by the preservative BIT**, likely is linked to its growing use in household cleaning products. While allergy to MIT (from 9.39% in 2013 to 1.98% in 2019) as well as to MIT/MCI (from 7.85% in 2014 to 1.39% in 2018) declined, BIT allergy rose steadily from 0.26% in 2014 to 3.42% in 2019 (see FIGURE 2-2). In 2019, **nearly half of BIT-positive cases were attributed to exposure through household products** such as laundry detergents and cleaning sprays. The authors emphasized that this trend may signal a shift in preservative exposure from cosmetics to domestic cleaning agents, which currently face no regulatory limits on isothiazolinone content.

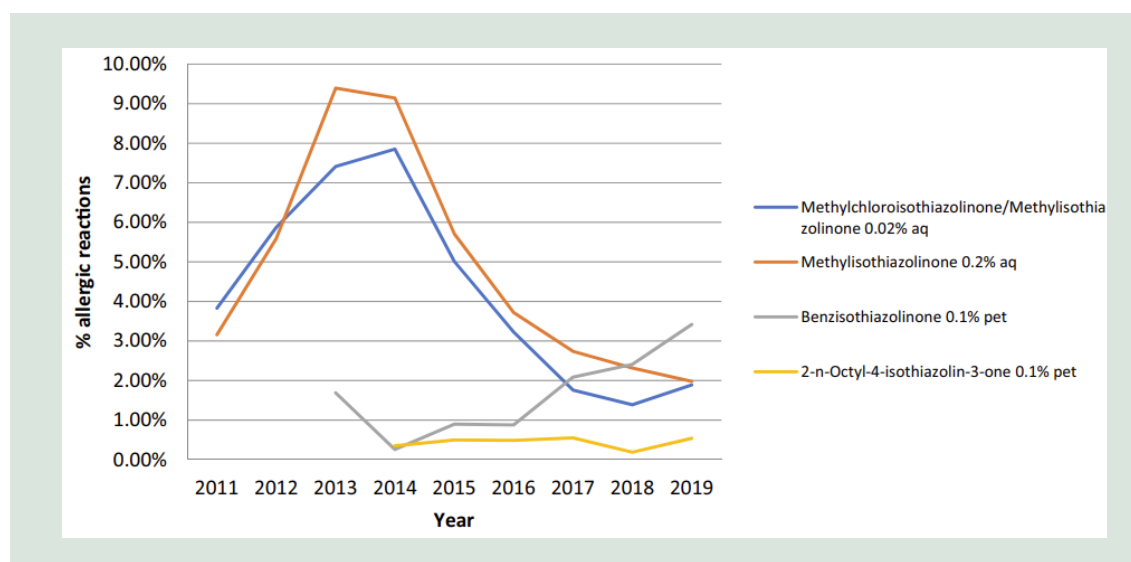


FIGURE 2-2. Allergic reactions to isothiazolinones over time. Source King et al., 2021. Note: “pet” stands for petrolatum, and “aq” stands for aqueous.

Paun et al., 2022 investigated the presence of isothiazolinones in various personal care products as well as in household products like dishwashing soap. For the purpose of the study, four different dishwashing detergents were purchased from local markets in Romania. In contrast to the personal care products, where OIT was the predominant component, **BIT was the predominant component found in dishwashing soap**, accounting for up to 71% of the total isothiazolinone concentration (see FIGURE 2-3.). It was also detected in all four dish soaps analysed in the study with concentrations ranging from 6.5 to 7.7 mg/L. Among other targeted compounds, CMI was present at concentrations between 0.2 and 2.2 mg/L, whereas MIT and OIT were each found at levels below 1.0 mg/L (Paun et al., 2022).

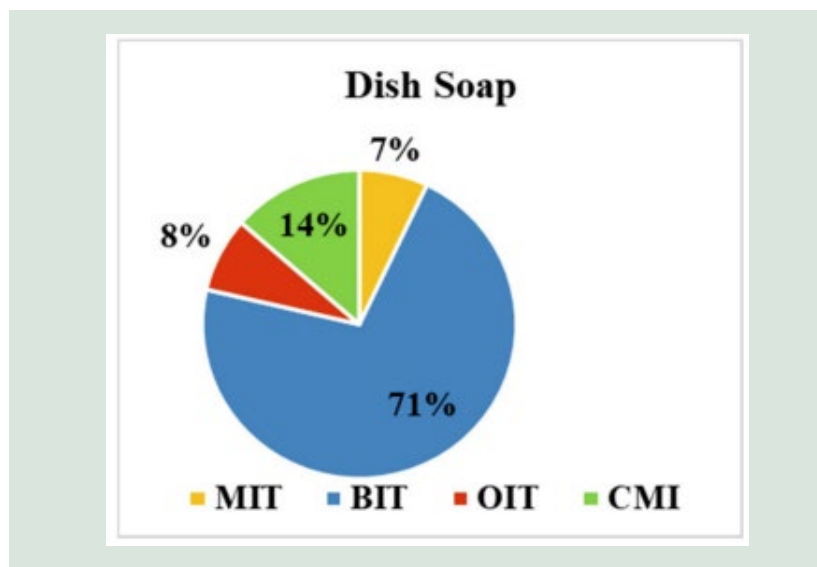


FIGURE 2-3. Percentage of isothiazolinones in commercial products – dishwashing soap. Source: Paun et al., 2022.

Presence and concentrations of isothiazolinone preservatives in household cleaning products were also investigated by Marrero-Alemán et al., 2019. Authors of the study additionally focused on potential exposure risks for sensitized individuals and the accuracy of product labeling. A total of 34 cleaning products was analysed – 17 provided by patients with confirmed contact allergy to MIT and MCI/MI, and 17 randomly purchased from supermarkets in Spain. Using LC-MS/MS, the authors measured levels of MIT, MCI, BIT, and OIT.

The results showed that 76.5% of the products contained at least one isothiazolinone, with MIT and BIT being the most frequently detected. MCI was found in seven products, while OIT appeared only in one. Detected concentrations ranged from 18.6 to 58,426.8 ng/g (ppb), and 12 products contained MIT levels exceeding 15 ppm, which is the maximum allowed in rinse-off cosmetics under EU regulation. Labelling inaccuracies were found for ten samples. Six contained undeclared isothiazolinones, and four did not have listed preservatives. The study concluded that cleaning products can be a substantial, underregulated source of isothiazolinones exposure (Marrero-Alemán et al., 2019).

To assess the potential risk of consumer exposure to MIT from laundry detergents, Hofmann et al. (2018) conducted a study investigating whether residues of MIT remain in clothes after machine washing. The results showed that MIT was not detectable in washed clothes when laundry detergents were used as directed in typical household washing conditions. On this basis, the study concluded that MIT poses no risk of exposure through washed clothing and emphasized the need for assessing their safety in the context of specific uses. Similar results were also obtained by Marrero-Alemán et al., 2021.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for the isothiazolinones is provided in TABLE 2-3 below. All except CIT and MIT·HCl are allowed for use as in-can preservatives in the EU/EEA. Restrictions (will) apply for MIT, BIT, MBIT and C(M)IT/MIT (3:1)) concerning treated articles¹². The content of MIT and C(M)IT/MIT (3:1)) in a detergent product for consumer use is not allowed (*de facto*¹³) to exceed 0.0015% (w/w), whereas the limit concerning BIT is 0.036% (w/w). Key in-can preservatives BIT and MIT received approval-decisions¹⁴ for use in PT 6 in May and June 2025, respectively.

¹² Applicable as from the date of approval of the active substance in question ((applicable by 01/10/2026 (BIT), 01/02/2027 (MIT)), in force (C(M)IT/MIT (3:1))).

¹³ Unless exposure can be avoided by other means than by the wearing of personal protective equipment.

¹⁴ Commission Implementing Regulation (EU) 2025/929 of 21 May 2025 approving 1,2-Benzisothiazol-3(2H)-one (BIT) as an existing active substance for use in biocidal products of product-types 6 and 13 in accordance with Regulation (EU) No 528/2012 of the European Parliament and of the Council.

Commission Implementing Regulation (EU) 2025/1257 of 26 June 2025 approving 2-methyl-2H-isothiazol-3-one (MIT) as an existing active substance for use in biocidal products of product-type 6 in accordance with Regulation (EU) No 528/2012 of the European Parliament and of the Council.

TABLE 2-3. CLP classification, status concerning PT 6 and use in treated articles for the isothiazolinones.

Preservative	CAS	CLP-Classification (Annex VI)	PT 6 status & remarks
1,2-benzisothiazol-3(2H)-one (BIT)	2634-33-5	Acute Tox. 2; H330 Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Dam. 1; H318 Skin Sens. 1A; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 Specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.036%. CLP00/ATP21 (shall apply from 1 September 2025)	Existing active substance; Approved. The placing on the market of treated articles is subject to the following conditions: (1) The person responsible for the placing on the market of a treated article treated with or incorporating BIT ensures that the label of that treated article provides the information listed in Article 58(3), second subparagraph, of Regulation (EU) No 528/2012; (2) The person responsible for the placing on the market for use by non-professionals of a mixture (other than paints) treated with or incorporating BIT ensures that the mixture does not contain BIT at a concentration triggering classification of the mixture as skin sensitiser category 1A, unless exposure can be avoided by other means than the wearing of personal protective equipment; (3) The person responsible for the placing on the market for use by non-professionals of a paint treated with or incorporating BIT at a concentration triggering classification of the mixture as skin sensitiser category 1A, ensures that: (i) The paint is supplied with appropriate protective gloves in compliance with European Standard EN 374 or equivalent; (ii) The label indicates that protective gloves must be worn during use.
2-methyl-2H-isothiazol-3-one (MIT)	2682-20-4	Acute Tox. 2; H330 Acute Tox. 3; H301 Acute Tox. 3; H311 Skin Corr. 1B; H314 Eye Dam. 1; H318 Skin Sens. 1A; H317 Aquatic Acute 1; H400	Existing active substance; Approved. The placing on the market of treated articles is subject to the following conditions: (1) The person responsible for the placing on the market of a treated article treated with or incorporating MIT ensures that the label of that treated article provides the information listed in Article 58(3), second subparagraph, of Regulation (EU) No 528/2012;

Preservative	CAS	CLP-Classification (Annex VI)	PT 6 status & remarks
		Aquatic Chronic 1; H410 EUH071 M = 10; M = 1 (chronic) Specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%. ATP13 (shall apply from 1 May 2020)	(2) Mixtures (other than paints) treated with or incorporating MIT and placed on the market for use by non-professional users do not contain MIT at a concentration triggering classification of the mixture as skin sensitiser category 1 in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council, unless exposure can be avoided by other means than the wearing of personal protective equipment; (3) The person responsible for the placing on the market for use by non-professionals of a paint treated with or incorporating MIT at a concentration triggering classification of the mixture as skin sensitiser category 1 in accordance with Regulation (EC) No 1272/2008 ensures that: (i) The paint is supplied with appropriate protective gloves in compliance with European Standard EN 374 or equivalent; (ii) The label indicates that protective gloves must be worn during use.
5-Chloro-2-methyl-2H-isothiazol-3-one (MCI or CIT)	26172-55-4	Notified CLP-classification (% of notifications): Aquatic Acute 1 - H400 (91.85%), Skin Corr. 1B - H314 (89.22%), Skin Sens. 1 - H317 (88.3%), Acute Tox. 3 - H301 (71.79%), Eye Dam. 1 - H318 (63.06%), Acute Tox. 3 - H311 (60.68%), - - (58.25%), Aquatic Chronic 1 - H410 (39.36%), Acute Tox. 2 - H330 (37.23%), Acute Tox. 2 - H310 (31.09%), STOT SE 3 - H335 (25.16%), Acute Tox. 3 - H331 (20.52%), Acute Tox. 2 - H300 (20.14%), Skin Sens. 1A - H317 (6.39%), Skin Corr. 1C - H314 (5.93%), Flam. Liq. 3 - H226 (4.35%), Aquatic Chronic 4 - H413 (3.89%), STOT SE 1 - H370 (3.34%), Resp. Sens. 1 - H334 (1.63%), NOTCLASS - - (1.3%), Skin Sens. 1B - H317 (1.04%), Aquatic Chronic 3 - H412 (0.88%), Acute Tox. 4 - H302 (0.54%), Skin Corr. 1 - H314 (0.5%),	New active substance; NOT approved for use as in-can preservative for treated articles.

Preservative	CAS	CLP-Classification (Annex VI)	PT 6 status & remarks
		Acute Tox. 4 - H312 (0.46%), Acute Tox. 4 - H332 (0.13%), Skin Irrit. 2 - H315 (0.13%), Acute Tox. 1 - H330 (0.08%), Acute Tox. 1 - H300 (0.08%), Acute Tox. 1 - H310 (0.08%), Eye Irrit. 2 - H319 (0.08%), Eye Irrit. 2A - H319 (0.04%)	
2-methyl-2H-isothiazol-3-one hydrochloride (MIT·HCl)	26172-54-3	Notified CLP-classification (% of notifications): Skin Sens. 1 - H317 (100.0%), Eye Dam. 1 - H318 (67.06%), Acute Tox. 3 - H301 (67.06%), Aquatic Chronic 1 - H410 (67.06%), Skin Corr. 1A - H314 (67.06%), Aquatic Acute 1 - H400 (66.47%), Acute Tox. 2 - H330 (61.18%), Acute Tox. 2 - H310 (61.18%), Resp. Sens. 1 - H334 (32.94%), Skin Corr. 1B - H314 (32.35%), Skin Corr. 1 - H314 (0.59%).	New active substance; initial application for approval in progress; NOT allowed for use as in-can preservative for treated articles. No severe (harmonised) classification according to CLP in regard to health hazards but indication of a change of this in the near future (RAC opinion - Skin Sens 1A; H317: C ≥ 0,0015%) and to be classified a Skin Sens. 1; H317 according to 100% of notifiers.
octhilinone (ISO); 2-octyl-2H-isothiazol-3-one (OIT)	26530-20-1	Acute Tox. 2; H330 Acute Tox. 3; H301 Acute Tox. 3; H311 Skin Corr. 1; H314 Eye Dam. 1; H318 Skin Sens. 1A; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 EUH071 M = 100; M = 100 (chronic) Specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%. CLP00/ATP15 (shall apply from 1 March 2022)	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles.
2-methyl-1,2-benzothiazol-3(2H)-one (MBIT)	2527-66-4	Acute Tox. 3; H301	New active substance; Approved .

Preservative	CAS	CLP-Classification (Annex VI)	PT 6 status & remarks
		Acute Tox. 4; H312 Skin Corr. 1C; H314 Eye Dam. 1; H318 Skin Sens. 1A; H317 Aquatic Acute 1; H400 Aquatic Chronic 2; H411 EUH071 Specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%. CLP00/ATP15 (shall apply from 1 March 2022)	The placing on the market of treated articles is subject to the following conditions: The person responsible for the placing on the market of a treated article treated with or incorporating 2-methyl-1,2-benzisothiazol3(2H)-one shall ensure that the label of that treated article provides the information listed in the second subparagraph of Article 58(3) of Regulation (EU) No 528/2012.
2-n-butyl-benzo[d]isothiazol-3-one (BBIT)	4299-07-4	Skin Corr. 1B; H317 Skin Sens. 1; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 CLP00	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles.
Reaction mass of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H - isothiazol-3-one (C(M)IT/MIT (3:1))	55965-84-9	Acute Tox. 2; H310 Acute Tox. 2; H330 Acute Tox. 3; H301 Skin Corr. 1C; H314 Eye Dam. 1; H318 Skin Sens. 1A; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 EUH071 M = 100; M = 100 (chronic) Specific concentration limits:	Existing active substance; Approved. The placing on the market of treated articles is subject to the following conditions: (1) In view of the risks identified for human health, mixtures treated with or incorporating C(M)IT/MIT (3:1) and placed on the market for use by the general public shall not contain C(M)IT/MIT (3:1) at a concentration triggering classification as skin sensitiser, unless exposure can be avoided by other means than the wearing of personal protective equipment. (2) In view of the risks identified for human health, liquid detergents treated with or incorporating C(M)IT/MIT (3:1) and placed on the market

Preservative	CAS	CLP-Classification (Annex VI)	PT 6 status & remarks
		Eye Dam. 1; H318: $C \geq 0,6\%$ Eye Irrit. 2; H319: $0,06\% \leq C < 0,6\%$ Skin Corr. 1C; H314: $C \geq 0,6\%$ Skin Irrit. 2; H315: $0,06\% \leq C < 0,6\%$ Skin Sens. 1A; H317: $C \geq 0,0015\%$ ATP13 (shall apply from 1 May 2020)	for use by professional users shall not contain C(M)IT/MIT (3:1) at a concentration triggering classification as skin sensitiser, unless exposure can be avoided by other means than the wearing of personal protective equipment. (3) In view of the risks identified for human health, mixtures treated with or incorporating C(M)IT/MIT (3:1), other than liquid detergents, and placed on the market for use by professional users shall not contain C(M)IT/MIT (3:1) at a concentration triggering classification as skin sensitiser, unless exposure can be avoided, including by the wearing of personal protective equipment. (4) The person responsible for the placing on the market of a treated article treated with or incorporating C(M)IT/MIT (3:1) shall ensure that the label of that treated article provides the information listed in the second subparagraph of Article 58(3) of Regulation (EU) No 528/2012.

2.4.3 Lactic acid (L-(+)-lactic acid)

In the former consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018, lactic acid (CAS No. 79-33-4)¹⁵ was found in 24 out of 429 liquid laundry and cleaning products on the Danish retail market. No precise concentrations for lactic acid in laundry and cleaning products are given in the study, but it is mentioned that use concentrations generally do not differ significantly from those used in cosmetic products (Kjølholt et al., 2018). The study states that lactic acid is among the less commonly used preservatives compared to, for example, phenoxyethanol and isothiazolinones (BIT, MIT), but is still one of the more frequently used outside the isothiazolinone group. The total annual amount of lactic acid used in Danish consumer products is estimated to be modest, likely under one t/y, based on the number of findings and comparison with other preservatives (Kjølholt et al., 2018).

More recent data on the specific products in which it is used, as well as its concentration and usage volumes, **could not be identified** during the conducted literature research.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for the two forms of lactic acid is provided in TABLE 2-4 below.

¹⁵ It is noted that lactic acid comes in two forms (stereochemistry). CAS-no. 79-33-4 is approved as an active substance in PT 6, and the other variant with CAS-no. 50-21-5 is a "low-risk active substance" listed in Annex I to the BPR (i.e. also approved for use).

TABLE 2-4. CLP classification, status concerning PT 6 and use in treated articles for lactic acid.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
L-(+)-lactic acid	79-33-4	Skin Corr. 1C; H314 Eye Dam. 1; H318 ATP15 (shall apply from 1 March 2022)	Existing active substance; Approved for use as in-can preservative for treated articles The placing on the market of treated articles is subject to the following conditions: 1) The person responsible for the placing on the market of a substance or mixture treated with or incorporating L-(+)-lactic acid at concentrations in the substance or mixture leading to classification for: (a) local effects concerning skin corrosion/irritation or eye damage/eye irritation, in accordance with Regulation (EC) No 1272/2008, shall ensure that exposure to the general public is minimised by appropriate risk mitigation measures. Those measures may include using a gel-like formulation, a packaging with dosing aid or a packaging with a self-dissolving shell; (b) Acute toxicity regarding corrosivity to the respiratory tract, in accordance with Regulation (EC) No 1272/2008, shall ensure that airborne exposure to the general public is minimised by appropriate risk mitigation measures. Those measures may include a label to indicate: no entry in the treated area until dry, or no application in the presence of the/in proximity to general public. 2) The person responsible for the placing on the market of a treated article treated with or incorporating L-(+)-lactic acid shall ensure that the label of that treated article provides the information listed in Article 58(3), second subparagraph, of Regulation (EU) No 528/2012. 3) Member States competent authorities or, in the case of a Union authorisation, the Commission shall specify in the summary of the biocidal product characteristics of a biocidal product containing L-(+)-lactic acid the relevant instructions for use and precautions to be indicated on the label of the treated articles under Article 58(3), point (e), of Regulation (EU) No 528/2012.
Lactic acid	EC No. 200-018-0	Notified classification: Skin Corr. 1C; H314 Eye Dam. 1; H318 EUH071	Listed in Annex I to the BPR; allowed for use as in-can preservative for treated articles. Restriction listed in Annex I to the BPR: Concentration to be limited so that each biocidal product does not require classification according to either Directive 1999/45/EC or Regulation (EC) No 1272/2008.

2.4.4 Ethanol (INCI name: Alcohol/Alcohol denat.)

In the former consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018, ethanol (CAS No. 64-17-5), was found in 23 out of 429 liquid laundry and cleaning products on the Danish retail market. Ethanol was found across various product categories, including general cleaning agents (11 products), dishwashing liquids (three), laundry detergents (six), specialty cleaning agents (one), and car care products (two) (Kjølholt et al., 2018). While primarily used as preservative due to its antimicrobial properties, ethanol may also be added for other functional purposes (Kjølholt et al., 2018).

Although the total market volume of ethanol used as a preservative is not precisely quantified, it is considered modest compared to that of more commonly used preservatives (Kjølholt et al., 2018).

The study from Kjølholt et al., 2018 did not provide specific concentration data for ethanol in identified products, nor where such data identified in other studies reviewed during this project. An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for ethanol is provided in TABLE 2-5 below.

TABLE 2-5. CLP classification, status concerning PT 6 and use in treated articles for ethanol.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Ethanol	64-17-5	Flam. Liq. 2; H225 CLP00	New active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.5 Potassium Sorbate

In the former consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018, potassium sorbate (CAS No., 24634-61-5) was found in a total of 13 out of 429 liquid laundry and cleaning products on the Danish retail market. These included dishwashing products (nine), general cleaning products (two), and special cleaning products (two). It was not detected in laundry and car care products.

More recent data regarding specific products containing potassium sorbate, as well as data on its concentration and usage volumes, was not identified in the available literature. An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for potassium sorbate is provided in TABLE 2-6 below.

TABLE 2-6. CLP classification, status concerning PT 6 and use in treated articles for potassium sorbate.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Potassium sorbate	24634-61-5	Eye Irrit. 2; H319 CLP07	Listed in Annex I to the BPR; allowed for use as in-can preservative for treated articles.

2.4.6 Formic Acid

In the former consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018, formic acid (CAS No., 64-18-6) was found in 13 out of 429 liquid laundry and cleaning products available on the Danish retail market. These were distributed across the following product categories: dishwashing products (two), general cleaning products (four), and special cleaning products (seven). It was not detected in laundry and car care products.

More recent data on the specific products in which formic acid is used, as well as information on its concentration and usage volumes, **could not be identified** during this literature research.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for formic acid is provided in TABLE 2-7 below.

TABLE 2-7. CLP classification, status concerning PT 6 and use in treated articles for formic acid.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Formic acid	64-18-6	Flam. Liq. 3; H226 Met. Corr. 1; H290 Acute Tox. 3; H331 Acute Tox. 4; H302 Skin Corr. 1A; H314 Eye Dam. 1; H318 EUH071 Specific concentration limits: <10 Eye Dam. 1; H315: C ≥10% <90 Skin Irrit. 2; H314: 2% ≤ C <10% E >85 Skin Corr. 1A; H314: C ≥90% Skin Corr. 1B; H314: 10% ≤ Flam. Liq. 3; H226: C >85% ≥10 Eye Irrit. 2; H318: 2% ≤ C <10% CLP00/ATP22	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.7 Benzyl Alcohol

In the former consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018, benzyl alcohol (CAS No., 100-51-6) was found in 13 out of 429 liquid laundry and cleaning products on the Danish retail market. It was specifically found in dishwashing products (three), general cleaning products (three), and special cleaning products (seven), but not in laundry or car care products.

Benzyl alcohol was typically used in concentrations between 0.5-1.0%, placing it among the preservatives with the highest use concentrations. It was commonly included in multi-preservative formulations, particularly in combination with phenoxyethanol or isothiazolinones (Kjølholt et al., 2018).

The total annual usage volume of benzyl alcohol in Denmark was estimated to be modest, likely ranging between five and seven tonnes per year (Kjølholt et al., 2018).

More recent data on the specific products in which it is used, as well as updated information on concentration and usage volumes, **could not be identified** in the reviewed literature.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for benzyl alcohol is provided in TABLE 2-8 below.

TABLE 2-8. CLP classification, status concerning PT 6 and use in treated articles for benzyl alcohol.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Benzyl alcohol	100-51-6	Acute Tox. 4; H302 Eye Irrit. 2; H319 Skin Sens. 1B; H317 CLP00/ATP21 (shall apply from 1 September 2025)	New active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.8 Didecyldimethylammonium chloride (DDAC) (INCI name: Didecyldimonium Chloride)

Lehtonen and Sirén, 2024 investigated the occurrence of two biocide-type disinfectants **DDAC** (CAS No. 7173-51-5) and **polyethylene glycol monoalkyl ether (GEN)** in 46 samples collected from two school environments that were daily cleaned with commercial chemical products. Their analysis identified concentrations of these substances both air and surface samples, attributable to the use of cleaning agents, ranging from 2.5 to 1,029 ng/ml. However, concentrations of DDAC and GEN in the cleaning agent itself were not provided.

In a separate study, Clausen et al., 2020 compiled a list of the most frequently used chemicals in spray-based cleaning and disinfection products, based on registrations in the Danish Product Registry. DDAC was reported in 12 out of 101 products, with concentration levels ranging from 0.0001% to 10%. Although the substance was primarily noted for its disinfectant and surface (tenside) properties, its use as a preservative was not explicitly mentioned. Nevertheless, DDAC is currently undergoing regulatory assessment for approval under product category PT 6.

Additional confirmation of DDAC's presence in cleaning products was provided by the Danish EPA, 2023. The study detected DDAC in all three tested products, with measured concentrations (%w/w) summarized in TABLE 2-15. For products no. 52 and no. 76, the analysed content matched what was stated in the declaration, while for product no.17, the measured concentration was somewhat higher than what was declared on the product. An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for DDAC is provided in TABLE 2-9 below.

TABLE 2-9. CLP classification, status concerning PT 6 and use in treated articles for DDAC.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
DDAC	7173-51-5	Acute Tox. 4; H302 Skin Corr. 1B; H314 CLP00	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.9 2-bromo-2-nitropropane-1,3-diol (Bronopol)

In addition to DDAC, several sources, including Razenberg et al., 2020 and King et al., 2021 mention Bronopol (CAS No. 52-51-7) is used as preservative in cleaning and washing products. Lidén et al. (2020) noted that both the overall tonnage and the number of products containing Bronopol increased between 1995 and 2018. However, they didn't note product-specific information for cleaning and washing applications.

A previous consumer product survey on preservatives in detergents conducted by Kjølholt et al., 2018 found Bronopol in just one out of 429 liquid laundry and cleaning products purchased from the Danish retail market.

According to data from Schuelke (date of access: May 2025), Bronopol is used in a variety of cleaning and household products under the trade name s&m Bronopol. It is incorporated both as a standalone preservative and in combination with other biocides in multi-component formulations (e.g., parmetol® A 28, A 28 S, N 20). This preservative is reportedly suitable for diverse applications, including washing-up liquids, liquid detergents, laundry fabric softeners, window cleaners, and wax emulsions.

In formulations where only Bronopol (marketed as s&m Bronopol) is used, concentrations are reported in the range of 0.02% to 0.1%, consistent across all listed product categories. Similar concentration levels are reported in formulations where Bronopol is used in combination with other active substances, such as those in the parmetol® product line. Although the specific function of Bronopol in each formulation is not specified in the dataset, its repeated inclusion across multiple product types suggests it functions as a broad-spectrum preservative.

According to King et al., 2021, who examined trends in preservative-related allergies, the incidence of allergic reactions to Bronopol has shown a slight increase, rising from ~ 0.2% in 2011 to 0.4% in 2019.

Bronopol might also be a formaldehyde releaser under certain conditions.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for bronopol is provided in TABLE 2-10 below.

TABLE 2-10. CLP classification, status concerning PT 6 and use in treated articles for Bronopol.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
2-bromo-2-nitropropane-1,3-diol	52-51-7	Acute Tox. 4; H302 Acute Tox. 4; H312 STOT SE 3; H335 Skin Irrit. 2; H315 Eye Dam. 1; H318 Aquatic Acute 1; H400 M = 10 CLP00/ATP01	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.10 Chlorocresol (INCI name: P-Chloro-M-Cresol)

Chlorocresol (CAS No. 59-50-7; EC No. 200-431-6) is a preservative approved by ECHA for use in PT 6 products. However, a study from Pastor-Nieto et al., 2017 could not detect chlorocresol in any of the analysed household products (n=209). Additionally, King et al., 2021, which aimed to investigate trends in preservative allergy, found there is a non-significant trend of increasing reactions to chlorocresol. Prevalence was ~ 0.35% in 2011 and went down to 0% in 2019.

More recent data on the specific products in which it is used, as well as updated information on concentration and usage volumes, **could not be identified** in the reviewed literature. An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for chlorocresol is provided in TABLE 2-11 below.

TABLE 2-11. CLP classification, status concerning PT 6 and use in treated articles for chlorocresol.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Chlorocresol	59-50-7	Acute Tox. 4; H302 STOT SE 3; H335 Skin Corr. 1C; H314 Eye Dam. 1; H318 Skin Sens. 1B; H317 Aquatic Acute 1; H400 Aquatic Chronic 3; H412 CLP00/ATP13 (shall apply from 1 May 2020)	Existing active substance; initial application for approval in progress; allowed for use as in-can preservative for treated articles

2.4.11 Formaldehyde

King et al., 2021 also investigated formaldehyde and other preservatives listed in FIGURE 2-4. They found that allergy rates to formaldehyde and its releasers remained stable over time, with no significant trends observed during the study period. Despite the stability, formaldehyde consistently ranked as the most frequently identified allergen among the preservatives tested. However, the study could not determine whether reactions were specifically linked to the use of this preservative in household products.

Formaldehyde is not allowed to be used as in-can preservatives in the EU/EEA, but if present, formaldehyde-releasing substances may contribute to exposure/allergy, even if formaldehyde itself is not used. The in-can preservative bronopol may for instance be a formaldehyde releaser under certain conditions.

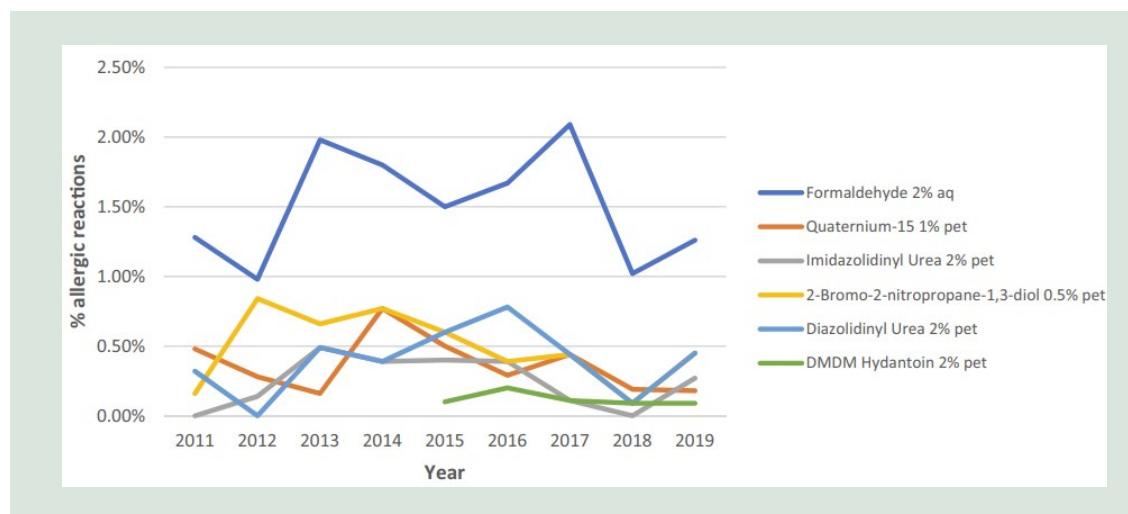


FIGURE 2-4. Allergic reactions to formaldehyde releasers and other preservatives over time (as provided in King et al., 2021). Note: “pet” stands for petrolatum, and “aq” stands for aqueous.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for formaldehyde is provided in TABLE 2-12 below.

TABLE 2-12. CLP classification, status concerning PT 6 and use in treated articles for formaldehyde.

Preservative	CAS No.	CLP-Classification (Annex VI)	PT 6 status & remarks
Formaldehyde	50-00-0	Acute Tox. 4; H302 Skin Corr. 1B; H314 Skin Sens. 1A; H317 Acute Tox. 2; H330 Muta. 2; H341 Carc. 1B; H350 EUH071 Specific concentration limits: <25 Eye Irrit. 2; H319: 5% ≤ C <25% STOT SE 3; H335: C ≥5% ≥25 Skin Irrit. 2; H315: 5% ≤ C <25% E ≥5 Skin Corr. 1B; H314: C ≥25% CLP00/ATP22 (shall apply from 1 May 2026)	NOT approved for PT 6. NOT allowed for use as in-can preservative for treated articles

2.4.12 Parabens

In their review of preservative used in non-cosmetic products, Lidén et al., 2022 investigated how the use of parabens, specifically butylparaben, isobutylparaben, ethylparaben, methylparaben, and propylparaben, changed between 1995-2018 (see FIGURE 2-5.).

They found that the trends were biphasic, meaning that patterns varied over time. While the overall volume (measured in tonnes) of most parabens has decreased, ethylparaben showed an increase in use by weight. At the same time, the number of products containing each of the parabens has steadily increased. This pattern suggests a shift toward the use of lower concentrations across a broader range of products.

The study also showed that the median concentration of parabens in products declined over time, especially during the early years. This decline was most noticeable for butylparaben and isobutylparaben. Parabens have been widely used in everyday products such as cosmetics, detergents, medicinal products, and food additives. Although recognized as relatively weak skin sensitizers, parabens can still trigger allergic reactions, particularly in vulnerable groups such as individuals with stasis eczema, leg ulcers, or atopic dermatitis.

The study also looked at which product categories parabens were most often found in. In non-cosmetic products, cleaning products and pharmaceuticals were the main uses for methylparaben and propylparaben, although the number of products was relatively small. This contrasts with other preservatives like isothiazolinones, which were much more common in products such as paints, adhesives, and fillers (Lidén et al., 2022).

According to King et al. (2021), who examined trends in preservative allergies, there was no significant increase in allergic reactions to paraben mix. In fact, the number of reported reactions remained close to 0% in both 2018 and 2019 (see FIGURE 2-6.). The paraben mix included methylparaben, ethylparaben, propylparaben, butylparaben, and isopropylparaben. Butylparaben and isobutylparaben have been identified at EU level as endocrine disrupters concerning human health (ED HH) and as SVHC substances according to REACH, whereas propylparaben has been identified as an endocrine disrupter concerning the environment (ED ENV). Furthermore, propylparaben is also under evaluation concerning ED HH under an EU-legislation and methylparaben concerning both ED HH and ED ENV.

Despite the hazards listed above and the fact that the parabens are not allowed to be used as in-can preservatives in the EU/EEA, they were identified in literature concerning household product use.

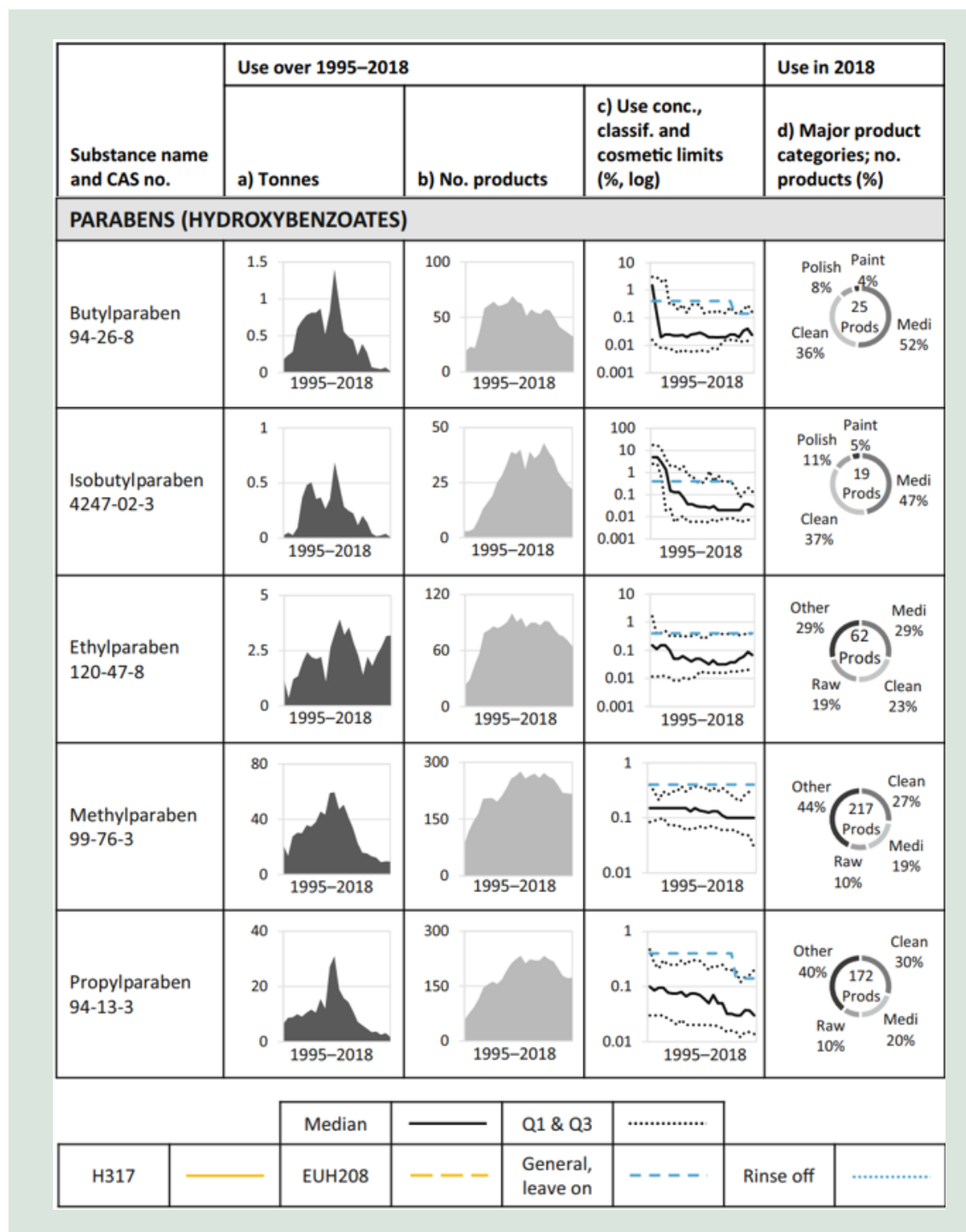


FIGURE 2-5. Data on use of parabens in non-cosmetic products since 1995–2018, based on annual reports by companies to the Swedish Products Register (as provided in Lidén et al., 2022).

Note: 'Clean' stands for the cleaning products (cleaning/washing agents).

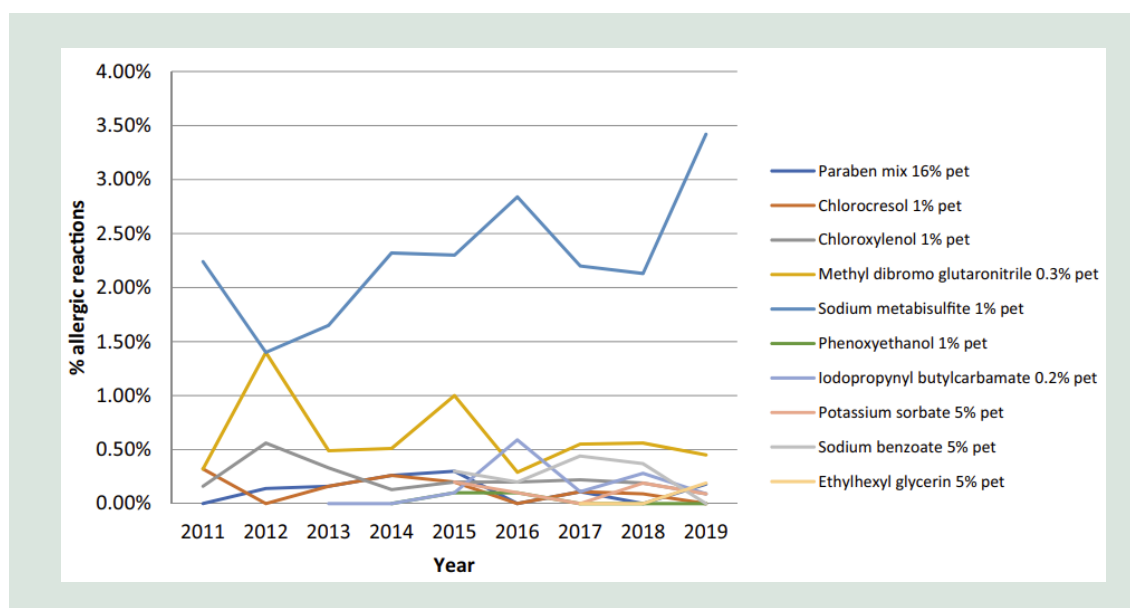


FIGURE 2-6. Allergic reactions to some preservatives over time (as provided in King et al., 2021).

Note: “pet” stands for petrolatum, and “aq” stands for aqueous.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for the parabens is provided in TABLE 2-13 below.

TABLE 2-13. CLP classification, status concerning PT 6 and use in treated articles for the parabens in question.

Preservative	CAS No.	CLP-Classification (Notified) (% of notifications)	PT 6 status & remarks
Butyl 4-hydroxybenzoate	94-26-8	Skin Irrit. 2 -[H315] (58.78%), Eye Irrit. 2 -[H319] (41.52%), STOT SE 3 -[H335] (39.73%), NOTCLASS -[] (32.81%), Eye Dam. 1 -[H318] (19.94%), Aquatic Chronic 3 -[H412] (16.59%), Skin Sens. 1 -[H317] (0.3%), Aquatic Chronic 4 -[H413] (0.22%), Eye Irrit. 2A -[H319] (0.07%)	Not approved for PT 6. NOT allowed for use as in-can preservative for treated articles. SVHC; ED HH
Isobutyl 4-hydroxybenzoate	4247-02-3	NOTCLASS -[] (62.03%), Eye Dam. 1 -[H318] (26.88%), Skin Irrit. 2 -[H315] (25.31%), Eye Irrit. 2 -[H319] (4.06%), Aquatic Acute 1 -[H400] (0.78%), -[]-[] (0.78%), STOT SE 3 -[H335] (0.47%), Aquatic Chronic 2 -[H411] (0.31%)	Not approved for PT 6. NOT allowed for use as in-can preservative for treated articles. SVHC; ED HH
Ethyl 4-hydroxybenzoate	120-47-8	NOTCLASS -[] (55.01%), Eye Irrit. 2 -[H319] (39.3%), Skin Irrit. 2 -[H315] (38.77%), Skin Sens. 1 -[H317] (33.98%), Asp. Tox. 1 -[H304] (33.46%), STOT SE 3 -[H335] (3.59%), Acute Tox. 4 -[H302] (0.3%), Resp. Sens. 1 -[H334] (0.15%)	Not approved for PT 6. NOT allowed for use as in-can preservative for treated articles.

Preservative	CAS No.	CLP-Classification (Notified) (% of notifications)	PT 6 status & remarks
Methyl 4-hydroxybenzoate	99-76-3	Skin Irrit. 2 -[H315] (53.75%), Eye Irrit. 2 -[H319] (53.63%), STOT SE 3 -[H335] (50.43%), NOTCLASS -[] (31.54%), Aquatic Chronic 2 -[H411] (7.4%), Aquatic Chronic 3 -[H412] (7.1%), Eye Dam. 1 -[H318] (0.34%), Skin Sens. 1 -[H317] (0.21%), Acute Tox. 4 -[H302] (0.15%), Muta. 2 -[H341] (0.15%), Resp. Sens. 1 -[H334] (0.06%), Eye Irrit. 2A -[H319] (0.06%), STOT SE 3 -[H336] (0.03%)	Not approved for PT 6. NOT allowed for use as in-can preservative for treated articles. Under evaluation for ED HH and ED ENV under an EU-legislation
Propyl 4-hydroxybenzoate	94-13-3	Eye Irrit. 2 -[H319] (66.67%), Skin Irrit. 2 -[H315] (63.63%), STOT SE 3 -[H335] (63.41%), NOTCLASS -[] (21.39%), Aquatic Chronic 3 -[H412] (9.01%), STOT SE 3 -[H336] (1.84%), Eye Dam. 1 -[H318] (1.27%), Skin Sens. 1 -[H317] (1.03%), Aquatic Chronic 4 -[H413] (0.35%), Aquatic Acute 1 -[H400] (0.18%), -[]-[] (0.18%), -[]-[H411] (0.04%), Resp. Sens. 1 -[H334] (0.04%), Aquatic Acute 2 -[] (0.04%), Acute Tox. 4 -[H302] (0.04%), Skin Sens. 1B -[H317] (0.04%), STOT RE 2 -[H373] (0.04%), Acute Tox. 4 -[H332] (0.04%), Eye Irrit. 2A -[H319] (0.04%)	Not approved for PT 6. NOT allowed for use as in-can preservative for treated articles. ED ENV Under evaluation for ED HH under an EU-legislation

2.4.13 Sodium benzoate

Sodium benzoate is authorised for use on the EU/EEA market and commercially available under the trade name Kalaguard® SB, produced by Lanxess, 2024. According to the manufacturer, sodium benzoate is used in a variety of cleaning and personal care formulations due to its broad-spectrum antimicrobial properties, which are particularly effective in acidic to neutral pH conditions. Its application concentration typically ranges from 0.1% to 1.25%, depending on the product type and formulation pH.

Sodium benzoate is often preferred as an alternative to isothiazolinones to avoid classified sensitizers.

According to King et al., 2021, which aimed to investigate trends in preservative allergy, there is a non-significant trend of increasing reactions to sodium benzoate. Prevalence was ~ 0.3% in 2015 and went down to 0% in 2019.

An overview of the classification according to CLP, status concerning PT 6 and use in treated articles for sodium benzoate is provided in TABLE 2-14 below.

TABLE 2-14. CLP classification, status concerning PT 6 and use in treated articles for sodium benzoate.

Preservative	CAS No.	CLP-Classification (Notified) (% of notifications)	PT 6 status & remarks
Sodium benzoate	532-32-1	Not classified (61.67%) Eye Irrit. 2; H319 (37.72%)	Listed in Annex I to the BPR; allowed for use as in-can preservative for treated articles.

2.4.14 Conclusion

The literature research identified numerous preservatives commonly used in indoor cleaning and washing products for consumer use. These preservatives are used either as standalone substances (see TABLE 2-15) or preservative blends (see TABLE 2-16).

Phenoxyethanol has been consistently identified across numerous product types, particularly in textile detergents, dishwashing liquids, and universal (all-purpose) cleaners. Conducted surveys and national registers indicate a significant and growing use of phenoxyethanol, with estimated concentrations typically around 0.7% and annual consumption in some regions, such as Denmark and Sweden, reaching several tonnes. Its inclusion in preservative blends further highlights its functional versatility and importance in ensuring product stability and safety.

It has low allergenic potential and no harmonised classification concerning this health hazard under CLP, reinforcing its suitability in formulations aimed at skin friendliness.

Overall, phenoxyethanol remains a key preservative in the detergent industry, supported by both regulatory and market data.

Further, data indicates further use and occurrence of **isothiazolinones**. Although MIT usage has declined due to reformulations and consumer pressure, BIT usage has increased, potentially shifting the allergenic risk from cosmetics to cleaning products. Studies also highlight regulatory gaps and labelling inaccuracies, indicating a need for better oversight. Despite some exposure risks, research shows that proper use of isothiazolinones-containing detergents (e.g., during washing cycles) does not result in detectable residues, supporting their continued use when appropriately managed.

Key in-can preservatives BIT and MIT received approval-decisions for use in PT 6 in May and June 2025 respectively containing requirements and restrictions in regard to their use in treated articles. As from the approval date¹⁶ of the active substance the content of MIT in a detergent product for consumer use is not allowed (*de facto*¹³) to exceed 0.0015% (w/w), whereas the limit concerning BIT is 0.036% (w/w).

Additionally, **DDAC** and **bronopol** have been identified as widely used in cleaning and disinfection products (i.e. PT 1- and PT 2-biocidal products¹⁷), with confirmed presence in various commercial formulations and environmental samples. DDAC, although primarily valued for its disinfectant and surfactants functions, currently is also under regulatory review as an in-can preservative (PT 6). Concentrations in products generally align with label declarations. Usage and product prevalence of bronopol have grown over recent decades. Typical concentrations range from 0.02% to 0.1%, and while allergic reactions to bronopol remain relatively low, a slight increase in incidence has been noted.

While less prevalent than phenoxyethanol and the isothiazolinones, a former consumer product survey on preservatives in detergents conducted by Kjølholt et al. 2018 found that several other preservatives such as **lactic acid**, **potassium sorbate**, **formic acid**, and **benzyl alcohol** play a supplementary yet important role in detergent formulations. Among these, benzyl alcohol stands out for its relatively high use concentration (0.5 – 1.0%) and presence in multi-preservative blends. Lactic acid also shown to be one of the more frequently used preservatives, after phenoxyethanol and the isothiazolinones. More recent data on the specific products in which these preservatives are used, as well as updated information on concentration and usage volumes, could not be identified in this literature research.

¹⁶ Approval dates: Concerning use of MIT in PT 6 = 1st of February 2027; Concerning use of BIT in PT 6 = 1st of October 2026.

¹⁷ Product-type 1: Human hygiene; Product-type 2: Disinfectants and algacides not intended for direct application to humans or animals as described in Annex 5 of the BPR.

TABLE 2-15. Identified in-can preservatives used as standalone ingredients, product occurrence and concentrations.

Preservative	Product type	Concentration, %	Additional information	Source
Phenoxyethanol	Detergents	Not specified	General presence confirmed, no concentration data	AISE, 2018
	Cosmetic products*	0.5 – 1.0	Information from different suppliers on the Danish market	Kjølholt et al., 2018
	Non-cosmetic products (cleaning, but also others)	0.0002 – 100 (median: 0.70)	Use concentrations (%) as reported by companies to the Swedish Products Register	Lidén et al., 2022
	Various cleaning products including laundry products (detergents and softeners), household cleaners (window cleaners) and other specialty products (wet wipes, system cleaners)	0.5 – 1.0	Standalone phenoxyethanol product 's&m Phenoxyethanol' for various industrial and household uses	Vink Chemicals, 2024
BIT	Household products, laundry detergents and cleaning sprays	Not specified.	General presence confirmed, no concentration data	AISE, 2018,; Havmose et al., 2021; King et al., 2021
	Air freshener	ND	n=1, DF=0%	Marrero-Alemán et al., 2019**
	Detergent	0.000006 – 0.002 (55.4-22,451.4 ppb)	n=2; DF=100%; one product not labelled as containing isothiazolinone.	
	Dishwashing liquid	ND – to 0.00002 (217.3 ppb)	n=6; DF=17%	
	Floor cleaner	ND – 0.004 (43,826.7 ppb)	n=5; DF=80%	
	Glass cleaners	ND – 0.003 (34,263 ppb)	n=5; DF=60%	
	Grease remover	ND – 0.003 (33,113.2 ppb)	n=4; DF=25%	
	Multipurpose cleaning spray	ND – 0.002 (20,767.7 ppb)	n=7; DF=43%	
	Stain remover	ND	n=1; DF=0%	
	WC cleaner	ND – 0.004 (35,372.8 ppb)	n=3; DF=67%	
	Dishwashing detergent	0.0000007 – 0.0000008 (6.48 – 7.68 ppb)	n=4; DF: 100%	Paun et al., 2022
	Liquid laundry detergents; Liquid detergents, highly alkaline; Washing-up liquids; Wax emulsions; Window cleaners	0.1 – 0.3	Standalone component in 'pametol® D 11'	Schuelke (date of access: May 2025)
	Liquid laundry fabric softener	0.1 – 0.2	Standalone component in 'pametol® D 11'	

Preservative	Product type	Concentration, %	Additional information	Source
MIT	Liquid detergents; Liquid scouring cleanser	0.1 – 0.4	Standalone component in `parmetol® D 11`	Vink Chemicals, 2024
	Wax emulsion; Shoes polishes; Enzyme containing cleanser	0.05 – 0.2	Vinkocide® BIT 20 G	
	Household products, laundry detergents and cleaning sprays	Not specified	General presence confirmed, no concentration data	AISE, 2018; Havmose et al., 2021; King et al., 2021
	Air freshener	ND	n=1; DF=0%	Marrero-Alemán et al., 2019**
	Detergent	ND – 0.003 (29,942.7 ppb)	n=2; DF=50%	
	Dishwashing detergent	<LOQ-0.74 mg/L	n=4; DF: 50%	
	Dishwashing liquid	ND – 0.0005 (4800.5 ppb)	n=6; DF=57%	
	Floor cleaner	0.000005 – 0.005 (51-51,184.5 ppb)	n=5; DF=100%	
	Glass cleaner	0.000007 – 0.002 (74.1-16,427.2 ppb)	n=5; DF=100%	
	Grease remover	ND – 0.0008 (8,272.3 ppb)	n=4; DF=50%	
	Multipurpose cleaning spray	ND – 0.006 (58,426.8 ppb)	n=7; DF=67%	
	Stain remover	0.00003 (316.8 ppb)	n=1; DF=100%	
	WC cleaner	ND – 0.004 (42,477.7 ppb)	n=3; DF=67%	
MCI	Not specified	<0.0001 – 75 (median: 0.001)	Use concentrations (%) as reported by companies to the Swedish Products Register	Lidén et al., 2022
	Air freshener	ND	n=1; DF=0%	Marrero-Alemán et al., 2019**
	Floor cleaner	ND – 0.000008 (80.7 ppb)	n=5; DF=20%	
	Glass cleaner	ND	n=5; DF=0%	
	Grease remover	ND – 0.000007 (72 ppb)	n=4; DF=25%	
	Detergent	ND	n=2; DF=0%	
	Dishwashing liquid	ND – 0.002 (15,235.8 ppb)	n=6; DF=50%	
	Multipurpose cleaning spray	ND – 0.002 (1495.1 ppb)	n=7; DF=14%	
	Stain remover	ND	Labelled as containing the isothiazolinone.	
	WC cleaner	ND – 0.0006 (6,410.5 ppb)	n=3; DF=33%	

Preservative	Product type	Concentration, %	Additional information	Source
MCI/MIT	Dishwashing detergent	<LOQ-2.20 mg/L	n=4; DF: 50%	Paun et al., 2022
	Household products, laundry detergents and cleaning sprays	Not specified	General presence confirmed, no concentration data	AISE, 2018; Havmose et al., 2020; King et al., 2021
OIT	Household products, laundry detergents and cleaning sprays	Not specified	General presence confirmed, no concentration data	Havmose et al., 2021; King et al., 2021
	Air freshener	ND	n=1; DF=0%	Marrero-Alemán et al., 2019**
	Detergent	ND	n=2; DF=0%	
	Dishwashing liquid	ND	n=6; DF=0%	
	Floor cleaner	ND	n=5; DF=0%	
	Glass cleaner	ND	n=5; DF=0%	
	Grease remover	ND	n=4; DF=0%	
	Multipurpose cleaning spray	ND – 0.0002 (2,378.1 ppb)	n=7; DF=14%	
	Stain remover	ND	n=1, DF=0%. Labelled as containing the isothiazolinone.	
	WC cleaner	ND	n=3; DF=0%	
DDAC	Dishwashing detergent	<LOQ – 0.77 mg/L	n=4; DF: 25%	Paun et al., 2022
	Enzyme containing cleanser; Wax emulsion	0.015 – 0.5	Standalone component in ‘Vinkocide® OIT 8’ and ‘Vinkocide® OIT 45’	Vink Chemicals, 2024
	Wood cleaning	2.0	Concentration (% w/w) declared on the product: <1.5%	Danish EPA, 2023
	Tile cleaning	0.259	Concentration (% w/w) declared on the product: <1%	
	Tile cleaning	4.46	Concentration (% w/w) declared on the product: 5%	
Dimethyl glycol	Liquid detergents; Liquid detergents, highly alkaline; Liquid laundry detergents; Liquid laundry fabric softener; Liquid scouring cleansers; Window cleaners; Wet wipes; Wax emulsions; Washing up liquids	0.05 – 0.15	Standalone component in ‘grotan® TK 5’	Schuelke (date of access: May 2025)
Bronopol	Detergents	Not specified	General presence confirmed, no concentration data	AISE, 2018

Preservative	Product type	Concentration, %	Additional information	Source
	Liquid detergents; Liquid laundry fabric softener; Window cleaners; Wax emulsions; Washing-up liquids	0.02 – 0.10	Standalone component in ‘s&m Bromopol’	Schuelke (date of access: May 2025)
	Liquid laundry fabric softener; Liquid scouring cleansers; Window cleaners; Shoes polishes	0.05 – 0.2	Standalone component in ‘Vinkocide® BND 20’	Vink Chemicals, 2024
DMDM hydantoin	Not specified	0.0013 – 70 (median: 0.5)	Use concentrations (%) as reported by companies to the Swedish Products Register	Lidén et al., 2022
Diazolidinyl urea		0.003 – 100 (median: 0.15)		
Quaternium-15		0.0002 – 64 (median: 0.033)		
Butylparaben		0.001 – 4 (median: 0.024)		
Isobutylparaben		0.001 – 2 (median: 0.029)		
Ethylparaben		0.001 – 100 (median: 0.068)		
Methylparaben		<0.0001 – 100 (median: 0.1)		
Propylparaben		<0.0001 – 100 (median: 0.03)		
MDBGN (DBDCB)		<0.0001 – 26 (median: 0.015)		
Sodium benzoate	Fabric conditioner; hand dishwashing liquid; general purpose cleaner	0.1 – 1.25	Active ingredient of commercially available preservative under name Kalaguard® SB.	Lanxess, 2024

* Information on concentration in non-cosmetic products not available in the study.

** Marrero-Alemán et al., 2019 measured concentration of isothiazolinone in various cleaning products available on the Spanish market.

ND – not detected.

TABLE 2-16. Identified preservative blends in consumer cleaning and washing products.

Product type	Preservative blend	Commercial name	Concentration of the blend in the product (%)	Source
In-can preservation (PT 6): Wax emulsions	BIT, Bronopol, MIT	Vinkocide® KTLB	0.1 – 0.3	Vink Chemicals, 2024
In-can preservation (PT 6): Wax emulsions; Enzyme containing cleansers	BIT; MIT	Vinkocide® KTL; Vinkocide® KTL 55; Vinkocide® KTL 95; Vinkocide® KTL 525	0.05 – 0.4	
Liquid laundry fabric softener; Liquid scouring cleansers; Window cleaners	IPBC; OIT	Vinkocide® OI	0.15 – 0.25	
	BIT; CMI/MIT (reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1))	Vinkocide® CMIK 10 new	0.1 – 0.2	
	BIT; OIT	Vinkocide® BO 313	0.05 – 0.3	
	Bronopol; MIT	Vinkocide® BTL	0.1 – 0.3	
	Bronopol; CMI/MIT (reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1))	Vinkocide® CMIB-Types	0.05 – 0.25	
	CMI/MIT	Vinkocide® CMI 1.5	0.1 – 0.25	
	BIT; phenoxyethanol	Vinkocide® BIT PE	0.25 – 1	
Not specified.				
Various cleaning products including, dishwashing, laundry products (detergents and softeners), household cleaners (window cleaners) and other specialty products (wet wipes, system cleaners)	BBIT, BDA and phenoxyethanol	parmetol® BPX	0.3 – 1.0	
	BDA; BIT; Pyridine-2-thiol-1-oxide, Sodium salt	parmetol® SBX	0.05 – 0.2	
	CMIT/MIT	parmetol® K 6	0.05 – 0.20	
Washing-up liquids; Liquid detergents; Liquid detergents, highly alkaline; Liquid laundry detergents; Liquid laundry fabric softener; Liquid scouring cleansers; Wet wipes; Wax emulsions	BIT; Laurylamine Dipropylenediamine	grotan® BA 21	0.05 – 0.4	Schuelke (date of access: May 2025)
	Dimethylol Glycol; OIT	grotan® TK 5 plus	0.05 – 0.15	
Washing-up liquids; Liquid detergents; Liquid laundry detergents; Liquid laundry fabric softener; Liquid scouring cleansers; Wet wipes; Wax emulsions	CMI; MIT; Glutaral	parmetol® SL 60	0.05 – 0.3	

Product type	Preservative blend	Commercial name	Concentration of the blend in the product (%)	Source
	Bronopol, OIT	parmetol® N 20	0.1 – 0.2	
	CMI/MIT	parmetol® K 20	0.05 – 0.2	
	CMI; MIT, OIT	parmetol® K 60	0.1 – 0.4	
	CMI; MIT; Bronopol	parmetol® A 28;	0.03 – 0.15;	
		parmetol® A 28 S	0.03 – 0.3	
	Dimethylol Glycol; CMI; MIT	parmetol® A 26;	0.05 – 0.25;	
		parmetol® DF 35	0.03 – 0.15	
	MIT; BIT; Laurylamine Dipropylenediamine	parmetol® MBX	0.05 – 0.4	
Wet wipes; Shoe polishes	CMI; MIT, OIT	parmetol® DF 12	0.1 – 0.3	

2.5 Results from the stakeholder consultation

2.5.1 Data collection from Danish industry associations and manufacturers

Responses were obtained from five manufacturers who contributed with filled-in questionnaires. Several manufacturers preferred to not disclose their name; hence, answers are anonymized here.

As it can be seen from the answers to the questionnaire listed below in TABLE 2-17, phenoxyethanol is used as in-can preservatives by three out of the five manufacturers who has responded. Phenoxyethanol is used in many different detergent products, usually at a concentration between 0.4-1%. In addition, sodium benzoate and potassium sorbate are used by two manufacturers at concentration below 0.5%.

One manufacturer uses the preservative blend ES-OPM¹⁸ in four different products at concentrations below 0.75%. The blend contains according to the manufacturer 2-methylpentane-1,5-diamine (CAS number: 15520-10-2), biphenyl-2-ol (CAS number: 90-43-7), 2-(2-(2-butoxyethoxy)ethoxy)ethanol (CAS number: 143-22-6) and sodium dimethyldithiocarbamate (CAS number: 128-04-1). The latter substance is currently being reviewed for use as a biocide in the EEA and/or Switzerland, for PT 9, 11 and 12 (preservation of fibers, leather, rubber, or polymers, preservation for liquid systems, controlling slimes) but not as an in-can preservative (PT 6).

Additionally, one manufacturer adds ethanol to their product(s) for the inherent preserving effect but with a different intended function specified. Three out of five manufacturers have focus on GMP-like measures and development of concentrated products (to reduce water activity in products) to be able to lower the content of in-can preservatives in their products.

One manufacturer state that they do not use any preservatives at all.

Since the number of responders is limited, the information does not sufficiently reflect which preservatives occur in detergents available to Danish consumers, however, the findings are in line with the findings of the literature survey showing that phenoxyethanol is a key ingredient for industry for preservation of cleaning and washing products, while potassium sorbate and sodium benzoate are also frequently used.

¹⁸ [Technical data sheet ES-OPM Straetmans High TAC GmbH Edited 11/16/2017](#)

TABLE 2-17. Questionnaire answers from stakeholders.

Question	Manufacturer 1	Manufacturer 2	Manufacturer 3	Manufacturer 4	Manufacturer 5
<i>Do you use preservatives in your washing and cleaning products?</i>	No	Yes Phenoxyethanol, Potassium Sorbate	Yes Phenoxyethanol, Potassium Sorbate	Yes Phenoxyethanol, Sodium benzoate, Potassium sorbate	Yes Floor cleaning products and dishwasher cleaner
<i>If yes, which are most frequently used</i>	Not applicable	Phenoxyethanol	Phenoxyethanol, Potassium Sorbate	Phenoxyethanol	ES-OPM contain 15520-10-2 (20-30%) + 90-43-7 (≥ 10 -<25%) + 143-22-6 (≥ 20 -<25%) + 128-04-1 (≥ 0.1 -<0.25%)
<i>Do you typically use one or several preservatives in combination?</i>	Not applicable	One	One	One	One
<i>Which combinations, if any?</i>					
<i>At what concentrations are the preservatives typically added?</i> <i>Name; CAS-no.; conc.</i>	Not applicable	Phenoxyethanol; 122-99-6; 0.4 w/w %	Phenoxyethanol; 122-99-6; <1 w/w % Potassium Sorbate; 24634-61-5; <0.3 w/w %	Phenoxyethanol; 122-99-6; 0.3-0.8 w/w % Potassium Sorbate; 24634-61-5; 0.2 w/w % Sodium Benzoate; 532-534-6; 0.5 w/w %	ES-OPM 0.15-0.75 %
<i>Which product types are preserved and with which preservatives?</i> <i>Name; CAS-no.; conc.</i>	Not applicable	Bathroom cleaner, Kitchen cleaner, Dishwashing detergent, Soap, Carpet cleaner, All-purpose cleaner: Phenoxyethanol; 122-99-6; 0.4 w/w %	Dishwashing detergent: Potassium Sorbate; 24634-61-5; <0.3 w/w % Scouring cream, Textile detergent (liquid): Phenoxyethanol; 122-99-6; <1 w/w %	Dishwasher rinse aid, Machine cleaner: Potassium Sorbate; 24634-61-5; 0.2 w/w % Soap: Sodium Benzoate; 532-534-6; 0.5 w/w % Glass cleaner, Textile detergent (liquid), Toilet cleaner: Phenoxyethanol; 122-99-6; 0.8 w/w % Scouring cream: : Phenoxyethanol; 122-99-6; 0.5 w/w % Kitchen cleaner, Dishwashing detergent, All-purpose cleaner: Phenoxyethanol; 122-99-6; 0.4 w/w % Rinse aid: Phenoxyethanol; 122-99-6; 0.3 w/w %	Machine cleaner: ES-OPM; CAS-no. See Q2); 0.15 % Wood soap: ES-OPM; CAS-no. See Q2); 0.5 % Floor cleaner: ES-OPM; CAS-no. See Q2); 0.75 % Tile cleaner: ES-OPM; CAS-no. See Q2); 0.35 %

Question	Manufacturer 1	Manufacturer 2	Manufacturer 3	Manufacturer 4	Manufacturer 5
<i>Which product types are typically not preserved?</i>	Bathroom cleaner, General-purpose cleaner, Oven cleaner, Rinse aid, Textile detergent (liquid), Toilet cleaner, Carpet cleaner	Dishwasher rinse aid, Glass cleaner, General-purpose cleaner, Chlorine cleaner, Machine cleaner, Metal cleaner, Oven cleaner, Scouring cream, Toilet cleaner	Dishwasher rinse aid, Bathroom cleaner, Glass cleaner, Chlorine cleaner, Kitchen cleaner, Rinse aid, Textile detergent (solid/powder), Toilet cleaner, All-purpose cleaner	General-purpose cleaner, Oven cleaner	Brown soap
<i>Have you introduced any other measures to improve the durability of your products? (e.g., new measures in production, packaging, etc.)</i>	No information provided	Thorough production hygiene. Disinfection of piping, hoses and machines before tapping.	CIP cleaning is carried out in production and strict hygiene rules are in place for all traffic and staff. Measures to reduce water activity in products are promoted through the development of concentrated products.	Thorough cleaning, good hygiene, high quality raw material and packaging, minimum handling of products in production, fewer touch points during production, shelf-life testing, optimization of production if needed.	No

2.5.2 The European Industry Association A.I.S.E.

A.I.S.E. (International Association for Soaps, Detergents and Maintenance Products) represents the detergents and maintenance products industry in Europe and has 29 national associations across Europe, 18 corporate members and 18 value chain partners as their members, thus representing about 900 companies supplying household and professional cleaning products and services across Europe (A.I.S.E., 2024).

A.I.S.E. holds market data for the European revenue for different categories of washing and cleaning products (TABLE 2-18) Even though consumption patterns of Danish consumers may differ, and revenue is not a direct measure for use volumes, the data provide an indication of the relative importance of the different product categories.

TABLE 2-18 shows the data compilation from 2016 and 2023 on the market value for household cleaning products and the corresponding market share from A.I.S.E. The household products are divided into five categories of laundry care, surface care, dishwashing, maintenance products and bleaches. The overall growth in the market across all five categories have increased with 29.47% from 2016 to 2023 where data from 2016 was used in Kjølholt et al., 2018. The revenue in the different product categories has been stable over the year, with the largest share in 2023 made up by laundry products (46.9%), followed by surface care (21.9%) and dishwashing products (16%).

TABLE 2-18. Revenue of consumer products in Europe from 2016 to 2024 by main product groups (sources: A.I.S.E. activity and sustainability reports from 2016 to 2022; A.I.S.E., 2024).

Household care	Laundry care	Surface care	Dishwashing	Maintenance products	Bleaches	Total
Market value 2016 (billion €)	13.5	6.0	4.4	3.9	0.7	28.5
Market share 2016 %	47.3	21.2	15.4	13.6	2.3	100
Market value 2023 (billion €)	17.1	7.9	5.8	4.7	0.8	36.3
Market share 2023 %	46.9	21.9	16	13	2.2	100

A.I.S.E. conduct surveys on consumers' understanding of cleanliness and hygiene and their washing and cleaning habits at home. Reports on this survey have been published every three years since 2008 but due to COVID-19 in February 2020 there is only a report from 2020 and 2025 available on data collected in 2020 and 2024 respectively.

The survey in 2020 was run in 23 countries in Europe, with approximately 200 respondents per country (total about 4500 online questionnaires in 2020 and 4600 questionnaires in 2024). The participation was done via recruitment panel with criteria as: men and women, aged 18-65, responsible for purchase and using a laundry machine (A.I.S.E. 2020a, A.I.S.E. 2025). The results for the two surveys are listed in TABLE 2-19. The survey results show that use of liquid laundry detergents is more common than powder detergents, and that about ¾ of the participants own a dishwasher and thus presumably also use dishwashing detergents in their home.

TABLE 2-19. Results of A.I.S.E. surveys from 2020 and 2024 on consumer's habits when cleaning and washing at home.

Questions	2020	2024
Washes/2 weeks	6.7	6.3
Find it easy to dose laundry detergent	80%	80%
Use of liquid laundry detergent	74%	75%
Use of powder laundry detergent	58%	55%
Use of laundry detergent capsules	34%	36%
Detergents are safe for people who use them	53%	60%
Dish loads/week	4.9	4.8
Owning a dishwasher	68%	73%
Special detergent for machine cleaning	68%	62%
Cleaning and hygiene in my home is important	89%	89%

In addition to the information on consumer habits in TABLE 2-19, 83% of consumers surveyed state that they care of laundry using a washing machine and 31% only use a disinfectant when cleaning their home or washing their clothes when they think there may be harmful bacteria or viruses. 59% of the consumers surveyed in the Nordics state that they use a disinfectant or bleach product in their home compared to the overall answer of 78% for all countries participating (A.I.S.E., 2025).

The usage of disinfectants or bleach products in homes are shown in FIGURE 2-7 where the primary use is cleaning of toilet seat, flush handle and lid as well as cleaning the toilet bowl.

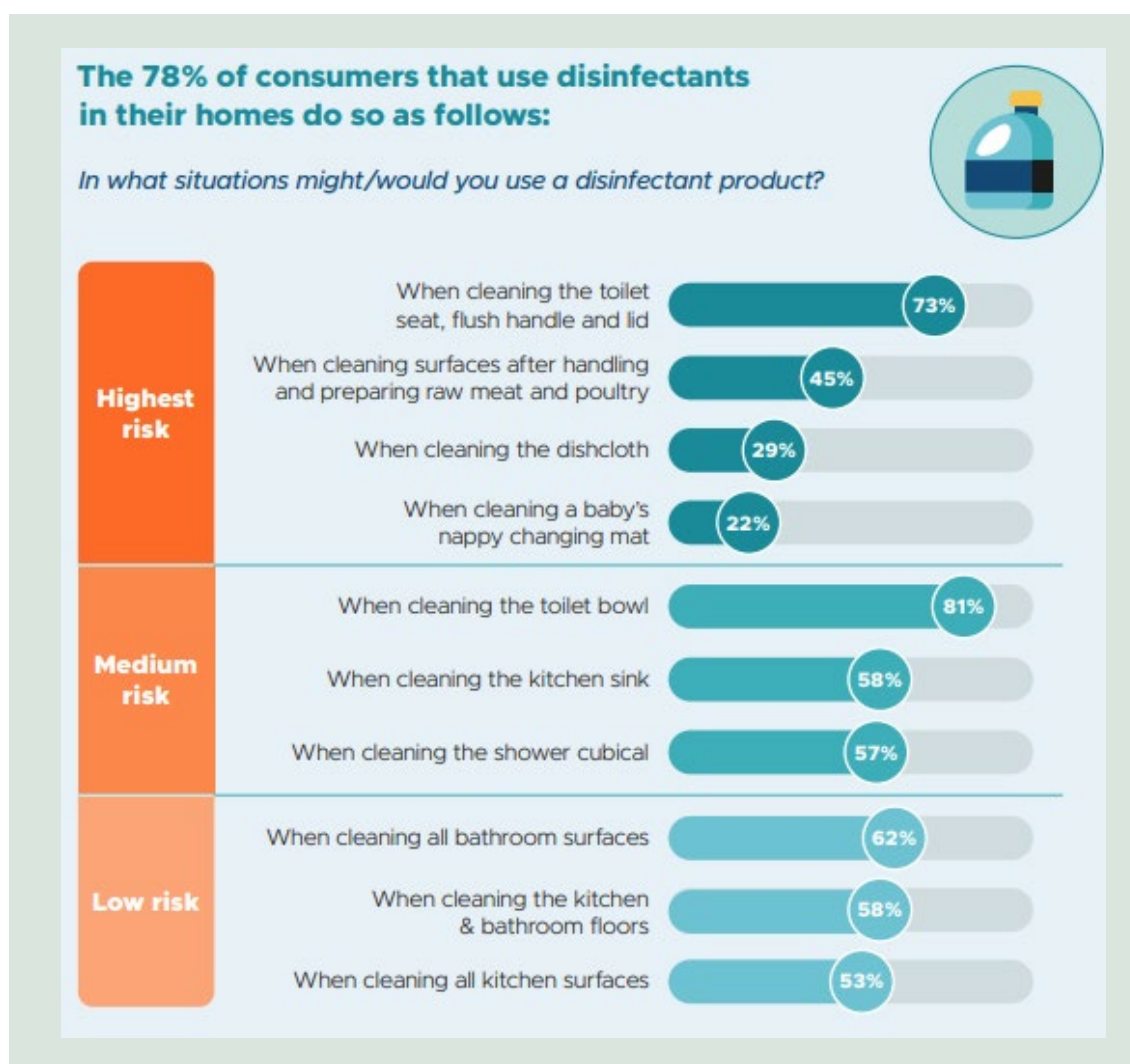


FIGURE 2-7. Shows the use of disinfectant products or bleaches in European homes (A.I.S.E., 2025)

2.5.3 The Danish Consumer Council THINK Chemicals

The Danish Consumer Council THINK Chemicals operates the app Kemiluppen which has an associated database on both cosmetic products as well as washing and cleaning products. The database among others has information on product categories, ingredients, number of scans and assessment of substances. The consumers can scan and submit products via Kemiluppen and receive more information on the possible content of unwanted chemistry in the products.

The database contains products that have been registered since 2015, laundry and cleaning detergents, however, have only been added in 2022 to the database. Moreover, the database contains information on whether the products are available on the market or whether they have been discontinued. In the current analysis, all products (both current and discontinued) are included, since it is not known whether discontinued products are still available in stores, even though production may have ceased.

The database extraction contains 1831 products within the product group “detergents”, covering 27 subcategories of dishwashing, cleaning, and laundry products (TABLE 2-20). In

order to match the categorisation of products as done in Kjølholt et al. (2018), some products from the category 'Cleaning' in the database were assigned to 'Special cleaning'.

About half of the products (53%, 978 out of 1831 products) contain one or more preservative. About one fifth of the products (18%, 321 products) contains more than one preservative.

From TABLE 2-20 it can be seen that preservatives are most often added to products from the following categories (out of the products in scope of this survey):

- Cleaning - Cleaning wipes (93%)
- Cleaning - Scouring powder / scouring cream (89%)
- Laundry - Fine laundry / wool / silk (78%)
- Cleaning - Glass cleaner (73%)
- Laundry - Colored (72%)
- Laundry - White (66%)
- Cleaning - All-purpose cleaning (66%)
- Dishwashing - Hand dishwashing detergent (65%)

TABLE 2-20. Overview of detergents and percentage of preserved detergents per product category based on the extract from the database on consumer products by The Danish Consumer Council THINK Chemicals.

Product category - subcategory	No. of products	No. of products with preservatives	Percentage of products with preservatives
Dishwashing - Rinse aid / dishwasher detergent	57	22	39%
Dishwashing - Hand dishwashing detergent	149	97	65%
Dishwashing - Machine dishwashing / tabs	152	8	5%
Cleaning - Bathroom / kitchen / descaling	143	57	40%
Cleaning - Glass cleaner	41	30	73%
Cleaning - Floor cleaning	22	9	41%
Cleaning - Cleaning wipes	60	56	93%
Cleaning - Soap flakes / brown soap	24	0	0%
Cleaning - Scouring powder / scouring cream	9	8	89%
Cleaning - Toilet block	83	31	37%
Cleaning - Toilet cleaner	86	32	37%
Cleaning - Outdoor cleaning	20	6	30%
Cleaning - All-purpose cleaning	117	77	66%
Special cleaning - Car care	23	17	74%
Special cleaning - Glasses / Screen cleaner	36	21	58%
Special cleaning - Home fragrance	32	22	69%
Special cleaning - Oven / stove cleaner	12	6	50%
Special cleaning - Special cleaning	52	24	46%
Laundry - Delicate / wool / silk	109	85	78%
Laundry - White	103	68	66%
Laundry - Colored	186	133	72%

Product category - subcategory	No. of products	No. of products with preservatives	Percentage of products with preservatives
Laundry - Stain remover	60	25	42%
Laundry - Soap berries	1	0	0%
Laundry - Fabric softener	119	76	64%
Laundry - Detergent powder	116	65	56%
Laundry - Laundry sheets	12	3	25%
Total number of products	1831	978	53%

TABLE 2-21 overleaf lists all preservatives occurring as ingredients in the products registered in the Kemiluppen database. The table also shows how many products within a given product category are preserved with the specific preservative and if additional preservatives are used in combination with the listed preservative.

It can be seen that phenoxyethanol is the most commonly used preservative in the consumer detergents, as it occurs in 39% (382 out of 978 preserved products) of the detergents. Other commonly used preservatives are; alcohol (25.6%), methylisothiazolinone (17%), benzisothiazolinone (14.6%) and sodium benzoate (9.3%).

Of note is that phenoxyethanol often is used as a sole preservative, e.g., there are 41 products within the category of dishwashing products that contain phenoxyethanol, but only 10 of these contain additional preservatives. Similarly, sodium benzoate, formic acid and alcohol (denaturated) are often used as sole preservatives.

In contrast, products containing isothiazolinones (benzisothiazolinone, methylisothiazolinone, octylisothiazolinone) are mostly used in combination with other preservatives, e.g., all of the 26 dishwashing products containing benzisothiazolinone also contain additional preservatives. Additionally, the less commonly used preservatives sodium pyrithione, 2-bromo-2-nitropropane-1,3-Diol (bronopol) and laurylamine dipropylenediamine do almost always occur in combination with other preservatives.

There are numerous combinations of preservatives, and as mentioned earlier, about one fifth of the products (18%, 321 products) contains more than one preservative. TABLE 2-22 presents the number of products containing more than one preservative and lists typical combinations and product categories for the preservative combinations.

TABLE 2-21. Preservatives occurring in the products per product category according to the Kemiluppen database.

INCI Name	Total number of products containing the preservative	Products with preservative/ total number of preserved products	Dishwashing, number of products with preservative	Number of products within category containing additional preservatives	Cleaning, number of products with preservative	Number of products within category containing additional preservatives	Special cleaning, number of products with preservative	Number of products within category containing additional preservatives	Laundry, number of products with preservative	Number of products within category containing additional preservatives
Benzylhemiformal	1	0.1%	-	-	-	-	1	0	-	-
Dimethylol Glycol	11	1.1%	-	-	10	2	1	1	-	-
Benzisothiazolinone	143	14.6%	26	26	31	22	11	9	75	74
Dmdm Hydantoin	13	1.3%	-	-	1	1	-	-	12	0
Methylisothiazolinone	166	17.0%	23	18	28	24	24	16	91	82
Octylisothiazolinone	28	2.9%	2	2	2	2	1	1	23	23
Phenoxyethanol	382	39.0%	41	10	57	14	17	4	266	67
Iodopropynyl Butylcarbamate	8	0.8%	-	-	7	7	1	1	-	-
Benzyl Alcohol	28	2.9%	4	4	4	0	2	1	18	8
O-Phenylphenol	5	0.5%	4	0	1	0		-		-
2-Bromo-2-Nitropropane-1,3-Diol	23	2.4%	5	4	6	4	7	7	5	4
Dicapryl/Dicaprylyl Dimonium Chloride	2	0.2%	-	-	2	2	-	-	-	-
Didecyldimonium Chloride	17	1.7%	-	-	12	3	2	2	3	0
Alcohol	251	25.6%	37	18	110	20	30	10	73	53
Alcohol Denat.	68	7.0%	6	3	27	10	9	1	26	4
Formic Acid	63	6.4%	4	0	34	2	1	1	24	0
Glutaral	5	0.5%	-	-	4	0	1	1	-	-
Sorbic Acid	8	0.8%	1	1	1	1	2	1	4	1
Hydrogen Peroxide	25	2.6%	-	-	8	1	3	1	14	0
Laurylamine	14	1.4%	2	2	7	2	1	1	4	4
Dipropylenediamine										
Sodium Pyrithione	29	3.0%	2	2	8	8	3	3	16	16
Sodium Metabisulfite	2	0.2%	-	-	-	-	2	2	-	-

INCI Name	Total number of products containing the preservative	Products with preservative/ total number of preserved products	Dishwashing, number of products with preservative	Number of products within category containing additional preservatives	Cleaning, number of products with preservative	Number of products within category containing additional preservatives	Special cleaning, number of products with preservative	Number of products within category containing additional preservatives	Laundry, number of products with preservative	Number of products within category containing additional preservatives
Diazolidinyl Urea	1	0.1%	-	-	1	1	-	-	-	-
Butylparaben	1	0.1%	-	-	-	-	-	-	1	1
Ethylparaben	2	0.2%	-	-	-	-	1	1	1	1
Methylparaben	6	0.6%	-	-	4	3	1	1	1	1
Propylparaben	1	0.1%	-	-	-	-	-	-	1	1
Sodium Benzoate	92	9.3%	29	3	26	4	11	3	25	4

TABLE 2-22. Combinations of preservatives.

Number of preservatives	Number of products	Number of different combinations	Most common combinations (number of products where this combination occurs)	Relevant product categories with the listed combination
2 preservatives	226	49	Alcohol, Phenoxyethanol (45) Benzisothiazolinone, Methylisothiazolinone (29) Methylisothiazolinone, Octylisothiazolinone (23)	Dishwashing - Hand washing, Cleaning - All-purpose cleaning, laundry Dishwashing - Rinse aid / dishwasher cleaner, Dishwashing - Hand washing, Cleaning - Cleaning wipes, Laundry (several) Laundry (several)
3 preservatives	81	38	Benzisothiazolinone, Methylisothiazolinone, Phenoxyethanol (21) Alcohol, Phenoxyethanol, Benzisothiazolinone (9) Phenoxyethanol, Benzisothiazolinone, Methylisothiazolinone (8)	Laundry (all) Dishwashing – Hand washing Laundry (delicate/wool/silk, coloured and washing powder)
4 preservatives	12	10	Alcohol denat., Phenoxyethanol, Benzisothiazolinone, Octylisothiazolinone (2) Phenoxyethanol, Benzisothiazolinone, Methylisothiazolinone, Alcohol (2) Most of the other combinations contain Benzisothiazolinone and another thiazoline an7or phenoxyethnol and one-two less commonly used preservatives	Laundry - White Cleaning - Cleaning wipes
5 preservatives	1	1	Phenoxyethanol, Sodium pyrithione, Methylisothiazolinone, Benzisothiazolinone, Benzyl alcohol (1)	Laundry - Delicate / wool / silk
6 preservatives	1	1	Phenoxyethanol, Butylparaben, Ethylparaben, Methylparaben, Propylparaben, Methylisothiazolinone	Laundry - Stain remover

2.5.4 Codecheck

Codecheck¹⁹ is an app intended for consumers in German-speaking countries. It can be used to scan the barcode on products and thereby give the consumers a rating based on the safety of the ingredients of the product, similar to the Danish app Kemiluppen. The Codecheck organisation was contacted with the aim of extracting data in the same way as for The Danish Consumer Council THINK Chemicals. However, any data extraction was not possible. Therefore, does this project does not contain any data or information from Codecheck.

2.5.5 SPIN Database

The SPIN (Nordic product register database) contains data about substances used in the Nordic countries. The database displays, if a substance is used in a specific country, in which amount or time frame it is used, and in which industry and in which function it is used. The database was consulted to obtain information about preservatives and their use in detergents.

TABLE 2-23 below displays the use of PT 6 preservatives in Denmark for the manufacturing of soap and detergents, cleaning and polishing preparations (Industrial Use (National); Code C204100).

As it can be seen 2-Phenoxyethanol is widely used peaking during the COVID pandemic in 2020 with a total use of 455 tonnes. A similar trend is seen for ethanol but this active substance is also included in many products and raw materials as a solvent.

The isothiazolinones BIT and MIT are also extensively used (although this is not displayed for MIT in terms of tonnes used/year which is assumed to be an error (or alternatively the numbers may be suppressed due to confidentiality issues perhaps)). DDAC is also used to high extent presumably mostly for the purpose of disinfection and hydrogen peroxide (presumably used for bleach in many cases). Benzyl alcohol is also used in a number of preparations. This well-known sensitiser may be added as both an in-can preservative or as part of perfume-blends.

The "low-risk" active substances (+)-tartaric acid, acetic acid, citric acid, lactic acid and sodium benzoate listed in Annex I of the BPR are also used in high tonnage and/or many preparations, whereas potassium sorbate, which is a high-use preservative in cosmetics, is only used to minor extent.

TABLE 2-23. The use of PT 6 preservatives in Denmark for the manufacturing of soap and detergents, cleaning and polishing preparations (Industrial Use (National); Code C204100).

Preservative	CAS No.	Year	#Prep	Tonnes
1,2-benzisothiazol-3(2H)-one (BIT)	2634-33-5	2023	15	1.2
		2022	15	0.8
		2021	13	17.7
		2020	16	17.8
		2019	16	1.3
		2018	16	2.5
		2017	11	1.2
		2016	10	0.0
		2010	4	0.0
		2009	4	0.0
		2008	4	0.0
2-methyl-2H-isothiazol-3-one (MIT)	2682-20-4	2023	32	0.0
		2022	33	0.0
		2021	25	0.0

¹⁹ [Website of Codecheck](#)

Preservative	CAS No.	Year	#Prep	Tonnes
		2020	27	0.0
		2019	6	0.0
		2018	8	0.0
		2017	6	0.0
		2016	7	0.0
		2015	7	0.0
		2014	7	0.0
		2013	6	0.0
		2012	7	0.0
		2011	6	0.0
		2010	7	0.0
		2009	8	0.0
		2008	8	0.0
2-Phenoxyethanol	122-99-6	2023	30	33.7
		2022	29	79.1
		2021	27	413.9
		2020	27	455.1
		2019	21	101.5
		2018	19	87.4
		2017	11	77.7
		2016	11	77.7
		2015	4	67.0
		2014	4	67.7
C(M)IT/MIT (3:1)	55965-84-9	2023	7	0.0
		2022	8	0.0
		2021	6	0.0
		2020	9	0.0
		2019	12	0.0
		2018	12	0.0
		2017	7	0.4
		2016	7	0.4
		2015	4	0.0
		2014	5	0.0
Didecyldimethylammonium chloride (DDAC)	7173-51-5	2010	5	0.0
		2023	31	5.7
		2022	31	4.7
		2021	15	3.6
		2020	15	9.4
		2019	10	9.3
		2018	11	7.3
		2017	6	4.6
		2016	5	4.6
Glutaral (Glutaraldehyde)	111-30-8	2023	5	0.0
Hydrogen peroxide	7722-84-1	2023	32	71.9
		2022	31	71.0
		2021	24	74.3
		2020	22	65.5
		2019	16	50.4
		2018	19	37.1
		2017	6	29.9
		2016	6	26.3
		2014	4	40.8

Preservative	CAS No.	Year	#Prep	Tonnes
N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine (Diamine)	2372-82-9	2013	5	45.0
		2012	5	45.0
		2023	7	0.3
		2022	6	1.0
		2021	5	0.9
		2020	6	4.3
Peracetic acid	79-21-0	2022	5	0.7
		2021	5	0.4
		2020	4	0.2
		2018	4	0.7
Benzyl Alcohol	100-51-6	2023	10	4.4
		2022	10	0.0
		2021	6	0.0
		2020	7	3.1
		2019	7	-1.4
		2018	16	0.0
		2017	15	3.1
		2016	15	3.1
Ethanol	64-17-5	2023	65	77.3
		2022	68	77.3
		2021	38	123.2
		2020	40	1,621.5
		2019	26	204.5
		2018	18	120.2
		2017	12	18.4
		2016	12	18.4
		2015	11	67.0
		2014	13	94.8
		2013	10	30.8
		2012	9	30.7
		2011	7	102.5
		2010	6	0.0
		2009	6	0.2
		2008	8	0.8
(+)-Tartaric acid	87-69-4	2018	11	2,718.1
Acetic acid	64-19-7	2023	22	312.8
		2022	18	9.0
		2021	21	427.3
		2020	22	382.2
		2019	15	6,288.7
		2018	21	6,166.9
		2017	21	6,206.8
		2016	21	8,172.4
		2015	19	7,906.0
		2014	19	1,410.9
		2013	18	1,411.0
		2012	17	1,410.8
		2011	17	909.8
		2010	18	907.0
		2009	17	125.3
		2008	18	126.0

Preservative	CAS No.	Year	#Prep	Tonnes
Citric acid	77-92-9	2023	19	7.2
		2022	25	14.3
		2021	21	81.4
		2020	30	107.0
		2019	38	818.7
		2018	31	817.5
		2017	18	679.6
		2016	18	6.0
		2015	13	2.0
		2014	10	2.3
		2013	9	24.4
		2012	10	24.4
		2011	8	242.4
		2010	5	241.0
		2009	5	236.3
		2008	5	236.3
Citronellal	106-23-0	2019	13	0.0
		2018	12	0.0
Lactic acid	50-21-5	2023	51	12.1
		2022	51	10.0
		2021	26	9.7
Potassium (E,E)-hexa-2,4-dienoate (Potassium Sorbate)	24634-61-5	2021	8	8.0
		2020	7	8.0
		2019	5	4.0
		2018	6	5.6
		2017	6	11.6
Sodium benzoate	532-32-1	2023	12	0.7
		2022	15	0.8
		2021	12	0.4
		2020	11	0.4
		2019	11	100.4
		2018	9	13.9
		2017	6	76.0
		2016	5	76.0
		2015	4	0.0
		2010	4	36.0
		2009	4	36.0
		2008	4	40.7

2.5.6 Allergy Certified

AllergyCertified is an international allergy label that certifies a range of product types including detergents, cosmetics, make-up, diapers, and hygiene products. AllergyCertified is founded in Denmark, and the criteria are developed by Danish experts who check all ingredients and concentrations of each product to ensure that it is as mild and gentle on the skin as possible.

The organisation contributed with a questionnaire and an interview to the data collection for this survey. They observe:

- An increased use of the in-can preservative benzisothiazolinone (BIT).
- That allergy-causing preservatives are being used to preserve raw materials - thus they are not declared since they are not directly added to the products.
- Raw materials containing sodium laureth sulfate, one of the most frequently used surface-active substances in detergents, are for instance in many cases preserved by use of MIT.
- There are articles/studies that show that allergies to BIT are increasing while allergies to MIT are decreasing – this correlate well with the substitution of MIT with BIT.

When asked which preservatives are most associated with allergic reactions AllergyCertified mention MIT and BIT.

Furthermore, when asked whether they see any changes (since 2018) in the use of preservatives in detergents and cleaning products on the Danish market, AllergyCertified mention that since the beginning of the war in Ukraine, several manufacturers have changed raw materials, which AllergyCertified subsequently have been unable to certify/approve. AllergyCertified agree that liquid formulations (containing water) are the main interest for the present project as these formulations demand preservation to a higher extent.

2.5.7 National Allergy Research Center

The National Allergy Research Center (in Danish: Videncenter for Allergi) is a national centre established by the Danish Environmental Protection Agency in 2001 to gain a deeper understanding of the health effects of chemical substances.

The purpose of the centre is to prevent allergies to chemical substances in consumer products through research, monitoring, and counselling.

The tasks include, among other things, to establish:

- Causes of contact allergy
- which products, substances, and concentrations trigger allergies
- which levels do not cause illness, so that these can potentially be implemented in legislation

In their response, the focus was on contact allergy caused by isothiazolinones. A summary of the most important points concerning contact allergy to isothiazolinones in relation to washing and cleaning agents was provided and is presented here.

- Isothiazolinones are a group of preservatives that pose a particular challenge regarding contact allergy as they have effective antimicrobial properties but also a significant tendency to cause sensitization.
- Previous studies have found isothiazolinones in a significant proportion of liquid detergents.
- A Swiss market survey from 2017 showed that at least one isothiazolinone appeared in the ingredient list of 239 out of 557 liquid detergents (43%) (Garcia-Hidalgo et al., 2017). Benzisothiazolinone (BIT) and methylisothiazolinone (MI) were both present in 31% of the detergents, while methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) appeared in 10% of the detergents. A supplementary chemical analysis detected MI in 27 of 69 detergents with an average concentration of 44 ppm, and BIT in 29 of 69 detergents with an average concentration of 75 ppm (Garcia-Hidalgo et al., 2017).

- A review of the Swedish product register from 2018 showed that the most frequently used preservatives in cleaning agents, in descending order, were: phenoxyethanol, MCI, methylparaben, and propylparaben (Lidén et al., 2022).
- At Gentofte Hospital, among patch-tested patients, the Center has observed a significant increase in contact allergy to BIT over the last decade - from $\leq 0.3\%$ in 2014 to 5.0% in 2023 (Søgaard et al., 2025). Concurrently, a decrease in contact allergy to both MI and MCI/MI was seen, which may indicate that BIT has somewhat replaced MI and MCI/MI in certain products.

Further, the Center states in their reply (translated from Danish):

“Historically, MCI/MI and MI have caused widespread outbreaks of contact allergy in the 1980s and 2010s respectively (Schwensen et al., 2015). These outbreaks were primarily related to the use of these substances in cosmetic products. In the EU, the incidence of contact allergy to MI reached its highest level in 2013-2014 when 5-10% of patch-tested patients had a positive reaction. Since then, this incidence has dropped to 2-6%, while in North America it still exceeds 10%, indicating that contact allergy to MI is a global problem (Reeder et al., 2023; Houle et al., 2025).

We do not have current data on the present use of isothiazolinones in washing and cleaning agents [...] it can be speculated that the use of MI and MCI/MI has decreased in line with increased awareness of the sensitizing properties of these substances, which has also led to restrictions in the use of MI and MCI/MI in cosmetic products in the EU. It is likely that BIT is increasingly used in washing and cleaning agents as a replacement for MI and MCI/MI. This assumption is consistent with clinical observations where we, as previously mentioned, have recorded a significant increase in contact allergy to BIT among patch-tested patients. It is particularly noteworthy that among patients with clinically relevant contact allergy to BIT, exposure via detergents was the most frequently identified cause of allergic contact dermatitis (Søgaard et al., 2025).

A European multicenter study from 2024 also showed that household products, including detergents, were the cause of allergic contact dermatitis caused by BIT in 53% of patients (Schwensen et al., 2024). However, it can be challenging to determine the clinical relevance of positive patch test reactions to BIT since the exposure sources are not always clear.

It is also important to be aware of other preservatives like methylidibromo glutaronitrile (MDBGN), which was previously a common cause of contact allergy but is now banned in cosmetic products and in 2018 only appeared in a few non-cosmetic products according to a Swedish survey (Lidén et al., 2022). Substitution of isothiazolinones with such preservatives in washing and cleaning agents could potentially lead to an increased incidence of contact allergy [...].”

2.5.8 Asthma-Allergy Denmark

Asthma-Allergy Denmark is a member-democratic patient association that works to improve the daily lives of everyone affected by asthma, allergies, hay fever, and eczema.

The organisation is also the Danish part of Asthma Allergy Nordic - a collaboration between the asthma and allergy organisations in Norway, Sweden and Denmark.

Asthma Allergy Nordic is responsible for the Asthma Allergy Nordic-label - a brand that is used both in the Nordic countries and on the global market.

In their response to the stakeholder consultation (questionary), Asthma-Allergy Denmark specifically emphasises their concerns related to the limited number of in-can preservatives allowed for use and the derived effects thereof (translated from Danish):

“We are seeing a tendency to limit the use of preservatives to very few preservatives, as the remaining approved preservatives have various undesirable effects. This is concerning as it may result in the population being exposed to larger amounts of fewer preservatives, which ultimately could lead to an increased occurrence of allergic reactions to these substances.

Therefore, it is our significant desire that funds are allocated within the EU to ensure an expansion of the number of approved preservatives. It is currently the responsibility of companies to undertake this task, but we believe it should also be considered a societal obligation, as we might risk facing a shortage of adequate preservatives in the long term, which neither provoke allergic reactions nor have other effects that society does not want. Another possibility is to reassess the current legislation regarding documentation of product durability, to ensure that it is up-to-date and takes into account the possibilities of using special packaging where the need for preservation is reduced”.

2.6 Initial hazard assessment

For this project, the output on the health hazards according to the CLP classification is used as basis for the initial hazard assessment and further prioritisation of substances for phase 2. Output on the health hazards for the gross list PT 6 active substances according to the CLP classification etc. is listed in Appendix 2.

A summary of the screening output for the prioritised substances based on their classification with 'severe' hazards (defined as CMR, Skin Sens. 1, Resp. Sens. 1, ED HH 1, STOT SE 1 and STOT RE 1, see section 2.2.4) is listed in TABLE 2-24 below.

TABLE 2-24. List of prioritised preservatives based on their severe hazard classification as identified in the initial hazard assessment.

Preservative	CAS	PT 6 status	Hazard classification
1,2-benzisothiazol-3(2H)-one (BIT)	2634-33-5	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.036%) - ATP 21 (shall apply as from 1 September 2025)
2-methyl-2H-isothiazol-3-one (MIT)	2682-20-4	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 13
octhiline (ISO); 2-octyl-2H-isothiazol-3-one (OIT)	26530-20-1	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 15
5-chloro-2-methyl-2H-isothiazol-3-one (MCI or CIT)	26172-55-4	Non-approval	Severe notified classifications according to CLP in regard to health hazards (% of notifications): Skin Sens. 1; H317 (88.3%); Skin Sens. 1A; H317 (6.39%). Recent non-approval-decision ⁶ (21 st of February 2025). Accordingly, products containing CIT may still be on the market.
2-methyl-1,2-benzothiazol-3(2H)-one (MBIT)	2527-66-4	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 15
2-n-butyl-benzo[d]isothiazol-3-one (BBIT)	4299-07-4	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1; H317)

Preservative	CAS	PT 6 status	Hazard classification
Reaction mass of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H -isothiazol-3-one (C(M)IT/MIT (3:1))	55965-84-9	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 13
2,2-dibromo-2-cyanoacetamide	10222-01-2	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (ED HH; STOT RE 1; H372 (respiratory tract; inhalation); Skin Sens. 1; H317)
2,2',2''-(hexahydro-1,3,5-triazine-1,3,5-triyl)triethanol	4719-04-4	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1; H317: C ≥ 0,1%)
2,2'-dithiobis[N-methylbenzamide]	2527-58-4	Initial application for approval in progress	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future but to be classified a Skin Sens. 1; H317 according to 99% of notifiers.
2-bromo-2-(bromomethyl)pentanedinitrile	35691-65-7	Approved	No severe (harmonised) classification according to CLP in regard to health hazards but indication of a change of this in the future - and to be classified a Skin Sens. 1; H317 according to > 57% of notifiers.
3-iodo-2-propynyl butylcarbamate (IPBC)	55406-53-6	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1; H317; STOT RE 1; H372 (larynx)) - ATP 6
Benzyl alcohol	100-51-6	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1B; H317) - ATP 21 (shall apply as from 1 September 2025).
Biphenyl-2-ol	90-43-7	Approved	Severe harmonised classification according to CLP in the near future in regard to health hazards (Skin sens 1B; H317; CARC. 2; H351) - ATP 22 (Shall apply as from 1 May 2026)
Chlorocresol	59-50-7	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1B; H317) - ATP 13
Glutaral	111-30-8	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; Resp. Sens. 1; H334) - ATP 09
N-(trichloromethylthio)phthalimide	133-07-3	Approved	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1; H317; CARC. 2; H351) - ATP 01
Peracetic acid	79-21-0	Approved	No severe (harmonised) classification according to CLP in regard to health hazards but this will change in the near future (Acute Tox. 2; H310; Acute Tox. 2; H330; STOT SE 3; H335: C ≥ 1%; EUH071) - ATP 22 (Shall apply as from 1 May 2026)

Preservative	CAS	PT 6 status	Hazard classification
Pyridine-2-thiol 1-oxide, sodium salt	3811-73-2	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1; H317; STOT RE 1; H372 (nervous system) - ATP 18
Pyrithione zinc	13463-41-7	Initial application for approval in progress	Severe harmonised classification according to CLP in regard to health hazards (Acute Tox. 2; H330; STOT RE 1; H372; Repr. 1B; H360D) - ATP 15
Tetrahydro-1,3,4,6-tetrakis(hydroxymethyl)imidazo[4,5-d]imidazole-2,5(1H,3H)-dione	5395-50-6	Initial application for approval in progress	No severe (harmonised) classification according to CLP in regard to health hazards and no indication that this will change in the near future but to be classified as Skin Sens. 1; H317 according to > 97% of notifiers.

2.7 Conclusion and selection of products and substances for chemical analyses

Numerous preservatives commonly used in indoor cleaning and washing products for consumer use were identified in the literature research, stakeholder consultation and by extraction of relevant information from consumer product databases and other databases about products and substances (i.e. the SPIN database and Kemiluppen by The Danish Consumer Council THINK Chemicals).

The main findings of the survey can be summarized as follows:

- The most commonly used in-can preservatives in consumer cleaning and washing products are phenoxyethanol, ethanol (alcohol), methylisothiazolinone, benzisothiazolinone and sodium benzoate (occurring in 9-39% of preserved detergents according to data from The Danish Consumer Council THINK Chemicals). Moreover, formic acid, sodium pyrithione, octylisothiazolinone, benzyl alcohol and 2-bromo-2-nitropropane-1,3-diol do also often occur in preserved detergents (occurring in 2-39% of preserved detergents according to data from The Danish Consumer Council THINK Chemicals).
- Of note is that phenoxyethanol often is used as a sole preservative, as is also the case for sodium benzoate, formic acid and ethanol (alcohol). In contrast, products containing isothiazolinones (benzisothiazolinone (BIT), methylisothiazolinone (MIT), octylisothiazolinone (OIT)) are mostly used in combination with other preservatives.
- The product types cleaning wipes, scouring cream, laundry detergents (liquid detergents), glass cleaner, all-purpose cleaner and hand dishwashing detergent do usually contain preservatives (about two thirds or more of the products are preserved).
- Laundry detergents do often contain combinations of preservatives, but also dishwashing detergents, all-purpose detergents and cleaning wipes have been shown to contain preservative combinations.
- The initial hazard assessment identified 20 preservatives that are currently approved or under assessment for approval for use as PT 6 preservatives. The substances are prioritized due to their either harmonized or notified severe hazard classification (CMR, Skin Sens. 1, Resp. Sens. 1, ED HH 1, STOT SE 1 and STOT RE 1). Additionally, the preservative 5-chloro-2-methyl-2H-isothiazol-3-one (MCI or CIT) has been included as a prioritized substance due to its hazard classification and its recent (February 2025) change of status as non-approved PT 6 preservative under the Biocides Regulation.
- Information about the extent consumers buy the products online from EU- and non-EU based websites could not be identified within this survey.

Based on the findings of the survey and in order to make best use of the resources available to this project, certain products were selected for purchase and certain preservatives were

selected for chemical analysis of these products. The prioritization and selection of preservatives and substances is described in the following sections.

2.7.1 Selection of substances

The following selection criteria were developed to prioritise and select substances for chemical analysis:

- Indication of high use of the substance, expressed as either:
 - High occurrence in different types of detergents
 - High use tonnages and possibly growing use tonnages in detergents, and/or
 - High concentration in detergents
- Indication of health hazard, expressed as
 - Notified or harmonised CLP hazard classifications as H317, H334, H340, H341, H350, H351, H360, H361, H362, H370, H372, EUH380 and/or
 - Reported growing number of allergy incidences among consumers

The following paragraphs summarise the survey findings regarding use tonnages, percentages, relevant product types and health properties for the identified preservatives and conclude on their inclusion to the chemical analysis program for this project.

Phenoxyethanol has been consistently identified across numerous product types, particularly in textile detergents, dishwashing liquids, and universal (all-purpose) cleaners. Conducted surveys and national registers indicate a significant and growing use of phenoxyethanol, with estimated concentrations typically around 0.7% and annual consumption in some regions, such as Denmark and Sweden, reaching several tonnes. Its inclusion in preservative blends further highlights its functional versatility and importance in ensuring product stability and safety. Overall, phenoxyethanol remains a key preservative in the detergent industry, supported by both regulatory and market data.

As the health hazard properties of phenoxyethanol are much less severe compared to for instance the isothiazolinones, this key in-can preservative was not prioritised for analysis in the purchased cleaning and washing products in this project though.

Ethanol has also been consistently identified across numerous product types, but this active substance is also widely used as a solvent present in many raw materials and products. A CLH-intention containing proposed classifications such as Repr. 2; H361 and Lact.; H362 is currently being considered in the EU for ethanol. However, based on the present harmonised classification according to CLP (Flam Liq. 2; H225), this in-can preservative is not prioritised for analysis in the purchased cleaning and washing products.

For the **isothiazolinones**, both literature, stakeholders and consumer product data indicate widespread use and occurrence. Although MIT usage has declined due to reformulations and consumer pressure, BIT usage has increased, potentially also shifting the allergenic risk from cosmetics to cleaning products. Studies and information provided by stakeholders (National Allergy Research Center and AllergyCertified) also highlight regulatory gaps and labelling inaccuracies, indicating a need for increased attention.

Next to phenoxyethanol and ethanol, BIT and MIT are by far the most extensively used in-can preservatives in washing and cleaning products, while OIT also has a rather high frequency of use, especially in liquid laundry products (see TABLE 2-21).

Moreover, isothiazolinones have severe health hazard properties (extremely potent skin sensitisers) and there are indications by stakeholders of unlabelled presence in the final washing/cleaning products due to their use as in-can preservatives for raw materials. Of note concerning the latter item is that raw materials containing the commonly used surface-active ingredient sodium laureth sulfate, which is present in a vast number of washing and cleaning products as well as cosmetics, in many cases are preserved with MIT. However, this information may be lost through the supply chain, meaning that the content of the preservatives may not be reflected in the labelling of ingredients on the final washing and cleaning products (according to information provided by AllergyCertified).

Based on the widespread use and severe health hazards, isothiazolinones are prioritised for analysis. Based on stakeholder information that MIT and possibly also BIT are not necessarily labelled on the products, the trend of substitution of MIT with BIT and an observed increase of allergies to BIT, the analysis of MIT and BIT was prioritised for all products, irrespective of the substances' labelling on the products. The remaining isothiazolinones, OIT, BBIT and CIT, are included in the analysis of the products in which their content has been labelled.

BIT and MIT received approval-decisions for use in PT 6 in May and June 2025, respectively. Restrictions (will) apply for MIT, BIT, MBIT and C(M)IT/MIT (3:1)) concerning treated articles. Applicable as from the approval date of the active substance¹⁶ the content of MIT and C(M)IT/MIT (3:1)) in a detergent product for consumer use is not allowed (*de facto*¹³) to exceed 0.0015% (w/w), whereas the corresponding limit concerning BIT is 0.036% (w/w) (applicable by 01/10/2026 (BIT), 01/02/2027 (MIT)), in force (C(M)IT/MIT (3:1))).

Concerning the remaining commonly used in-can preservatives, **DDAC** and **bronopol** have been identified as widely used in cleaning and disinfection products, with confirmed presence in various commercial formulations and environmental samples. DDAC, although primarily valued for its disinfectant and surfactants functions, currently is also under regulatory review as an in-can preservative (PT 6). Concentrations in products generally align with label declarations. Usage and product prevalence of bronopol have grown over recent decades. Typical concentrations range from 0.02% to 0.1%, and while allergic reactions to bronopol remain relatively low, a slight increase in incidence has been noted. Based on the results of the initial risk assessment DDAC and bronopol were not prioritized for analysis in the purchased cleaning and washing products.

While less prevalent than phenoxyethanol and the isothiazolinones, a former consumer product survey on preservatives in detergents conducted by Kjølholt et al. (2018) found that several other preservatives such as **lactic acid**, **potassium sorbate**, **formic acid**, and **benzyl alcohol** play a supplementary yet important role in detergent formulations. Among these, benzyl alcohol stands out for its relatively high use concentration (0.5 – 1.0%) and presence in multi-preservative blends. Based on this, and the fact that benzyl alcohol is also a well-known sensitizer it was prioritized for analysis in the purchased cleaning and washing products.

Lastly, **IPBC** and **sodium pyrithione** were also considered as candidates for analysis in the purchased cleaning and washing products. This was based on their frequency of use in the selected product types (data from The Danish Consumer Council THINK Chemicals – see TABLE 2-21) and the results of the initial risk assessment. Due to high costs associated with the analysis of the two substances they were not selected though.

“Low-risk” active substances (listed on Annex I to the BPR) like potassium sorbate and sodium benzoate were not prioritized for analysis in the purchased cleaning and washing products. Also, high volume substances like phenoxyethanol, were not considered relevant candidates if they are not classified with severe health hazards as defined in this project.

In conclusion, the following preservatives were considered to be the main in-can preservatives of interest and therefore singled out and selected as targeted preservatives for analysis in the purchased cleaning and washing products:

- Isothiazolinones BIT, MIT and OIT
- benzyl alcohol

2.7.2 Selection of products

Selection criteria were developed for the selection of products for the purchase and chemical analyses. The criteria are to reflect that focus is on products that Danish consumers are exposed to and that are representative of Danish consumers' purchases.

Since reliable information about the distribution of shops, where consumers buy detergents, could not be identified in this survey, it was decided in cooperation with the EPA that approximately 60% of the products should be bought in physical stores in Denmark,²⁰ while the remaining 40% were purchased from webshops based in the EU as well as outside the EU (20% each).

The criteria for selection of products are:

- Presence of labelled hazardous preservatives (i.e. with human health hazard properties)
- Liquid formulations (having a higher demand for preservation)
- High-use product types that commonly contain preservatives
- High likelihood for dermal and/or inhalation exposure
- High use frequency/prolonged exposure during use
- Indoor use

Based on the criteria listed above, the product types as listed and justified in TABLE 2-25 are prioritised and products from these categories are purchased for chemical analysis in this project. Additionally, it was in cooperation with the EPA discussed that a few products without labelled hazardous preservatives could be purchased and included in the chemical analysis program due to the following reasons:

- In some cases, preservatives may not be labelled, since the preservative may not actively be added to the product but can originate from preservation of raw materials used in the product.
- While labels and ingredients list can be read from products in physical stores, information on ingredients and thus also on preservatives is often not available for products at online webshops (even though it should be).
- There is a certain interest for investigating whether products promoted as "hypoallergenic" are free of potentially sensitising substances.

Glass cleaner products were not selected for phase 2 although these products have shown to contain preservatives to a high extent. According to data from The Danish Consumer Council THINK Chemicals 40 out of a total of 42 products in this category contain ethanol. The intended function of ethanol in this product type is not preservation though. Instead, it is selected for its properties as a fast-evaporating solvent (a basic need for this kind of product).

Concerning the liquid laundry detergents only the variant intended for fine laundry / wool / silk was selected as product type for phase 2. This is reasoned by the consideration that while possible skin exposure during use is limited to (more or less) the step of loading of the washing machine (i.e. during handling of the container with the liquid washing detergent) exposure by use as hand wash of fine laundry, wool and silk may also be a possible exposure route for the variant of laundry detergent intended for fine laundry / wool / silk.

A summary of the purchased products, including product type, number of products and type of shop is available in TABLE 2-26 below.

²⁰ Including their online webshops.

TABLE 2-25. Product types selected for chemical analysis, justification for their selection and targeted preservatives.

Product Type	Justification for selection	Targeted preservatives in chemical analysis
Dishwashing - Hand dishwashing detergent	Presence of labelled hazardous preservatives²¹: • Benzisothiazolinone,(BIT) • Methylisothiazolinone (MIT) • Laurylamine dipropylenediamine, • 2-bromo-2-nitropropane-1,3-diol (Bronopol), High percentage containing preservatives (65%)²⁰ High likelihood for dermal exposure High use frequency/prolonged exposure during use High-use product type (A.I.S.E. data)	Benzisothiazolinone,(BIT) Methylisothiazolinone (MIT) (Benzyl Alcohol)
Laundry - Delicate / wool / silk	Presence of labelled hazardous preservatives²¹: • Benzisothiazolinone,(BIT) • Methylisothiazolinone (MIT) • Octylisothiazolinone (OIT) • (Sodium pyrithione) High percentage containing preservatives (78%) High likelihood for dermal exposure (handwashing of delicate textiles) High-use product type (A.I.S.E. data)	Benzisothiazolinone,(BIT) Methylisothiazolinone (MIT) Octylisothiazolinone (OIT) (Benzyl Alcohol)
Cleaning - All-purpose cleaning	Presence of labelled hazardous preservatives²¹: • Benzisothiazolinone,(BIT) • Methylisothiazolinone (MIT) • (Sodium pyrithione) High percentage containing preservatives (66%) High likelihood for dermal exposure High use frequency/prolonged exposure during use High-use product type (A.I.S.E. data)	Benzisothiazolinone,(BIT) Methylisothiazolinone (MIT) (Benzyl Alcohol)
Cleaning - Cleaning wipes (soaked in liquid detergent solution)	Presence of labelled hazardous preservatives²¹: • Benzisothiazolinone,(BIT) • Methylisothiazolinone (MIT) • Octylisothiazolinone (OIT) • Didecylidmonium chloride (DDAC) • DMDM hydantoin, • Methylparaben, • Iodopropynyl butylcarbamate (IPBC) • 2-bromo-2-nitropropane-1,3-diol (Bronopol) High percentage containing preservatives (93%)	Benzisothiazolinone,(BIT) Methylisothiazolinone (MIT) Octylisothiazolinone (OIT) (Benzyl Alcohol)

²¹ Data from The Danish Consumer Council THINK Chemicals.

Product Type	Justification for selection	Targeted preservatives in chemical analysis
Cleaning - scouring cream*	High likelihood for dermal exposure Presence of labelled hazardous preservatives²¹: - Sodium pyrithione - Laurylamine dipropylenediamine High percentage containing preservatives (89%) High likelihood for dermal exposure	Benzisothiazolinone,(BIT) Methylisothiazolinone (MIT)
Cleaning - Bathroom / kitchen / descaling	Presence of labelled hazardous preservatives²¹: - Benzisothiazolinone (BIT) - Dicapryl/dicaprylyl dimonium chloride - Laurylamine dipropylenediamine - Sodium pyrithione (Medium percentage containing preservatives (40%)) High likelihood for dermal and inhalation exposure	Benzisothiazolinone,(BIT) Methylisothiazolinone (MIT) (Benzyl Alcohol)

*Note that scouring products comprise both creams/liquids and powder. Hazardous preservatives have only been identified in liquid products in the database by The Danish Consumer Council THINK Chemicals.

TABLE 2-26. Summary of purchased products for chemical analysis.

Product Type	Number bought in physical/online stores in DK	Number bought in online stores in EU	Number bought in online stores in non-EU
Cleaning – all-purpose	5	2	2
Cleaning - Bathroom/kitchen/descaling	5	3	2
Cleaning - scouring cream	5	3	1
Cleaning wipes	5	2	2
Dishwashing - Hand dishwashing	7	2	1
Laundry - Delicate/wool/silk	3	3	NA
In total	30	15	8

3. Chemical analysis of selected products

3.1 Analysis program of preservatives in selected products

Chemical analyses of sample products have been conducted by Eurofins.

The following section contains a summary of the methods used for analysis of selected isothiazolinones and benzyl alcohol.

For the analysis of isothiazolinones, the material sample was analysed directly using ultra-high-performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry (UHPLC-QTOF-MS), employing electrospray ionization in positive mode. The analysis was performed in accordance with ISO 17025. A calibration curve was established to cover the analytical range. If the measured concentration exceeded this range, the sample was diluted accordingly. Additionally, individual dilutions of the relevant compounds were prepared and used as controls to ensure analytical accuracy. Each sample was analysed in duplicate. A method blank and a solvent control were analysed together with the samples. The method blank consisted of extraction solvent treated exactly like a sample, allowing identification of any contamination originating from reagents or handling.

The analytical uncertainty is estimated to be 20% (RSD, relative standard deviation), and the methods are not accredited.

The LOQ (limit of quantification) values are as follows:

- 0.01 mg/kg for MIT (Methylisothiazolinone), CIT (Chloromethylisothiazolinone), and BBIT (2-n-butyl-benzo[d]isothiazol-3-one)
- 0.1 mg/kg for BIT (Benzisothiazolinone) and OIT (Octylisothiazolinone)

For the analysis of benzyl alcohol, a method applicable for determining the content of various organic components in materials was used. The sample was dissolved or extracted using dichloromethane and subsequently analysed directly by gas chromatography coupled with mass spectrometry (GC/MS).

The method is typically employed for materials that do not fully dissolve in dichloromethane or for components that partition into the aqueous phase. A calibration curve was established to cover the analytical range of 0.1–25 µg/mL. Each sample was analysed in duplicate, and a spike recovery test was included. In case the measured concentration fell outside this range, the sample was diluted accordingly.

The LOQ for benzyl alcohol is 1 mg/kg, and the LOD is estimated to be approximately three times lower. The analytical uncertainty is 20% (RSD, relative standard deviation), and a method blank and solvent control were analysed together with the samples to verify the absence of contamination. The method was performed in accordance with ISO 17025 and is not accredited.

All analytes were quantified as true double determinations, and the concentration in each product is reported as average concentration of the two samples analysed from each product, unless something else is stated.

3.2 Measured concentrations

In this project, a total of 53 products has been analysed. All products have been analysed for MIT and BIT regardless of their indication on the product label or not, because stakeholder

information indicated that MIT and possibly also BIT could be present in the products without being labelled due to their use as preservatives in the raw materials.

Additionally, selected products have been analysed for BBIT, OIT, CIT and benzyl alcohol, because of the indicated content of these preservatives in the products (declared on the products and/or informed in connection with online purchase). TABLE 3-1 provides an overview of the number of products analysed, number of detections, concentrations and applicable limit values. All six analysed substances were found above the quantification limits during chemical analysis.

In the following subsections, more detailed information about concentrations will be provided per substance, product group and region of origin and detected contents will be compared to labelled ingredients. A table with all analytical results is provided in Appendix 3.

TABLE 3-1. Number (n) of products analysed for each substance, number of products in which the substances were detected, concentrations, and number of products with concentrations above applicable limit values.

Substance	n analysed	n detected (detection frequency)	Median concentration (min. – max.) ¹ (mg/kg)	Limit ² (mg/kg)	n > limit ³ (n > LV %)
BIT	53	14 (26%)	11.25 (0.11 - 74)	360	0 (0%)
BBIT	1	1 (100%)	0.10	10,000	0 (0%)
MIT	53	26 (49%)	0.46 (0.013 - 190)	15	7 (13%)
OIT	3	3 (100%)	0.71 (0.56 - 1.15)	15	0 (0%)
CIT	11	5 (45%)	1.5 (0.01 - 28)	10,000	0 (0%)
Benzyl alcohol	6	6 (100%)	75.5 (1.8 – 5,550)	10,000	0 (0%)

¹ Only for products in which the substance was detected (not for all products that were analysed).

² For more information about applicable limit values, please refer to TABLE 3-11.

³ Number of products with concentrations above limit value out of number of products analysed.

3.2.1 1,2-benzisothiazol-3(2H)-one (BIT)

BIT has been detected in 14 out of 53 analysed products. In comparison, 23 of the products had a labelled content of BIT according to physical label and 24 according to online labelling information provided. Concentrations ranged from <0.1 mg/kg up to 74 mg/kg. An overview of detected BIT concentrations is provided in TABLE 3-2. The highest concentration of 74 mg/kg has been detected in the floor cleaning spray purchased in Denmark and belonging to cleaning – bathroom/kitchen/descaling product group.

Obtained results indicate products purchased in Denmark display wider concentration range and higher maximum levels, which can be due to the higher number of products analysed from Denmark. This is particularly the case for all-purpose cleaners, bathroom and kitchen descalers, as well as scouring creams. On the other hand, products purchased in EU countries other than Denmark have somewhat lower concentrations across analysed product groups, except for cleaning wipes, where higher concentration levels have been observed compared to cleaning wipes purchased in Denmark.

None of the obtained concentrations are above the specific concentration limit of 360 ppm (360 mg/kg) resulting in classification of the detergent in question as Skin Sens. 1A; H317 according to CLP. Importantly, the specific concentration limit of 360 ppm equals the future *de facto* limit for content of BIT in detergent products for consumer use (applicable by 01/10/2026) as stated in the EU approval of the preservative¹⁴.

However, it is important to note that due to the low number of samples, it is difficult to draw any definitive conclusions on the future compliance of preservative concentration levels in consumer products. (Specific) concentration limit and selected restrictions for use in treated articles for the preservatives in question are listed in TABLE 3-11.

TABLE 3-2. Ranges (min - max) of average concentrations (c) for each duplicate determinations per product for BIT per product group, by region of purchase and number of products (n).

Product group	DK		EU		Non-EU	
	c, mg/kg	n	c, mg/kg	n	c, mg/kg	n
Cleaning – all-purpose	<0.1–18.50	5	<0.1	2	<0.1	2
Cleaning - Bathroom/kitchen/descaling	<0.1–74	5	<0.1	3	<0.1	2
Cleaning - scouring cream	<0.1–45	5	<0.1–0.11	3	<0.1	1
Cleaning wipes	<0.1–14	5	9.00–17.50	2	<0.1	2
Dishwashing - Hand dishwashing	<0.1–0.23	7	<0.1–0.15	2	<0.1	1
Laundry - Delicate/wool/silk	<0.1	3	<0.1	3	NA	NA

Abbreviations: NA – not analysed; EU – European Union, DK – Denmark

3.2.2 2-Butyl-1,2-benzothiazol-3(2H)-one (BBIT)

Only one product was analysed for BBIT (from the group of descalers and cleaning products for bathroom and kitchen). This product was purchased in Germany with the label indicating that the product contains benzisothiazolinone, and BBIT. BBIT was detected at a concentration of 0.1 mg/kg (TABLE 3-3). BBIT is allowed for use as in-can preservative for treated articles. Due to the low number of samples, it is difficult to draw any definitive conclusions.

TABLE 3-3. Ranges (min - max) of average concentrations (c) for each duplicate determinations per product for BBIT per product group, by region of purchase and number of products (n).

Product group	DK		EU		Non-EU	
	c, mg/kg	n	c, mg/kg	n	c, mg/kg	n
Cleaning - Bathroom/kitchen/descaling	NA	NA	0.10	1	NA	NA

Abbreviations: NA – not analysed; EU – European Union, DK – Denmark

3.2.3 2-Methyl-4-isothiazolin-3-on (MIT)

MIT has been detected in 26 out of 53 analysed products. In comparison, 18 of the products had a labelled content of MIT according to physical labels and 28 following online labelling information provided. Concentrations ranged from <0.1 mg/kg up to 190 mg/kg. An overview of detected MIT concentrations is provided in TABLE 3-4. The highest concentration has been observed in the dishwashing product group, in a product purchased in Germany.

Obtained results show detected concentrations vary both across product groups as well as between the regions where it was purchased.

In analysed all-purpose cleaners, concentration levels are low regardless of from which region the product was purchased, compared to concentrations observed in other cleaning product groups, such as bathroom and kitchen descalers, scouring creams and cleaning wipes. Two cleaning product groups (bathroom and kitchen descalers and scouring cream) show higher maximum concentrations in products purchased in Denmark compared to products purchased in EU countries other than Denmark. Regarding cleaning wipes, MIT was detected above limit of quantification (LOQ) in all products purchased in Denmark and <LOQ in all products purchased in other EU countries.

In hand dishwashing products, concentrations are generally higher in products purchased in the EU, with one product standing out with a significantly higher average concentration of 190 mg/kg. Seven products contained MIT despite the label (either physical or online) did not indicate its presence. Five of these products were purchased outside the EU while two originated from Denmark. One of these products, a scouring cream bought in Denmark, had a content of MIT of 52 mg/kg - more than three times the specific concentration limit of 15 ppm (15 mg/kg) resulting in classification of the product as Skin Sens. 1A; H317 according to CLP. Three of the products had a low content (0.014 - 0.039 mg/kg) and the remaining three products had a somewhat higher content (0.30 – 0.57 mg/kg), but still below the EUH208 elicitation threshold of 1.5 ppm (1.5 mg/kg) and do not by themselves require EUH208 labelling according to CLP.

Seven products in total contain MIT above the specific concentration limit of 15 ppm (15 mg/kg) resulting in classification of the detergent in question as Skin Sens. 1A; H317 according to CLP. It is important to note that the specific concentration limit of 15 ppm equals the future *de facto* limit for content of MIT in detergent products for consumer use (applicable by 01/02/2027) as stated in the EU approval of the preservative¹⁴. The number of products per product group exceeding this future concentration limit is provided in TABLE 3-5. It is important to note that due to the low number of samples in this study, it is difficult to draw any definitive conclusions for all products on the market based on this finding.

TABLE 3-4: Ranges (min - max) of average concentrations (c) for each duplicate determinations per product for MIT per product group, by region of purchase and number of products (n).

Product group	DK		EU		non-EU	
	c, mg/kg	n	c, mg/kg	n	c, mg/kg	n
Cleaning – all-purpose	<0.01– 0.058	5	<0.01– 0.11	2	<0.01– 0.014	2
Cleaning - Bathroom/kitchen/descaling	<0.01–55	5	<0.01– 0.052	3	<0.01– 0.57	2
Cleaning - scouring cream	<0.01–52	5	<0.01–21	3	0.30	1
Cleaning wipes	<0.01–42	5	<0.01	2	<0.01– 0.04	2
Dishwashing - Hand dishwashing	<0.01–27	7	<0.01–190	2	0.35	1
Laundry - Delicate/wool/silk	<0.01– 77.5	3	<0.01– 4.45	3	NA	NA

Abbreviations: NA – not analysed; EU – European Union, DK – Denmark

TABLE 3-5. Number of products exceeding the future (*de facto*) concentration limit for MIT in detergents for consumer use.

Product group	DK	EU	non-EU	Total exceeding
Cleaning – all-purpose	0	0	0	0
Cleaning - Bathroom/kitchen/descaling	1	0	0	1
Cleaning - scouring cream	1	1	0	2
Cleaning wipes	1	0	0	1
Dishwashing - Hand dishwashing	1	1	0	2
Laundry - Delicate/wool/silk	1	0	0	1
Total	5	2	0	7

3.2.4 2-Octyl-1,2-thiazol-3(2H)-one (OIT)

OIT has been detected in three out of three analysed products. Concentrations ranged from <0.1 to 1.15 mg/kg. Two products have been purchased in Denmark and one in Germany. OIT is allowed for use as in-can preservative for treated articles.

TABLE 3-6. Ranges (min - max) of average concentrations (c) for each duplicate determinations per product for OIT per product group, by region of purchase and number of products (n).

Product group	DK		EU		Non-EU	
	c, mg/kg	n	c, mg/kg	n	c, mg/kg	n
Cleaning wipes	NA	NA	0.56	1	NA	NA
Dishwashing - Hand dishwashing	<0.1–1.15	2	NA	NA	NA	NA

Abbreviations: NA – not analysed; EU – European Union, DK – Denmark

3.2.5 5-Chloro-2-methyl-4-isothiazolin (CIT) (and C(M)IT/MIT (3:1))

CIT has been detected in five out of 11 analysed products. Concentrations ranged from <0.01 mg/kg up to 28 mg/kg. An overview of detected CIT concentrations is provided in TABLE 3-7. The highest concentration of 28 mg/kg has been detected in a bathroom cleaner product purchased in Denmark.

Concentrations of CIT in analysed products are generally low compared with for example the detected MIT concentrations in this study. Most of the analysed cleaning products show values <LOQ, with cleaning wipes reaching up to 4.9 mg/kg, and hand dishwashing detergents up to 1.5 mg/kg.

In February 2025 European Commission decided not to approve⁶ CIT for use as in-can preservative for treated articles, it should therefore not occur in these kinds of articles in the future²². This applies unless it's added as part of the active substance "C(M)IT/MIT (3:1)" which is a mixture of CIT (CAS Nr. 26172-55-4) and MIT (CAS Nr. 2682-20-4) in the ratio 3 to 1 and CAS Nr. 55965-84-9 for the mixture.

²² In case a non-approval decision is adopted, articles which were treated or incorporated a biocidal product containing that active substance should no longer be placed on the market as from 180 days from that decision.

For C(M)IT/MIT (3:1), a specific concentration limit of 15 ppm (15 mg/kg) resulting in classification of the detergent in question as Skin Sens. 1A; H317 according to CLP, is applicable in line with the case for MIT. It is important to note, that this specific concentration limit of 15 ppm equals the in force *de facto* limit for content of C(M)IT/MIT (3:1) in detergent products for consumer use, as stated in the EU approval of the preservative¹⁰. In respect to the physical label eight of the 11 products analysed for CIT have a labelled content of either CIT or C(M)IT/MIT (3:1) (3 listed CIT on the label and 5 listed C(M)IT/MIT (3:1)).

Both CIT and MIT were detected in three out of the five products displaying content of C(M)IT/MIT (3:1) on the physical label. For the two remaining products in question neither CIT nor MIT was detected indicating inconsistent labelling. The products were bought in Denmark and EU. Available online information also stated presence of the two in-can preservatives.

The number of products per product group in which CIT has been detected is provided in TABLE 3-7. It is important to note that due to the low number of samples analysed in this study, it is difficult to draw any definitive conclusions.

TABLE 3-7. Ranges (min - max) of average concentrations (c) for each duplicate determinations per product for CIT per product group, by region of purchase and number of products (n).

Product group	DK		EU		Non-EU	
	c, mg/kg	n	c, mg/kg	n	c, mg/kg	n
Cleaning – all-purpose	<0.01	2	NA	NA	NA	NA
Cleaning - Bathroom/kitchen/descaling	<0.01–28	2	<0.01	1	0.01	1
Cleaning - scouring cream	NA	NA	<0.01	1	NA	NA
Cleaning wipes	<0.01–4.6	2	NA	NA	NA	NA
Dishwashing - Hand dishwashing	1.3	1	NA	NA	NA	NA
Laundry - Delicate/wool/silk	NA	NA	0.07	1	NA	NA

Abbreviations: NA – not analysed; EU – European Union, DK – Denmark

3.2.6 Benzyl alcohol

Benzyl alcohol has been detected in all six products tested. Concentrations ranged from 1.8 to 5,500 mg/kg. The highest concentration has been observed in two laundry products purchased in Denmark. An overview of detected benzyl alcohol average concentrations is provided in TABLE 3-8. Although some products contain significantly higher concentrations compared to the isothiazolinones, it has to be kept in mind that the quantified concentrations have to be compared to the generic concentration limit of $\geq 10,000$ mg/kg ($\geq 1.0\%$) resulting in a classification of the detergent product as “Skin Sens 1; H317” according to CLP). It is also important to note that due to the low number of samples analysed in this study, it is difficult to draw any definitive conclusions.

TABLE 3-8. Ranges (min - max) of average concentrations (c) for each duplicate determinations per product for benzyl alcohol per product group, by region of purchase and number of products (n).

Product group	DK		EU		Non-EU	
	c, mg/kg	n	c, mg/kg	n	c, mg/kg	n
Cleaning – all-purpose	110	1	NA	NA	NA	NA
Cleaning - Bathroom/kitchen/descaling	2.7	1	51	1	2.0	1
Cleaning - scouring cream	NA	NA	NA	NA	NA	NA
Cleaning wipes	NA	NA	NA	NA	NA	NA
Dishwashing - Hand dishwashing	NA	NA	NA	NA	NA	NA
Laundry - Delicate/wool/silk	5,550	2	NA	NA	NA	NA

Abbreviations: NA – not analysed; EU – European Union, DK – Denmark

3.3 Summary of analytical results by product group

Comparing the detections in the different product groups, the results show that products from all of the analysed product categories commonly contain (some of) the investigated preservative. TABLE 3-9 presents the analytical results per category of consumer products.

TABLE 3-9. Summary by product category.

Product group (no. of products analysed in the category)	Preservatives detected (Number of products with concentrations > LOQ) ¹	Main findings
Cleaning – all- purpose (9 products)	BIT (1 product) MIT (3 products) Benzyl alcohol (1 product)	Generally low levels: no exceedances recorded.
Bathroom / kitchen / descaling (10 products)	BIT (2 products) BBIT (1 product) MIT (4 products) CIT (2 products) Benzyl alcohol (3 products)	High content of MIT and BIT in one specific product (DK) triggering CLP Skin Sens. 1A classification
Scouring cream (8 products)	BIT (4 products) MIT (5 products)	High content of MIT in 2 products (DK+EU) triggering CLP Skin Sens. 1A classification One of these products also has a rather high content of BIT (45 mg/kg).
Cleaning wipes (9 products)	BIT (3 products) MIT (5 products) OIT (1 product) CIT (1 product)	High content of MIT in 1 product (DK) triggering CLP Skin Sens. 1A classification.
Hand-dishwashing liquids (10 products)	BIT (4 products) MIT (6 products) OIT (2 products) CIT (1 product)	High content of MIT in 2 products (DK+EU) triggering CLP Skin Sens. 1A classification The maximum (190 mg kg ⁻¹) was in a hand- dishwashing liquid purchased in Germany (EU). Content of isothiazolinones in remaining products generally at low level.
Laundry for delicate fabrics (6 products)	MIT (3 products) CIT (1 product) Benzyl alcohol (2 products)	High content of MIT in 1 product (DK) triggering CLP Skin Sens. 1A classification. High content of benzyl alcohol in 2 products triggering EUH208 according to CLP.

¹ Please note that several products contain more than one preservative, meaning that the sum of products in column 2 can exceed the number of products analysed.

3.4 Discussion of analytical results

Data from the Danish consumer council show that next to phenoxyethanol and ethanol, BIT and MIT are by far the most extensively used in-can preservatives in washing and cleaning products, while OIT also has a rather high frequency of use, especially in liquid laundry products (see TABLE 2-21).

MIT is the predominant preservative found in the cleaning products included in this project (detection frequency, df, of 49%) and is responsible for all exceedances of the future *de facto* limit (= 15 mg/kg (15 ppm), applicable by 01/02/2027). BIT occurs less often (df of 26%) but can reach rather high levels in some Danish cleaners. None of the found concentrations of BIT are above the specific concentration limit of 360 ppm (360 mg/kg) resulting in classification of the detergent in question as Skin Sens. 1A; H317 according to CLP, but in two cases the measured content is above the level triggering EUH208. It is noted that the detection frequencies are not representative for cleaning products in general, as the products partially have been selected for analysis based on their labelled content of the mentioned preservatives.

In the study conducted by Kjølholt et al. (2018) benzyl alcohol was noted for its relatively high concentration (0.5–1.0%) and frequent inclusion in multi-preservative blends. These findings were corroborated by the analyses conducted in this project. In the two products with the highest concentrations of benzyl alcohol, the average concentration was 5550 mg/kg (0.56%).

According to information reported in the literature and obtained from preservative suppliers, the use of multiple in-can preservatives in cleaning and washing products is frequent practice. Among the 53 products analysed, 29 contained two or more preservatives, with two products containing as many as four different preservatives. The most common combination of preservatives in the analysed products are MIT and BIT, which are found together in 16 products in this project. When comparing the analytical findings by region of purchase (DK vs. EU vs. Non-EU), the Danish (DK) samples show the widest ranges and highest maxima for almost every substance, although the single highest MIT concentration originates from another EU country (Germany). All seven MIT exceedances of the future *de facto* limit of 15 mg/kg (applicable by 01/02/2027) were found in DK or EU products (5 DK products; 2 EU products); none were found in non-EU. It is not possible to conclude on a general trend from these findings, because a higher number of products bought in Denmark (30 products) compared to the other regions of purchase (15 in EU, eight in non-EU), were included in the project.

Only a few non-EU products were included in the analyses. The analytical results indicate the levels of tested active substances were typically low (< 0.01 mg/kg for CIT in several product groups and ≤ 0.014 mg/kg for MIT in all-purpose cleaners).

3.4.1 Comparison of labelled and measured preservative content

This section delves into detailed analysis and comparison of the actual labelled information against what would be required according to CLP based on the measured levels of preservatives. Important to note is that preservatives not added intentionally (i.e. impurities) do not have to be displayed on the labels and can therefore be identified by chemical analysis even though not appearing on the label. Likewise, potential formulation or supply-chain changes, may also contribute to apparent mismatches between labels and analytical results. The detailed outcome of the analysis is provided in Appendix 4.

Article 48 of the CLP Regulation contains provisions concerning advertisement for chemical products. More comprehensive requirements, hereunder in relation to online advertisement, will be introduced by the implementation of the revised CLP Regulation. Similar provisions are expected in the upcoming revision of the Detergent Regulation.

Eight of the products originate from non-EU countries. For these products a thorough label evaluation has not been conducted as they are not necessarily obliged to comply with EU regulations (CLP). For the remaining products, the comparison shows that for 24 out of the 45 analysed products (53%), inconsistencies in the labelling occur; for 7 out of the 45 analysed products (16%), possible inconsistencies in the labelling occur, whereas for 14 out of the 45 analysed products (31%), the labelling is considered to be correct. Main inconsistencies are:

- The preservatives displayed on the physical label do not match those included in online labelling information provided during purchase (16 out of 53 products; 30%);
- Measured levels of preservatives trigger labelling of the product as H317 or EUH208 according to CLP which is not reflected on the actual label (and vice versa) (12 out of 53 products, 23%), and
- Preservatives are labelled on the product but not found in the chemical analysis (13 out of 53 products, 25%).

Furthermore, the preservative MIT could be quantified in seven products, even though its presence was not labelled. As stated above, preservatives not added intentionally (i.e. impurities) do not necessarily have to be displayed on the labels, but depending on their concentration, their presence may still pose a risk to consumers.

In one of the seven products, the concentration of MIT was 52 mg/kg - more than three times the specific concentration limit of 15 ppm (15 mg/kg) resulting in classification as Skin Sens. 1A; H317 according to CLP (the label of the product lists the EUH208-sentence, based on the content of BIT only).

Seven products in total contain MIT above the specific concentration limit of 15 ppm (15 mg/kg) resulting in classification of the detergent in question as Skin Sens. 1A; H317 according to CLP. Concerning five of these products, H317 was displayed on the label while two products had listed the EUH208-sentence (one due to the content of BIT).

TABLE 3-10 below summarizes the number of tested products, number of detections > LOQ, information concerning declaration of each preservative, and observed discrepancies per preservatives concerning declaration on the physical label vs. online (at the web shop during the moment of purchase).

TABLE 3-10. Number of products analysed, number of products analysed with concentrations > LOQ, labelling information per preservative and observed discrepancies regarding substances mentioned on the label vs. online.

Substance name	Number of products analysed	Number of products with concentrations > LOQ	Observed discrepancies regarding substances mentioned on the label vs. online
BIT	53	14	23 products listing BIT (web/online) 24 products listing BIT on label 8 products with discrepancies (online vs. label)
BBIT	1	1	1 product listing BBIT on label but not on web/online
MIT	53	26	28 products listing MIT (web/online) 18/23* products listing MIT on label 5 products with discrepancies (online vs. label) 7 products with undeclared content of MIT
OIT	3	3	3 products listing OIT (web/online) 3 products listing OIT on label
CIT	11	5	8 products listing CIT (web/online) 3 products listing CIT on label 5 products listing C(M)IT/MIT (3:1) on label 2 products with discrepancies (online vs. label)
Benzyl alcohol	6	6	3 products listing benzyl alcohol (web/online) 2 products listing benzyl alcohol on label 1 product with discrepancies (online vs. label)

*Including the labelling of C(M)IT/MIT (3:1).

3.4.2 Implications for consumer health

When, in the future, the Review Programme¹¹ (i.e. the EU work programme for the examination of existing biocidal active substances contained in biocidal products) is complete, any biocidal product placed on the market in the EU/EEA will require authorisation according to the rules of the BPR before it is marketed. At present this only applies for biocidal products containing approved active substances, whereas for biocidal products containing active substances still under review transitional measures apply. The transitional provisions laid down in Article 89 of the BPR allow biocidal products containing an active substance included in the Review Programme (for a given product type) to be made available on the market and used, subject to national rules, until three years after the date of their approval (shorter timeframes apply in case of non-approval).

Active substances contained in a biocidal product must be approved under the BPR. The approval and renewal of active substances take place at Union level; the European Commission adopts the approval decisions following the Biocidal Products Committee (BPC), which issues opinions as part of the process coordinated by ECHA and involving experts appointed by the Member States. Both OIT and benzyl alcohol are currently in this process for in-can preservation (product type 6).

BIT, MIT and C(M)IT/MIT (3:1) have been through the EU approval process and the use of these substances as in-can preservatives has been approved at Union level following BPC opinions and a risk assessment. For each of these preservatives, the Commission approval decisions include a concentration condition (*de facto* limit) for maximum concentration in mixtures placed on the market for the general public (non-professional use) due to their skin sensitising properties. Based on the BPC opinions and underlying risk assessments, intended consumer uses of any cleaning products containing preservatives at or below the *de facto* limits are not expected to pose unacceptable health risks.

For C(M)IT/MIT (3:1) the *de facto* limit is 15 ppm and it is already in place, but for MIT and BIT the levels have not yet entered into force. According to the approval decisions for MIT and BIT published in May and June 2025, the *de facto* limit applicable for MIT is 15 ppm (applicable from 1 February 2027) and for BIT the corresponding limit is 360 ppm (applicable from 1 October 2026). However, combined exposure across products is not addressed by these limits. This may be an issue as further literature, stakeholder feedback, and consumer product data indicate widespread use and occurrence of both isothiazolinones and benzyl alcohol in cleaning products. Although MIT usage has declined due to reformulations and consumer pressure, BIT usage has increased, potentially shifting the allergenic risk from cosmetics to cleaning products (King et al., 2021).

In relation to the above, it is crucial to highlight the concerns raised by one of the stakeholders, Asthma Allergy Denmark, regarding the limited availability of in-can preservatives with acceptable health hazard profiles. Many of the standard preservatives used by industry in consumer products today do have some kind of hazard phrase and many of them are classified as skin sensitizing. There is no recognised risk assessment model for sensitisation to chemical substances available at present. A Swiss article from 2018 attempted to estimate the dermal exposure to isothiazolinones among the population and from this assess the risk of allergy development (Garcia-Hidalgo et al. 2018). The Qualitative Risk Assessment model used by Garcia-Hidalgo et al (2018) is called QRA, has previously been assessed by the SCCS (Scientific Committee on Consumer Safety). QRA was developed for fragrances and not for preservatives, but Garcia-Hidalgo concludes the same risk assessment principles applies for these two groups of chemicals. Due to the SCCS opinions on QRA, an international initiative to improve QRA generated the updated version called QRA2. In 2018 SCCS evaluated also QRA2 and highlighted in their opinion that “it is not yet possible to use the QRA2 to establish a concentration at which induction of sensitisation of fragrance is unlikely to

occur. Several aspects of the methodology are not clear and the scientific rationale behind the methodology needs to be better described” (SCCS, 2018).

At present, there is no officially fully recognised method for risk assessment of risk from sensitising substances. This and the fact that many of the consumer products tested in this project contains at least two and up to four different preservatives raised the question on combined exposure. To this date, it is not possible to perform a combined risk assessment, not even for isothiazolinones, which are structurally related, as it is not clear whether their effects are additive. The Danish Knowledge Center for Allergy provided expert knowledge to this project, in particular on the risk for cross sensitisation of isothiazolinones. In a written response, Dr. Rebekka Søgaard, Dr. Jacob Ferløv Baselius Schwensen and Professor Jeanne Duus Johansen at the Danish Knowledge Center for Allergy conclude concomitant exposures to multiple isothiazolinones are common, but that cross-reactivity between different isothiazolinones have only been studied in a few experimental studies and there is a lack of human data in this area. The researchers present data from several clinical studies indicating different overlapping reactions to different combinations of isothiazolinones. However, they conclude that it is debatable whether the overlapping reactions are due to cross-reactivity or simultaneous exposure. Overall, cross-reactivity between certain isothiazolinones, particularly among structurally related compounds, remains a possibility; however, most data indicate that co-exposure is more influential in the observed clinical effects.

Another significant issue related to consumer health raised in this project is incorrect or inconsistent labelling. Consumers face challenges in navigating and avoiding exposure to specific in-can preservatives, which is particular important in case they have been sensitized. This concern is heightened in online shopping, where discrepancies between online declarations of preservatives and actual product labels are common. Additionally, the presence of undeclared MIT content in products is problematic for users who have been sensitized to this substance, even if the content is below the limit requiring CLP labelling with EUH208 (i.e., <1.5 ppm).

Analytical results have been compared with established limit values. The concentrations of in-can preservatives in analysed products were compared to specific concentration limits according to CLP and restrictions for use in treated articles. TABLE 3-11 below displays selected limits and restrictions for substances in focus.

TABLE 3-11. Selected concentration limits and restrictions for substances in focus.

Substance	Applicable limits	Restrictions (treated articles)
	(Specific) concentration limit (CLP)	
BIT	Skin Sens. 1A; H317: C ≥ 0.036% (360 ppm) EUH208: C ≥ 0.0036% (36 ppm)* ATP21 (shall apply from 1 September 2025)	Detergents, consumer use: C < 0.0036% (360 ppm) Applicable: 1 October 2026
MIT	Skin Sens. 1A; H317: C ≥ 0.0015% (15 ppm) EUH208: C ≥ 0.00015% (1.5 ppm)* ATP13 (shall apply from 1 May 2020)	Detergents, consumer use: C < 0.0015% (15 ppm) Applicable: 1 February 2027
C(M)IT/MIT (3:1)	Skin Sens. 1A; H317: C ≥ 0.0015% (15 ppm) EUH208: C ≥ 0.00015% (1.5 ppm)* ATP13 (shall apply from 1 May 2020)	Detergents, consumer use: C < 0.0015% (15 ppm) Applicable: 1 July 2017
OIT	Skin Sens. 1A; H317: C ≥ 0.0015% (15 ppm) EUH208: C ≥ 0.00015% (1.5 ppm)* ATP15 (shall apply from 1 March 2022)	-
BBIT	Skin Sens. 1; H317: C ≥ 1% (10000 ppm)	-

Substance	Applicable limits	Restrictions (treated articles)
	(Specific) concentration limit (CLP)	
CIT	Skin Sens. 1; H317: C ≥ 1% (10000 ppm)	Non-approval decision published 21 February 2025
Benzyl alcohol	Skin Sens. 1B; H317: C ≥ 1% (10000 ppm) ATP21 (shall apply from 1 September 2025)	-

* According to note 1 to table 3.4.6 in the CLP Regulation sensitising substances with a specific concentration limit, the concentration limit for elicitation shall be set at a tenth of the specific concentration limit.

-: No restrictions.

4. Conclusions

The findings in this project show substantial variability in the occurrence, concentrations and labelling of in-can preservatives across consumer cleaning and washing products.

By substance, methylisothiazolinone (MIT) was detected in 26 of 53 products at concentrations up to 190 mg/kg. Seven products exceeded 15 mg/kg, a level that both triggers CLP Skin Sens. 1A classification (H317) and will not be permitted for consumer detergents after the applicable compliance date (01/02/2027). MIT was also found without declaration on seven product labels, including one product containing 52 mg/kg.

Benzisothiazolinone (BIT) was detected in 14 of 53 products at levels up to 74 mg/kg; although elevated in some cleaners, none exceeded the 360 mg/kg threshold for Skin Sens. 1A. Given BIT's increasing use with MIT decline, it would be relevant to track any potential upward trends in BIT use as in-can preservative in the future, associated EUH208 triggers as well as allergy incidences related to BIT.

Chloromethylisothiazolinone (CIT), including when as part of C(M)IT/MIT (3:1), was detected in 5 of 11 products at generally low levels (<0.01–28 mg/kg), and some products declared C(M)IT/MIT (3:1) without containing detectable concentrations of CIT or MIT, suggesting either labelling inconsistencies or formulation changes.

Octylisothiazolinone (OIT) was detected at low levels (≤ 1.6 mg/kg) in three products (two hand-dishwashing liquids and one cleaning wipe).

Butylbenzisothiazolinone (BBIT) was observed in a single bathroom/descaler sample at 0.10 mg/kg, precluding broader conclusions.

Benzyl alcohol was detected in all six targeted products, with high levels in two laundry products; these concentrations are consistent with EUH208 labelling but remain below the 1% threshold for H317 classification.

As the dates approach when several *de facto* limits take effect (applicable by 01/10/2026 (BIT), 01/02/2027 (MIT)), the analytical findings in this study indicate that some products currently available on the market for Danish consumer will exceed the future *de facto* limits. This applies especially for MIT in detergents. Unless changes are made to the products, the issue will persist.

When viewed **by product group**, the most frequent or critical findings occurred in hand-dishwashing liquids, scouring creams, bathroom/kitchen descenders, and cleaning wipes. The highest MIT concentration (190 mg/kg) was found in a hand-dishwashing liquid, while all-purpose cleaners generally contained low preservative levels, with no exceedances recorded. These findings support that preservatives are commonly found in liquid detergent products (or wipes with liquids) with a high potential for dermal consumer exposure

Regarding **geographical patterns**, samples from products purchased on the Danish market exhibited wider concentration ranges and higher maximum concentrations for most active substances than products purchased online from EU and non-EU markets. The single highest MIT concentration, however, was found in a product purchased in Germany. As Danish products were overrepresented in the sample set, these differences should not be considered representative of the wider market. Still, the results indicate that Danish/EU detergent products not *per se* are more compliant to the CLP Regulation than products imported from non-EU regions.

Labelling discrepancies were identified in 31 of 53 products. In some cases, preservatives were declared on the label but not detected analytically; in others, preservatives were detected

without being declared (for example, MIT in seven products). Such inconsistencies complicate avoidance strategies for consumers. Providing clear and reliable information on product labels is important for consumer health, especially for individuals already sensitized to specific preservatives. Addressing this will help sensitized individuals to receive accurate information about product content and make informed choices. Additionally, the findings in this project also show the need to improve labelling information for products bought online, as well as a need for aligning labelling information available online with information of the physical labels.

Multiple preservatives per product were common: 29 of 53 products contained two or more preservatives, and two products contained four active substances. The most frequent combination was MIT with BIT (16 products). Clinical evidence summarised by the Danish Knowledge Center for Allergy indicates overlapping reactions among isothiazolinones; whether this reflects cross-reactivity or concurrent exposure is unresolved. Overall, the Danish Knowledge Center for Allergy conclude that cross-reactivity between certain isothiazolinones cannot be excluded - especially between structurally related compounds, but most data indicates that simultaneous exposure plays a larger role in clinical practice. This is supported by several European surveys of eczema patients who have developed contact allergy primarily to MIT and BIT, as well as some older product analyses of MIT and BIT respectively. No validated methodology currently exists for assessing combined risk from co-present isothiazolinones. There is no officially recognised quantitative model to establish generic “safe” concentrations, suitable for preventing the induction of skin sensitisation. For some in-can preservatives that have been approved at Union level, like MIT, BIT and C(M)IT/MIT (3:1), the Commission approval decisions include several conditions for the placing on the market of treated articles, including a concentration condition (*de facto* limit) for mixtures placed on the market for the general public, set to manage risks arising from their hazardous skin sensitising properties.

As the scientific knowledge is limited whether cross-reactions can occur between substances with similar chemical structure, it could be considered if the use of different preservatives with similar chemical structure should be used in combination or if the combined use should be discouraged from a regulatory perspective.

The use of alternative preservatives with documented and more sustainable health characteristics would be valuable to phase out ingredients with sensitising properties in detergents products with common use within society.

It is noted that there are some **limitations** to the study, that have to be kept in mind alongside with the conclusion. These are market coverage, analytical coverage of substance in products as well as detection limits and quantification limits of the analytical methods. The market coverage was unbalanced by design (approximately 60% Denmark, 20% EU, and 20% non-EU), limiting generalisability across regions. Analytical coverage differed between substances; for some active substances (e.g., BBIT and OIT), analyses were performed only when declared on labels, resulting in fewer datapoints. Method detection and quantification limits, as well as potential formulation or supply-chain changes, may also contribute to apparent mismatches between labels and analytical results.

References

- A.I.S.E., Preservatives: Key biocidal ingredients to Preserve liquid detergents A call to secure their future availability, 2018.
- A.I.S.E., Activity and sustainability report 2016-17, 2016
- A.I.S.E., Activity and sustainability report 2017-18, 2017
- A.I.S.E., Activity and sustainability report 2018-19, 2018
- A.I.S.E., Activity and sustainability report 2019-20, 2019
- A.I.S.E., Compaction of Household Laundry Detergents, Fact sheet 2019, 2019a
- A.I.S.E., Activity and sustainability report 2020-21, 2020
- A.I.S.E., A.I.S.E.'s pan-European habits survey 2020, Key facts & figures, 2020a
- A.I.S.E., Activity and sustainability report 2021-22, 2021
- A.I.S.E., The Cleaning & Hygiene Products Industry report 2022-23, 2022
- A.I.S.E., The Detergents & Maintenance Products Industry n Facts & Figures, 2024
- A.I.S.E., Cleanliness & hygiene – Consumers' understanding and washing & cleaning habits at home, A.I.S.E.'s pan-European consumer habits and perceptions research, 2025
- Danish EPA, Mapping and environmental assessment of cleaning products for outdoor use, Survey of chemical substances in consumer products No. 192, April 2023
- (Clausen et al., 2020) Clausen PA, Frederiksen M, Sejbæk CS, Sørli JB, Hougaard KS, Frydendall KB, Carøe TK, Flachs EM, Meyer HW, Schlünssen V, Wolkoff P., Chemicals inhaled from spray cleaning and disinfection products and their respiratory effects. A comprehensive review., *Int J Hyg Environ Health* 2020;229:113592.
- Garcia-Hidalgo E, Sottas V, von Goetz N, et al (2017) Occurrence and concentrations of isothiazolinones in detergents and cosmetics in Switzerland. *Contact Dermatitis* 76:96–106. <https://doi.org/10.1111/cod.12700>.
- Havmose M, Thyssen JP, Zachariae C, Menné T, Johansen JD. The epidemic of contact allergy to methylisothiazolinone—An analysis of Danish consecutive patients patch tested between 2005 and 2019. *Contact Dermatitis*. 2021; 84:254–262. <https://doi.org/10.1111/cod.13717>
- Hofmann, M.A., GiménezArнау A., Aberer, W., BindslevJensen, C., Zuberbier, T., MI (2-methyl-4-isothiazolin-3-one) contained in detergents is not detectable in machine washed textiles, *Clin Transl Allergy* (2018) 8:1 <https://doi.org/10.1186/s13601-017-0187-2>
- Houle M-C, DeKoven JG, Atwater AR, et al (2025) North American Contact Dermatitis Group Patch Test Results: 2021–2022. *Dermatitis®*. <https://doi.org/10.1089/derm.2024.0474>
- King N, Latheef F, Wilkinson M. Trends in preservative allergy: Benzisothiazolinone emerges from the pack. *Contact Dermatitis*. 2021;85(6):637-642. doi: 10.1111/cod.13968
- Kjølholt et al., Kortlægning af konserveringsmidler i vaske- og rengøringsmidler Biocider i forbrugerprodukter (in english: *Mapping preservatives in detergents and cleaning products* biocides in consumer products), Miljøstyrelsen, 2018.
- Lanxess, Technical application bulletin Kalaguard® SB, Source: [Link](#), 2024
- Lehtonen and Sirén, Determination of Biocide-type Disinfectants in Water Condensates Originating from Cleaning Chemicals with Capillary Electrophoresis, *Anal. Bioanal. Chem. Res.*, Vol. 11, No. 1, 51-67, January 2024

- Lidén C, Andersson N, White IR. Preservatives in non-cosmetic products: Increasing human exposure requires action for protection of health. *Contact Dermatitis*. 2022;87(5):389-405. doi:10.1111/cod.14181
- Marrero-Alemán G, Borrego L, Antuña AG, Macías Montes A, Pérez Luzardo O. Isothiazolinones in cleaning products: Analysis with liquid chromatography tandem mass spectrometry of samples from sensitized patients and market. *Contact Dermatitis*. 2019;82: 94–100. <https://doi.org/10.1111/cod.13430>
- Marrero-Alemán G, Borrego L, Antuña AG, Macías Montes A, Pérez Luzardo O. Persistence of Isothiazolinones in Clothes After Machine Washing. *DERMATITIS*, Vol 32, No 5, September/October, 2021
- Pastor-Nieto MA, Alcántara-Nicolás F, Melgar-Molero V, Pérez-Mesonero R, Vergara-Sánchez A, Martín-Fuentes A, et al. Conservantes en productos de higiene y cosméticos, medicamentos tópicos y productos de limpieza doméstica en España. ~ *Actas Dermosifiliogr*. 2017;108:758---770.
- Paun, I.; Pirvu, F.; Iancu, V.I.; Chiriac, F.L. Occurrence and Transport of Isothiazolinone-Type Biocides from Commercial Products to Aquatic Environment and Environmental Risk Assessment. *Int. J. Environ. Res. Public Health* 2022, 19, 7777. <https://doi.org/10.3390/ijerph19137777>
- Razenberg et al., Microbial cleaning products: an inventory of products, potential risks and applicable regulatory frameworks, National Institute for Public Health and the Environment, RIVM, 2020.
- Reeder MJ, Warshaw E, Aravamuthan S, et al (2023) Trends in the Prevalence of Methylchloroisothiazolinone/Methylisothiazolinone Contact Allergy in North America and Europe. *JAMA Dermatol* 159:267–274. <https://doi.org/10.1001/JAMADERMATOL.2022.5991>
- SCCS (2018) Scientific Committee on Consumer Safety Expert Opinion on Skin Sensitisation Quantitative Risk Assessment for Fragrance Ingredients (QRA2), preliminary version of 24-25 October 2017, final version of 30 July 2018, SCCS/1589/17. Available Online (2025-10-31) https://health.ec.europa.eu/publications/skin-sensitisation-quantitative-risk-assessment-fragrance-ingredients-qra2-submission-i_en
- Schülke, In-can preservation for household products Optimum protection for your products, Source: [Link](#) (date of access: 12.5.2025)
- Schwensen JF, White IR, Thyssen JP, et al (2015) Failures in risk assessment and risk management for cosmetic preservatives in Europe and the impact on public health. *Contact Dermatitis* 73:133–141. <https://doi.org/10.1111/COD.12446>
- Schwensen JFB, Uter W, Aerts O, et al (2024) Current frequency of contact allergy to isothiazolinones (methyl-, benz- and octylisothiazolinone) across Europe. *Contact Dermatitis*. <https://doi.org/10.1111/cod.14641>
- Søgaard R, Kursawe Larsen C, Johansen JD, Schwensen JFB (2025) Trends in Contact Allergy to Preservatives From 2014 to 2023: Benzisothiazolinone on the Rise. *Contact Dermatitis*. <https://doi.org/10.1111/cod.14818>
- Vink Chemicals, Preservation for household products, 2024

Definitions

Definitions according to Article 2 of the EU Detergent Regulation²³:

"Detergent" means any substance or mixture containing soaps and/or other surfactants intended for washing and cleaning processes. Detergents may be in any form (liquid, powder, paste, bar, cake, moulded piece, shape, etc.) and marketed for or used in household, or institutional or industrial purposes.

Other products to be considered as detergents are:

- "Auxiliary washing mixture", intended for soaking (pre-washing), rinsing or bleaching clothes, household linen, etc.;
- "Laundry fabric-softener", intended to modify the feel of fabrics in processes which are to complement the washing of fabrics;
- "Cleaning mixture", intended for domestic all purposes cleaners and/or other cleaning of surfaces (e.g.: materials, products, machinery, mechanical appliances, means of transport and associated equipment, instruments, apparatus, etc.);
- "Other cleaning and washing mixtures", intended for any other washing and cleaning processes.

"Washing" means the cleaning of laundry, fabrics, dishes and other hard surfaces.

"Cleaning" has the meaning defined by EN ISO 862.

"Substance" means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the products and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

"Mixture " means a mixture or solution composed of two or more substances.

"Surfactant" means any organic substance and/or preparation used in detergents, which has surface-active properties and which consists of one or more hydrophilic and one or more hydrophobic groups of such a nature and size that it is capable of reducing the surface tension of water, and of forming spreading or adsorption monolayers at the water-air interface, and of forming emulsions and/or microemulsions and/or micelles, and of adsorption at water-solid interfaces.

"Industrial and institutional detergent" means a detergent for washing and cleaning outside the domestic sphere, carried out by specialised personnel using specific products.

Definitions according to Article 3 of the EU Biocidal Products Regulation²⁴:

"Biocidal product" means:

- any substance or mixture, in the form in which it is supplied to the user, consisting of, containing or generating one or more active substances, with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise

²³ Regulation (EC) No 648/2004 of the European Parliament and of the Council of 31 March 2004 on detergents

²⁴ Regulation (EU) No 528/2012 of The European Parliament and of The Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

exerting a controlling effect on, any harmful organism by any means other than mere physical or mechanical action,

- any substance or mixture, generated from substances or mixtures which do not themselves fall under the first indent, to be used with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on, any harmful organism by any means other than mere physical or mechanical action.

A treated article that has a primary biocidal function shall be considered a biocidal product.

"Treated article" means any substance, mixture or article which has been treated with, or intentionally incorporates, one or more biocidal products.

"Active substance" means a substance or a micro-organism that has an action on or against harmful organisms;

"Existing active substance" means a substance which was on the market on 14 May 2000 as an active substance of a biocidal product for purposes other than scientific or product and process-orientated research and development;

"New active substance" means a substance which was not on the market on 14 May 2000 as an active substance of a biocidal product for purposes other than scientific or product and process-orientated research and development.

Definitions according to Article 2 of the EU CLP Regulation²⁵:

"Hazard class" means the nature of the physical, health or environmental hazard;

"Hazard category" means the division of criteria within each hazard class, specifying hazard severity;

"Hazard pictogram" means a graphical composition that includes a symbol plus other graphic elements, such as a border, background pattern or colour that is intended to convey specific information on the hazard concerned;

"Signal word" means a word that indicates the relative level of severity of hazards to alert the reader to a potential hazard; the following two levels are distinguished:

- (a) "Danger" means a signal word indicating the more severe hazard categories;
- (b) "Warning" means a signal word indicating the less severe hazard categories;

"Hazard statement" means a phrase assigned to a hazard class and category that describes the nature of the hazards of a hazardous substance or mixture, including, where appropriate, the degree of hazard;

²⁵ Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

"Precautionary statement" means a phrase that describes recommended measure(s) to minimise or prevent adverse effects resulting from exposure to a hazardous substance or mixture due to its use or disposal;

"Concentration limit" means a threshold of any classified impurity, additive or individual constituent in a substance or in a mixture that may trigger classification of the substance or the mixture, respectively.

Appendix 1. Gross list – in-can preservatives (PT 6)

Substance name	EC/List no.	CAS no.	Active Substance (AS) Group	PT 6 Status
(benzyloxy)methanol	238-588-8	14548-60-8	RP	Under assessment
(ethylenedioxy)dimethanol (Reaction products of ethylene glycol with paraformaldehyde (EGForm))	222-720-6	3586-55-8	RP	Under assessment
1,2-benzisothiazol-3(2H)-one (BIT)	220-120-9	2634-33-5	RP	Approved
1,3-bis(hydroxymethyl)-5,5-dimethylimidazolidine-2,4-dione (DMDMH)	229-222-8	6440-58-0	RP	Under assessment
2,2-dibromo-2-cyanoacetamide (DBNPA)	233-539-7	10222-01-2	RP	Under assessment
2,2',2''-(hexahydro-1,3,5-triazine-1,3,5-triyl)triethanol (HHT)	225-208-0	4719-04-4	RP	Under assessment
2,2'-dithiobis[N-methylbenzamide] (DTBMA)	219-768-5	2527-58-4	RP	Under assessment
2-bromo-2-(bromomethyl)pentanedinitrile (DBDCB)	252-681-0	35691-65-7	RP	Approved
2-butyl-benzo[d]isothiazol-3-one (BBIT)	420-590-7	4299-07-4	RP	Under assessment
2-methyl-2H-isothiazol-3-one (MIT)	220-239-6	2682-20-4	RP	Approved
2-octyl-2H-isothiazol-3-one (OIT)	247-761-7	26530-20-1	RP	Under assessment
2-Phenoxyethanol	204-589-7	122-99-6	RP	Under assessment

Substance name	EC/List no.	CAS no.	Active Substance (AS) Group	PT 6 Status
3-iodo-2-propynylbutylcarbamate (IPBC)	259-627-5	55406-53-6	RP	Approved – renewal in progress
Biphenyl-2-ol	201-993-5	90-43-7	RP	Approved
Bronopol	200-143-0	52-51-7	RP	Under assessment
C(M)IT/MIT (3:1)	611-341-5	55965-84-9	RP	Approved
Chlorocresol	200-431-6	59-50-7	RP	Approved
Didecylidimethylammonium chloride (DDAC (C8-10))	270-331-5	68424-95-3	RP	Under assessment
Didecylidimethylammonium chloride(DDAC)	230-525-2	7173-51-5	RP	Under assessment
Dodecylguanidine monohydrochloride	237-030-0	13590-97-1	RP	Under assessment
formaldehyde released from the reaction products of paraformaldehyde and 2-hydroxypropylamine (ratio 1:1)	-	-	RP	Under assessment
formaldehyde released from the reaction products of paraformaldehyde and 2-hydroxypropylamine (ratio 3:2)	-	-	RP	Under assessment
Formic acid	200-579-1	64-18-6	RP	Under assessment
Glutaral (Glutaraldehyde)	203-856-5	111-30-8	RP	Approved
Hexa-2,4-dienoic acid (Sorbic acid)	203-768-7	110-44-1	RP	Under assessment
Hydrogen peroxide	231-765-0	7722-84-1	RP	Approved
L-(+)-lactic acid	201-196-2	79-33-4	RP	Approved
N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine (Diamine)	219-145-8	2372-82-9	RP	Under assessment
Peracetic acid	201-186-8	79-21-0	RP	Approved

Substance name	EC/List no.	CAS no.	Active Substance (AS) Group	PT 6 Status
Pyridine-2-thiol 1-oxide, sodium salt (Sodium pyrrithione)	223-296-5	3811-73-2	RP	Under assessment
Pyrrithione zinc (Zinc pyrrithione)	236-671-3	13463-41-7	RP	Under assessment
Silver chloride	232-033-3	7783-90-6	RP	Under assessment
Tetrahydro-1,3,4,6-tetrakis(hydroxymethyl)imidazo[4,5-d]imidazole-2,5 (1H,3H)-dione (TMAD)	226-408-0	5395-50-6	RP	Under assessment
Tetrakis(hydroxymethyl)phosphonium sulphate (2:1) (THPS)	259-709-0	55566-30-8	RP	Under assessment
2-methyl-2,3-dihydro-1,2-thiazol-3-one hydrochloride	247-499-3	26172-54-3	New AS	Under assessment
Benzyl Alcohol	202-859-9	100-51-6	New AS	Under assessment
Ethanol	200-578-6	64-17-5	New AS	Under assessment
MBIT	695-989-4	2527-66-4	New AS	Approved
Monochloramine generated from ammonium carbamate and a chlorine source	-	-	New AS	Under assessment
N-(trichloromethylthio)phthalimide (Folpet)	205-088-6	133-07-3	New AS	Approved
Sodium Azide	247-852-1	26628-22-8	New AS	Under assessment
sodium hydrogensulfite released from sodium metabisulfite in aqueous solution	231-673-0	7681-57-4	New AS	Under assessment
sulfur dioxide released from sodium metabisulfite	-	-	New AS	Under assessment
(+)-Tartaric acid	201-766-0	87-69-4	Annex I	Approved
(9Z,12E)-tetradeca-9,12-dien-1-yl acetate	608-490-3	30507-70-1	Annex I	Approved

Substance name	EC/List no.	CAS no.	Active Substance (AS) Group	PT 6 Status
Acetic acid	200-580-7	64-19-7	Annex I	Approved
Arnica montana, ext.	273-579-2	68990-11-4	Annex I	Under assessment
Ascorbic acid	200-066-2	50-81-7	Annex I	Approved
Baculovirus	-	-	Annex I	Approved
Bentonite	215-108-5	1302-78-9	Annex I	Approved
Carbon dioxide	204-696-9	124-38-9	Annex I	Approved
Carbon dioxide generated from propane, butane or a mixture of both by combustion	-	-	Annex I	Approved
chabazite	-	-	Annex I	Under assessment
Cheese	-	-	Annex I	Approved
Citric acid	201-069-1	77-92-9	Annex I	Approved
Citronellal	203-376-6	106-23-0	Annex I	Approved
Concentrated apple juice	-	-	Annex I	Approved
D-Fructose	200-333-3	57-48-7	Annex I	Approved
Honey	617-041-0	8028-66-8	Annex I	Approved
Iron sulphate	231-753-5	7720-78-7	Annex I	Approved
Lactic acid	200-018-0	-	Annex I	Approved
Lavender oil (Natural oil)	616-770-1	8000-28-0	Annex I	Approved
Linseed oil	232-278-6	8001-26-1	Annex I	Approved
Nitrogen	231-783-9	7727-37-9	Annex I	Approved
Nitrogen generated from ambient air	-	-	Annex I	Approved
Oct-1-en-3-ol	222-226-0	3391-86-4	Annex I	Approved
Peppermint oil (Natural oil)	616-900-7	8006-90-4	Annex I	Approved
Potassium (E,E)-hexa-2,4-dienoate (Potassium Sorbate)	246-376-1	24634-61-5	Annex I	Approved

Substance name	EC/List no.	CAS no.	Active Substance (AS) Group	PT 6 Status
Powdered egg	-	-	Annex I	Approved
Propionic acid	201-176-3	79-09-4	Annex I	Approved
Saccharomyces cerevisiae (yeast)	614-750-7	68876-77-7	Annex I	Approved
Sodium acetate	204-823-8	127-09-3	Annex I	Approved
Sodium benzoate	208-534-8	532-32-1	Annex I	Approved
trisodium orthophosphate	231-509-8	7601-54-9	Annex I	Under assessment
Vinegar	-	8028-52-2	Annex I	Approved
Webbing clothes moths pheromone (Mixture)	-	-	Annex I	Approved
Wolbachia pipientis strain wPip	-	-	Annex I	Under assessment

RP: Review programme (i.e. the EU work programme for the examination of existing biocidal active substances contained in biocidal products).

New AS: New active substance

Annex I: “Low risk” active substances - active substances that can be contained in biocidal products eligible for simplified authorisation procedure according to BPR.

Appendix 2. Initial hazard assessment

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
(benzyloxy)methanol	14548-60-8				No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future (i.e. no future amendments to the CLP (ATP's) etc. concerning this active substance)
(ethylenedioxy)dimethanol	3586-55-8				No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future (i.e. no future amendments to the CLP (ATP's) etc. concerning this active substance)
1,2-benzisothiazol-3(2H)-one	2634-33-5	Acute Tox. 4 * Skin Irrit. 2 Eye Dam. 1 Skin Sens. 1 Aquatic Acute 1 CLP00"	Acute Tox. 2 Acute Tox. 4 Skin Irrit. 2 Eye Dam. 1 Skin Sens. 1A Aquatic Acute 1 Aquatic Chronic 1 CLP00/ATP21"	Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Acute Tox. 2; H330, Eye Dam. 1; H318, Skin Sens. 1B; H317, Aquatic Acute 1; H400,	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.036%) - ATP 21 (shall apply as from 1 September 2025)

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
1,3-bis(hydroxymethyl)-5,5-dimethylimidazolidine-2,4-dione	6440-58-0			Aquatic Acute 1, M-factor=1, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=1	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future (i.e. no future amendments to the CLP (ATP's) etc. concerning this active substance
2,2-dibromo-2-cyanoacetamide	10222-01-2	Acute Tox. 2 Acute Tox. 3 STOT RE 1 Skin Irrit. 2 Eye Dam. 1 Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1 ATP17"		Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Acute Tox. 2; H330, Skin Irrit. 2; H315, Eye Dam. 1; H318, Skin Sens. 1; H317, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1, Aquatic Chronic 2; H411	Yes	Severe harmonised classification according to CLP in regard to health hazards (ED HH; STOT RE 1; H372 (respiratory tract; inhalation); Skin Sens. 1; H317)
2,2',2''-(hexahydro-1,3,5-triazine-1,3,5-triyl)triethanol	4719-04-4	Acute Tox. 4 * Skin Sens. 1 CLP00"			Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1; H317: C ≥ 0,1%)

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
2,2'-dithiobis[N-methylbenzamide]	2527-58-4				Yes	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future but to be classified a Skin Sens 1; H317 according to 99% of notifiers.
2-bromo-2-(bromomethyl)pentanedinitrile	35691-65-7			Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Acute Tox. 2; H330, Eye Dam. 1; H318, Skin Sens. 1; H317, Aquatic Chronic 2; H411	Yes	No severe (harmonised) classification according to CLP in regard to health hazards but indication of a change of this in the future - and to be classified a Skin Sens. 1; H317 according to > 57% of notifiers.
2-Butanone, peroxide	1338-23-4				No	Not approved for PT 6
2-n-butyl-benzo[d]isothiazol-3-one	4299-07-4	Skin Corr. 1B Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1			Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1; H317)
		CLP00"				
2-methyl-2H-isothiazol-3-one hydrochloride	26172-54-3			Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Skin Corr. 1A; H314, Eye Dam. 1; H318,	No	New Active - not allowed for treated articles

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
2-methyl-2H-isothiazol-3-one	2682-20-4	Acute Tox. 2 Acute Tox. 3 Acute Tox. 3 Skin Corr. 1B Eye Dam. 1 Skin Sens. 1A Aquatic Acute 1 Aquatic Chronic 1 ATP13"		Skin Sens. 1A; H317, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=1 Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Acute Tox. 3; H311, Acute Tox. 1; H330, Skin Corr. 1B; H314, Skin Sens. 1A; H317, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=10, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=1	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 13
octhlinone (ISO); 2-octyl-2H-isothiazol-3-one	26530-20-1	Acute Tox. 2 Acute Tox. 3 Acute Tox. 3 Skin Corr. 1 Eye Dam. 1 Skin Sens. 1A Aquatic Acute 1		Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Acute Tox. 3; H311, Acute Tox. 2; H330, Skin Corr. 1B; H314,	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 15

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
		Aquatic Chronic 1 CLP00/ATP15"		Eye Dam. 1; H318, Skin Sens. 1A; H317, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=100, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10		
2-phenoxyethanol	122-99-6	Acute Tox. 4 STOT SE 3 Eye Dam. 1 CLP00/ATP17"		Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Eye Dam. 1; H318, STOT SE 3; H335	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
3-iodo-2-propynyl butylcarbamate	55406-53-6	Acute Tox. 3 Acute Tox. 4 STOT RE 1 Eye Dam. 1 Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1 ATP06"		Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Acute Tox. 2; H330, Eye Dam. 1; H318, Skin Sens. 1; H317, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=10, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10"	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1; H317; STOT RE 1; H372 (larynx) - ATP 6

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
4,4-dimethyloxazolidine	51200-87-4				No	Not approved for PT 6
5-chloro-2-methyl-2H-isothiazol-3-one	26172-55-4				No	Not approved for PT 6
7a-ethylidihydro-1H,3H,5H-oxazolo[3,4-c]oxazole	7747-35-5				No	Not approved for PT 6
Benzyl alcohol	100-51-6	Acute Tox. 4 * Acute Tox. 4 * CLP00"	Acute Tox. 4 Eye Irrit. 2 Skin Sens. 1B CLP00/ATP21"	Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Eye Irrit. 2; H319, Skin Sens. 1B; H317	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1B; H317) - ATP 21
Biphenyl-2-ol	90-43-7	STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Aquatic Acute 1 CLP00"	Carc. 2 Skin Corr. 1 Eye Dam. 1 Skin Sens. 1B Aquatic Acute 1 Aquatic Chronic 1 CLP00/ATP22"	Intention status: Opinion Adopted Intention: Skin Corr. 1; H314, Eye Dam. 1; H318, Carc. 2; H351, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=1	Yes	Severe harmonised classification according to CLP in the near future in regard to health hazards (Skin Sens 1B; H317; Carc. 2; H351) - ATP 22 (Shall apply as from 1 May 2026)
Bronopol	52-51-7	Acute Tox. 4 * Acute Tox. 4 * STOT SE 3 Skin Irrit. 2		Intention status: Opinion Adopted Intention:	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
reaction mass of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H - isothiazol-3-one	55965-84-9	Eye Dam. 1 Aquatic Acute 1		Acute Tox. 3; H301, Acute Tox. 4; H312, Acute Tox. 3; H331, Skin Irrit. 2; H315, Eye Dam. 1; H318, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=100, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10		
		CLP00/ATP01"				
reaction mass of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H - isothiazol-3-one	55965-84-9	Acute Tox. 2 Acute Tox. 2 Acute Tox. 3 Skin Corr. 1C Eye Dam. 1 Skin Sens. 1A Aquatic Acute 1 Aquatic Chronic 1		Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Acute Tox. 2; H310, Acute Tox. 2; H330, Skin Corr. 1C; H314, Skin Irrit. 2; H315, Eye Irrit. 2; H319, Skin Sens. 1A; H317, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=100, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=100	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 13
		CLP00/ATP13"				

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Chlorocresol	59-50-7	Acute Tox. 4 STOT SE 3 Skin Corr. 1C Eye Dam. 1 Skin Sens. 1B Aquatic Acute 1 Aquatic Chronic 3 CLP00/ATP13"		Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Skin Irrit. 2; H315, Eye Dam. 1; H318, Skin Sens. 1B; H317, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1, Aquatic Chronic 3; H412	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1B; H317) - ATP 13
cis-1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride (cis CTAC)	51229-78-8	Flam. Sol. 2 Repr. 2 Acute Tox. 4 * Skin Irrit. 2 Skin Sens. 1 Aquatic Chronic 2 ATP01"			No	Not approved for PT 6
Quaternary ammonium compounds, di-C8-10-alkyldimethyl, chlorides	68424-95-3				No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Didecyldimethylammonium chloride	7173-51-5	Acute Tox. 4 * Skin Corr. 1B			No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Dodecylguanidine monohydrochloride	13590-97-1	CLP00"			No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Ethanol	64-17-5	Flam. Liq. 2 CLP00"		Intention status: Intention: Flam. Liq. 2; H225, Eye Irrit. 2; H319; Repr. 2; H361d, Lact.; H362, STOT SE 3; H336, STOT RE 2; H373	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Formic acid	64-18-6	Skin Corr. 1A CLP00"	Flam. Liq. 3 Met. Corr. 1 Acute Tox. 3 Acute Tox. 4 Skin Corr. 1A Eye Dam. 1 CLP00/ATP22"	Intention status: Opinion Adopted Intention: Flam. Liq. 3; H226, Met. Corr. 1; H290, Acute Tox. 4; H302, Acute Tox. 3; H331, Skin Corr. 1A; H314, Eye Dam. 1; H318"	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Glutaral	111-30-8	Acute Tox. 2 Acute Tox. 3 STOT SE 3 Skin Corr. 1B Resp. Sens. 1		Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Acute Tox. 1; H330,	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens 1A; H317; Resp. Sens. 1; H334) - ATP 09

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Hexa-2,4-dienoic acid	110-44-1	Skin Sens. 1A Aquatic Acute 1 Aquatic Chronic 2 CLP00/ATP09"		Skin Corr. 1B; H314, Resp. Sens. 1; H334, Skin Sens. 1A; H317, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Acute 1, M- factor=10, Aquatic Chronic 2; H411	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Hydrogen peroxide	7722-84-1	Ox. Liq. 1 Acute Tox. 4 * Acute Tox. 4 * Skin Corr. 1A CLP00"		Intention status: Opinion Development Intention: Ox. Liq. 1; H271, Acute Tox. 3; H301, Acute Tox. 4; H332, Skin Corr. 1A; H314, Aquatic Chronic 3; H412	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
L-(+)-lactic acid	79-33-4	Skin Corr. 1C Eye Dam. 1 ATP15"		Intention status: Opinion Adopted Intention: Skin Irrit. 2; H315, Eye Dam. 1; H318, STOT SE 3; H335	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
2-methyl-1,2-benzothiazol-3(2H)-one	2527-66-4	Acute Tox. 3 Acute Tox. 4		Intention status: Opinion Adopted	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
		Skin Corr. 1C Eye Dam. 1 Skin Sens. 1A Aquatic Acute 1 Aquatic Chronic 2 ATP15"		Intention: Acute Tox. 3; H301, Acute Tox. 3; H311, Acute Tox. 3; H331, Skin Corr. 1B; H314, Eye Dam. 1; H318, Skin Sens. 1A; H317, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1, Aquatic Chronic 2; H411		1A; H317; specific concentration limit: Skin Sens. 1A; H317: C ≥ 0.0015%) - ATP 15
Methenamine 3-chloroallylochloride	4080-31-3				No	Not approved for PT 6
N,N'-methylenebismorpholine	5625-90-1	Carc. 1B Muta. 2 Acute Tox. 4 Acute Tox. 4 Acute Tox. 4 STOT RE 2 Skin Corr. 1B Eye Dam. 1 Skin Sens. 1 ATP10"		Intention status: Opinion Adopted Intention: Skin Corr. 1B; H314, Skin Sens. 1; H317, Muta. 2; H341, Carc. 1B; H350	No	Not approved for PT 6
N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine	2372-82-9				No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
N-(trichloromethylthio)phthalimide	133-07-3	Carc. 2 Acute Tox. 4 * Eye Irrit. 2 Skin Sens. 1 Aquatic Acute 1 CLP00/ATP01"		Intention status: Opinion Adopted Intention: Acute Tox. 2; H330, Skin Irrit. 2; H315, Eye Dam. 1; H318, Skin Sens. 1A; H317, Carc. 2; H351, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=10, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=1	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin sens 1; H317; CARC. 2; H351) - ATP 01
p-[(diiodomethyl)sulphonyl]toluene	20018-09-1			Intention status: Withdrawn Intention: Acute Tox. 3; H331, Eye Dam. 1; H318, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=100, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10	No	Not approved for PT 6

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Peracetic acid	79-21-0	Flam. Liq. 3 Org. Perox. D **** Acute Tox. 4 * Acute Tox. 4 * Acute Tox. 4 * Skin Corr. 1A Aquatic Acute 1 CLP00"	Org. Perox. D Acute Tox. 2 Acute Tox. 2 Acute Tox. 3 Skin Corr. 1A Aquatic Acute 1 Aquatic Chronic 1 CLP00/ATP22"	Intention status: Opinion Adopted Intention: Flam. Liq. 3; H226, Org. Perox. CD; H242, Acute Tox. 3; H301, Acute Tox. 2; H310, Acute Tox. 2; H330, Skin Corr. 1A; H314, STOT SE 3; H335, Aquatic Acute 1, M-factor=1, Aquatic Chronic 1, M-factor=10	Yes	No severe (harmonised) classification according to CLP in regard to health hazards but this will change in the near future (Acute Tox. 2; H310; Acute Tox. 2; H330; STOT SE 3; H335: C ≥ 1%; EUH071) - ATP 22
CoPoly(bisiminoimidocarbonyl, hexamethylene hydrochloride), (iminoimidocarbonyl, hexamethylene hydrochloride)	27083-27-8	Carc. 2 Acute Tox. 2 Acute Tox. 4 STOT RE 1 Eye Dam. 1 Skin Sens. 1B Aquatic Acute 1 Aquatic Chronic 1 ATP05/ATP09"		Intention status: Withdrawn Intention: Acute Tox. 4; H302, Acute Tox. 2; H330, Eye Dam. 1; H318, Skin Sens. 1B; H317, Carc. 2; H351, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=10, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10	No	Not approved for PT 6

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Potassium 2-biphenylate	13707-65-8				No	Not approved for PT 6
Pyridine-2-thiol 1-oxide, sodium salt	3811-73-2	Acute Tox. 3 Acute Tox. 3 Acute Tox. 4 STOT RE 1 Skin Irrit. 2 Eye Irrit. 2 Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 2 ATP18"		Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Acute Tox. 4; H312, Acute Tox. 3; H331, Skin Irrit. 2; H315, Eye Irrit. 2; H319, Skin Sens. 1; H317, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=100	Yes	Severe harmonised classification according to CLP in regard to health hazards (Skin Sens. 1; H317; STOT RE 1; H372 (nervous system) - ATP 18
Pyrithione zinc	13463-41-7	Repr. 1B Acute Tox. 2 Acute Tox. 3 STOT RE 1 Eye Dam. 1 Aquatic Acute 1 Aquatic Chronic 1 ATP15"		Intention status: Opinion Adopted Intention: Acute Tox. 3; H301, Acute Tox. 2; H330, Eye Dam. 1; H318, Repr. 1B; H360D, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1000, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10	Yes	Severe harmonised classification according to CLP in regard to health hazards (Acute Tox. 2; H330; STOT RE 1; H372; Repr. 1B; H360D) - ATP 15

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Silver chloride	7783-90-6				No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Silver nitrate	7761-88-8	Ox. Sol. 2 Skin Corr. 1B Aquatic Acute 1 Aquatic Chronic 1 CLP00/ATP01"		Intention status: Opinion Development Intention: Ox. Sol. 1; H271, Acute Tox. 2; H300, Skin Corr. 1A; H314, Skin Sens. 1; H317, Muta. 2; H341, Repr. 1B; H360FD, STOT RE 2; H373, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=1000, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=100	No	Not approved for PT 6
Sodium 2-biphenylate	132-27-4	Acute Tox. 4 * STOT SE 3 Skin Irrit. 2 Eye Dam. 1 Aquatic Acute 1 CLP00"		Intention status: Withdrawn Intention: Acute Tox. 4; H302, Skin Corr. 1; H314, Eye Dam. 1; H318, Carc. 2; H351,	No	Not approved for PT 6

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Sodium azide	26628-22-8	Acute Tox. 2 * Aquatic Acute 1 Aquatic Chronic 1		Aquatic Acute 1; H400, Aquatic Chronic 1; H410	No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Disodium disulphite	7681-57-4	CLP00" Acute Tox. 4 * Eye Dam. 1			No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
Sodium N-(hydroxymethyl)glycinate	70161-44-3	CLP00" Carc. 1B Muta. 2 Acute Tox. 4 Acute Tox. 4 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Skin Sens. 1		Intention status: Opinion Adopted Intention: Acute Tox. 4; H302, Skin Irrit. 2; H315, Eye Irrit. 2; H319, Skin Sens. 1; H317, Muta. 2; H341, Carc. 1B; H350	No	Not approved for PT 6
Sodium p-chloro-m-cresolate	15733-22-9	ATP15"			No	Not approved for PT 6
Tetrahydro-1,3,4,6-tetrakis(hydroxymethyl)imidazo[4,5-d]imidazole-2,5(1H,3H)-dione	5395-50-6				Yes	No severe (harmonised) classification according to CLP in regard to health hazards and no indication that this will change in the near future but to be classified as Skin Sens. 1; H317 according to > 97% of notifiers.

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Dazomet	533-74-4	Acute Tox. 4 * Eye Irrit. 2 Aquatic Acute 1 Aquatic Chronic 1 CLP00"		Intention status: Opinion Development Intention: Acute Tox. 4; H302, Skin Irrit. 2; H315, Eye Irrit. 2; H319, Skin Sens. 1; H317, STOT SE 3; H335, STOT RE 1; H372, Aquatic Acute 1; H400, Aquatic Acute 1, M-factor=10, Aquatic Chronic 1; H410, Aquatic Chronic 1, M-factor=10	No	Not approved for PT 6
Tetrakis(hydroxymethyl)phosphonium sulphate(2:1)	55566-30-8				No	No severe (harmonised) classification according to CLP in regard to health hazards and no indication of a change of this in the near future.
1-[1,3-bis(hydroxymethyl)-2,5-dioxoimidazolidin-4-yl]-1,3-bis(hydroxymethyl)urea	78491-02-8				No	Not approved for PT 6
butyl 4-hydroxybenzoate	94-26-8				No	Not approved for PT 6
Isobutyl 4-hydroxybenzoate	4247-02-3				No	Not approved for PT 6
Ethyl 4-hydroxybenzoate	120-47-8				No	Not approved for PT 6
Methyl 4-hydroxybenzoate	99-76-3				No	Not approved for PT 6
Propyl 4-hydroxybenzoate	94-13-3				No	Not approved for PT 6

Substance name	CAS no.	CLP	CLP (future amendments) (up to ATP 22)	CLH intentions (and status)	Prioritised for chemical analysis	Justification
Sodium benzoate	532-32-1				No	"Low-risk" active substance listed on Annex I of the BPR
Poly(oxy-1,2-ethanediyl), a-2-propen-1-yl-w-hydroxy-	27274-31-3				No	Not approved for PT 6

Appendix 3. Preservative concentrations

All concentrations are average concentrations of true double determinations in mg/kg

Product Type	Product	Country of purchase	BIT	BBIT	MIT	OIT	CIT	Benzyl alcohol
Cleaning - all-purpose	H-01	DK	<0.1	-	<0.01	-	<0.01	-
			<0.1	-	<0.01	-	<0.01	-
	H-02	DK	<0.1	-	0.058	-	-	-
			<0.1	-	0.058	-	-	-
	H-03	DK	<0.1	-	<0.01	-	<0.01	-
			<0.1	-	<0.01	-	<0.01	-
	H-04	DK	21	-	<0.01	-	-	-
			16	-	<0.01	-	-	-
	H-06	DK	<0.1	-	<0.01	-	-	100
			<0.1	-	<0.01	-	-	200
	H-08	EU	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-09	EU	<0.1	-	0.11	-	-	-
			<0.1	-	0.095	-	-	-
	H-12	non-EU	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-13	non-EU	<0.1	-	0.013	-	-	-
			<0.1	-	0.015	-	-	-

Product Type	Product	Country of purchase	BIT	BBIT	MIT	OIT	CIT	Benzyl alcohol
Cleaning - Bathroom/kitchen/descaling	H-52	DK	<0.1	-	2.0	-	26	2.6
			<0.1	-	2.1	-	30	2.8
	H-45	DK	<0.1	-	<0.01	-	<0.01	-
			<0.1	-	<0.01	-	<0.01	-
	H-53	DK	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-55	non-EU	<0.1	-	0.64	-	-	2.2
			<0.1	-	0.5	-	-	1.8
	H-54	non-EU	<0.1	-	<0.01	-	0.01	-
			<0.1	-	<0.01	-	<0.01	-
	H-46	DK	2.3	-	<0.01	-	-	-
			2.2	-	<0.01	-	-	-
	H-51	DK	76	-	51	-	-	-
			72	-	59	-	-	-
	H-49	EU	<0.1	-	<0.01	-	<0.01	51
			<0.1	-	<0.01	-	<0.01	51
	H-48	EU	<0.1	-	<0.01	-	<0.01	-
			<0.1	-	<0.01	-	<0.01	-
	H-50	EU	<0.1	0.089	0.05	-	-	-
			<0.1	0.11	0.053	-	-	-
Cleaning - scouring cream	H-29	DK	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-30	DK	16	-	6.6	-	-	-
			19	-	7	-	-	-

Product Type	Product	Country of purchase	BIT	BBIT	MIT	OIT	CIT	Benzyl alcohol
Cleaning wipes	H-36	DK	40	-	52	-	-	-
			50	-	52	-	-	-
	H-37	DK	9.5	-	0.11	-	-	-
			13	-	0.093	-	-	-
	H-38	DK	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-31	EU	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-32	EU	0.11	-	24	-	-	-
			<0.1	-	18	-	-	-
	H-33	EU	<0.1	-	<0.01	-	<0.01	-
			<0.1	-	<0.01	-	<0.01	-
	H-40	non-EU	<0.1	-	0.42	-	-	-
			<0.1	-	0.17	-	-	-
	H-15	DK	15	-	43	-	-	-
			13	-	41	-	-	-
	H-19	DK	<0.1	-	0.77	-	<0.01	-
			<0.1	-	0.83	-	<0.01	-
	H-20	DK	<0.1	-	0.11	-	4.3	-
			<0.1	-	0.1	-	4.9	-
	H-22	DK	<0.1	-	0.017	-	-	-
			<0.1	-	0.018	-	-	-
	H-17	EU	16	-	<0.01	-	-	-
			19	-	<0.01	-	-	-
	H-18	EU	8.7	-	<0.01	0.56	-	-

Product Type	Product	Country of purchase	BIT	BBIT	MIT	OIT	CIT	Benzyl alcohol
Dishwashing - Hand dishwashing	H-26	non-EU	9.3	-	<0.01	0.56	-	-
			<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-21	DK	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-28	non-EU	<0.1	-	0.037	-	-	-
			<0.1	-	0.041	-	-	-
	H-58	DK	0.23	-	0.59	-	-	-
			0.22	-	0.64	-	-	-
	H-59	DK	0.13	-	0.21	-	-	-
			0.16	-	0.23	-	-	-
	H-60	DK	0.11	-	<0.01	-	-	-
			0.35	-	<0.01	-	-	-
	H-61	DK	<0.1	-	<0.01	0.7	-	-
			<0.1	-	<0.01	1.6	-	-
	H-62	DK	<0.1	-	<0.01	0.72	-	-
			<0.1	-	<0.01	1.2	-	-

Product Type	Product	Country of purchase	BIT	BBIT	MIT	OIT	CIT	Benzyl alcohol
Laundry - Delicate/wool/silk	H-63	DK	<0.1	-	0.11	-	1.1	-
			<0.1	-	0.14	-	1.5	-
	H-64	DK	0.13	-	30	-	-	-
			<0.1	-	24	-	-	-
	H-66	EU	0.16	-	250	-	-	-
			0.13	-	130	-	-	-
	H-67	EU	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-69	non-EU	<0.1	-	0.32	-	-	-
			<0.1	-	0.37	-	-	-
	H-72	DK	<0.1	-	80	-	-	-
			<0.1	-	75	-	-	-
	H-75	EU	<0.1	-	3	-	-	-
			<0.1	-	5.9	-	-	-
	H-74	EU	<0.1	-	<0.01	-	-	-
			<0.1	-	<0.01	-	-	-
	H-77	DK	<0.1	-	<0.01	-	-	5,500
			<0.1	-	<0.01	-	-	5,600
	H-78	EU	<0.1	-	<0.23	-	0.075	-
			<0.1	-	<0.24	-	0.072	-
	H-81	DK	<0.1	-	<0.01	-	-	6,200
			<0.1	-	<0.01	-	-	4,900

Abbreviations: BIT – benzisothiazolinone; BBIT – 2-n-butyl-benzo[d]isothiazol-3-one; MIT – methylisothiazolinone; OIT – octylisothiazolinone; CIT – Methylchlorisothiazolinone; - – not analysed; EU – European Union, DK – Denmark

Appendix 4. Label evaluation

Table including comparison of the actual labelled information against what would be required according to CLP based on the measured levels of preservatives.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
Cleaning – all-purpose H-01	Glutaral	<0.1 (BIT) <0.01 (MIT) <0.01 (CIT)	Inconsistent labelling. Label displays only glutaral. Additionally, EUH208 is displayed based on content of glutaral ("Contains glutaral. May produce an allergic reaction"). Preservatives declared online: BIT, MIT and CIT. BIT, MIT and CIT are not displayed on the label which is correct as they weren't detected. Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-02	MIT, BIT	<0.1 (BIT) 0.058 (MIT)	Inconsistent labelling. Label indicates presence of BIT and MIT in the product, however, only MIT was detected at low concentrations. Additionally, EUH208 is displayed based on content of MIT ("Contains Methylisothiazolinone. May produce an allergic reaction") which is not required due to concentration below the specific concentration limit (of 1.5 mg/kg) which triggers EUH208 according to CLP. Preservatives declared online: MIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-03	C(M)IT/MIT (3:1)	<0.1 (BIT) <0.01 (MIT) <0.01 (CIT)	Inconsistent labelling. EUH208 is displayed on label: "Contains mixture of 5-chloro-2-methyl-4-isothiazolin-3-one (26172-55-4) and 2-methyl-4-isothiazolin-3-one (2682-20-4) (3:1). May produce an allergic reaction" even though none of the main constituents of this mixture were detected. Preservatives declared online: CIT and MIT (C(M)IT:MIT (3:1))
H-04	Sodium pyrithione, BIT	18.5 (BIT) <0.01 (MIT)	Inconsistent labelling. BIT detected. Its presence is displayed on the label. Preservatives declared online: BIT Detected concentration of BIT is below the specific concentration limit (of 36 mg/kg) which triggers EUH208 according to CLP. Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-06	None	<0.1 (BIT) <0.01 (MIT) 110 (benzyl alcohol)	Inconsistent labelling. Label doesn't indicate the presence of benzyl alcohol although it was detected and its indication on the label is mandatory if used as preservative or perfume. Detected concentration of benzyl alcohol is below the concentration limit (of 1000 mg/kg) which triggers EUH208 according to CLP. "Parfum", "limonene", "eugenol", "benzyl benzoate", "linalool" and "cinnamal" included in the ingredient list (INCI). The phrases "non-toxic household cleaner", "not harming the environment" and "scented with essential oils" are displayed on the label. Preservatives declared online: Benzyl alcohol. Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-08	Sodium benzoate	<0.1 (BIT) <0.01 (MIT)	Inconsistent labelling. Label doesn't indicate the presence of BIT and MIT in the product which is okay as none of these were detected. Preservatives declared online: BIT and MIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-09	BIT, MIT	<0.1 (BIT) 0.1 (MIT)	Inconsistent labelling. Label indicates the presence of BIT and MIT in the product; however, only MIT was detected. Additionally, label contains also H317; however, there is no reference to MIT or BIT. Detected concentration of MIT is below the specific concentration limit (of 1.5 mg/kg) which triggers EUH208 according to CLP. Preservatives declared online: BIT and MIT
H-12	None	<0.1 (BIT) <0.01 (MIT)	Not evaluated - non-EU product (not labelled according to CLP). The ingredient list on label (INCI) doesn't indicate the presence of a preservative. Preservatives declared online: No information provided.
H-13	"alcohol" (ethanol) listed in the INCI	<0.1 (BIT) 0.014 (MIT)	Not evaluated - non-EU product (not labelled according to CLP). MIT detected; its presence is not indicated on the label (ok - if present as an impurity). Detected concentration of MIT is below the specific concentration limit (of 1.5 mg/kg) which triggers EUH208 according to CLP. Preservatives declared online: No information provided.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
Cleaning – Bathroom/kitchen/descaling			Inconsistent labelling.
H-45	None	<0.1 (BIT)	No preservatives contained according to label and no preservatives detected.
		<0.01 (MIT)	Preservatives declared online: C(M)IT/MIT (3:1)
		<0.01 (CIT)	Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-46	Sodium pyrithione and BIT	2.25 (BIT)	Inconsistent labelling.
		<0.01 (MIT)	BIT has been detected and is mentioned on the label.
			Detected concentration of BIT is below the specific concentration limit (of 36 mg/kg) which triggers EUH208 according to CLP.
H-48	CIT, MIT, DMDM hydantoin		Preservatives declared online: BIT and MIT
			Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-49	None	<0.1 (BIT)	Inconsistent labelling.
		<0.01 (MIT)	Benzyl alcohol detected but not present on the label (ok - if present as an impurity).
		51 (benzyl alcohol)	Preservatives declared online: Sodium pyrithione and BIT
			Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-50	MIT, laurylamine dipropylenediamine, BIT and BBIT	<0.1 (BIT) 0.1 (BBIT) 0.05 (MIT)	Inconsistent labelling. BIT indicated on the label but could not be detected. BBIT and MIT are indicated and detected at low level. The product is labelled as H317 according to CLP. Preservatives declared online: BIT and MIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-51	MIT, laurylamine dipropylenediamine, BIT	74 (BIT) 55 (MIT)	Correct labelling. The product is labelled with H317 - "May cause an allergic skin reaction" which is correct as the content of MIT is above the specific concentration limit (of 15 mg/kg) which triggers H317 according to CLP. High level of MIT detected. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: MIT, laurylamine dipropylenediamine and BIT
H-52	C(M)IT/MIT (3:1)	<0.1 (BIT) 2.1 (MIT) 28 (CIT) 2.7 (benzyl alcohol)	Correct labelling. Benzyl alcohol detected but not mentioned on the label (ok - if present as an impurity). EUH208 is correctly displayed on label: "Contains mixture of 5-chloro-2-methyl-4-isothiazolin-3-one (26172-55-4) and 2-methyl-4-isothiazolin-3-one (2682-20-4) (3:1). May produce an allergic reaction". Preservatives declared online: CIT and MIT (C(M)IT:MIT (3:1))
H-53	None	<0.1 (BIT) <0.01 (MIT)	Correct labelling. No preservatives contained according to label and no preservatives detected. Preservatives declared online: No information provided.
H-54	Unknown	<0.1 (BIT) <0.01 (MIT) 0.01 (CIT)	Not evaluated - non-EU product (not labelled according to CLP). CIT detected at LOQ; labelling in Chinese.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-55	Unknown/none	<0.1 (BIT) 0.57 (MIT) 2.7 (benzyl alcohol)	Not evaluated - non-EU product (not labelled according to CLP). Benzyl alcohol must be mentioned on the label if used as preservative or perfume. No preservatives listed in the ingredient list on the label (INCI) but the surfactant sodium laureth sulfate is listed (according to information provided by stakeholder AllergyCertified raw materials containing sodium laureth sulfate may be preserved by use of MIT).

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
Cleaning (scouring cream)			
H-29	Phenoxyethanol	<0.1 (BIT) <0.01 (MIT)	Inconsistent labelling. Only phenoxyethanol listed on the label which is okay since BIT and MIT were not detected. Preservatives declared online: BIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-30	MIT	17.5 (BIT) 6.8 (MIT)	Inconsistent labelling. BIT detected but not mentioned on the label. Labelled H317 which is not in line with measured content of MIT (the concentration of MIT is below the specific concentration limit of 15 mg/kg which triggers H317 according to CLP but above the limit of 1.5 mg/kg triggering EUH208). Preservatives declared online: MIT and BIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-31	Sodium Pyrithione, BIT	<0.1 (BIT) <0.01 (MIT)	Possible inconsistent labelling. Label indicates presence of BIT; however, this preservative was not detected. Preservatives declared online: Sodium Pyrithione and BIT
H-32	BIT, MIT, laurylamine dipropylenediamine	0.11 (BIT) 21 (MIT)	Inconsistent labelling. EUH208 is displayed on label. Needs to be labelled H317 – “contains methylisothiazolinone. May cause an allergic skin reaction” as the concentration of MIT is above the specific concentration limit (of 15 mg/kg) which triggers H317 according to CLP. High level of MIT detected. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: BIT, MIT and laurylamine dipropylenediamine.
H-33	Bronopol and CMIT/MIT (3:1)	<0.1 (BIT) <0.01 (MIT) <0.01 (CIT)	Possible inconsistent labelling. C(M)IT/MIT listed on the label but CIT and MIT which are main constituents of this mixture were not detected. Preservatives declared online: Bronopol, CIT and MIT (C(M)IT:MIT (3:1))

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-36	BIT, laurylamine dipropylenediamine	45 (BIT) 52 (MIT)	Inconsistent labelling Needs to be labelled as H317 - "Contains methylisothiazolinone. May cause an allergic skin reaction" as the concentration of MIT is above the specific concentration limit (of 15 mg/kg) which triggers H317 according to CLP. The product is labelled EUH208 (based on content of BIT). High level of MIT detected. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: BIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-37	MIT, BIT	11.25 (BIT) 0.1 (MIT)	Inconsistent labelling Product labelled EUH208 based on content of MIT which is not in line with results as measured content of MIT is below the specific concentration limit (of 1.5 mg/kg) triggering EUH208 according to CLP. Content of BIT is below the specific concentration limit (of 36 mg/kg) triggering EUH208 according to CLP. Preservatives declared online: MIT Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-38	None	<0.1 (BIT) <0.01 (MIT)	Correct labelling. BIT and MIT not detected so they don't have to be indicated on the label. Preservatives declared online: No information provided.
H-40	Unknown	<0.1 (BIT) 0.59 (MIT)	Not evaluated - non-EU product (not labelled according to CLP). MIT detected. Preservatives declared online: No information provided (labelling in Chinese)
Cleaning wipes			

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-15	BIT, MIT	14 (BIT) 42 (MIT)	Correct labelling. Both BIT and MIT detected and labelled. H317 is displayed on the label based on content of MIT which is in line with results as the concentration of MIT is above the specific concentration limit (of 15 mg/kg) which triggers H317 according to CLP. High level of MIT detected. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: BIT and MIT.
H-17	BIT	17.5 (BIT) <0.01 (MIT)	Inconsistent labelling. BIT detected and listed on the label. Content of BIT is below the specific concentration limit (of 36 mg/kg) triggering EUH208 according to CLP. Preservatives declared online: BIT and MIT. Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-18	BIT, OIT, Phenoxyethanol	9.00 (BIT) <0.01 (MIT) 0.56 (OIT)	Inconsistent labelling. EUH208 is displayed on the label based on content of OIT which is not in line with results as measured content of OIT is below the specific concentration limit (of 1.5 mg/kg) triggering EUH208 according to CLP. Content of BIT is below the specific concentration limit (of 36 mg/kg) triggering EUH208 according to CLP. Preservatives declared online: BIT, OIT, Phenoxyethanol
H-19	Phenoxyethanol, BIT, MIT, CIT	<0.1 (BIT) 0.8 (MIT) <0.01 (CIT)	Inconsistent labelling. BIT and CIT listed on the label as present in the product but neither of the two was detected. EUH208 is displayed with reference to content of the preservative "CMIT/MIT (3:1) mixture" which is not in line with measured content. Preservatives declared online: Phenoxyethanol, BIT, MIT and CIT (C(M)IT:MIT (3:1))

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-20	C(M)IT:MIT (3:1)	<0.1 (BIT) 0.1 (MIT) 4.6 (CIT)	Correct labelling. EUH208 is displayed on label: "Contains mixture of 5-chloro-2-methyl-4-isothiazolin-3-one (26172-55-4) and 2-methyl-4-isothiazolin-3-one (2682-20-4) (3:1). May produce an allergic reaction". Preservatives declared online: CIT and MIT (C(M)IT:MIT (3:1))
H-21	None (/Benzalkonium chloride)	<0.1 (BIT) <0.01 (MIT)	Correct labelling. Based on information provided on the label the product is probably to be categorised as a PT 2 biocidal product (wipes for disinfection of surfaces) and not as a detergent product. According to the labelling it contains benzalkonium chloride (CAS No. 68424-85-1), which is an active substance approved for use in PT 2.
H-22	None	<0.1 (BIT) 0.02 (MIT)	Correct labelling. MIT detected at low level but not indicated on the label (ok - if present as an impurity). Preservatives declared online: No information provided.
H-26	Unknown	<0.1 (BIT) <0.01 (MIT)	Not evaluated - non-EU product (not labelled according to CLP). BIT and MIT not detected so they don't have to be indicated on the label Preservatives declared online: No information provided.
H-28	Unknown	<0.1 (BIT) 0.04 (MIT)	Not evaluated - non-EU product (not labelled according to CLP). MIT detected. Preservatives declared online: No information provided (labelling in Chinese)
Dishwashing - Hand dishwashing			

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-58	BIT, MIT	0.23 (BIT) 0.62 (MIT)	Inconsistent labelling. Both BIT and MIT detected and displayed on the label. H317 is displayed on the label which is not in line with results as the concentration of MIT is below the specific concentration limit (of 1.5 mg/kg) and as the concentration of BIT is below the specific concentration limit (of 36 mg/kg) which triggers EUH208 according to CLP. Preservatives declared online: MIT. Please note there is inconsistency when comparing preservatives listed on the label vs declaration of preservatives online.
H-59	BIT, MIT, phenoxyethanol	0.15 (BIT) 0.22 (MIT)	Inconsistent labelling. BIT and MIT detected and included on the label. EUH208 is displayed on the label based on content of MIT which is not in line with results as the concentration of MIT is below the specific concentration limit (of 1.5 mg/kg) triggering EUH208 according to CLP. The concentration of BIT is below the specific concentration limit (of 36 mg/kg) which triggers EUH208 according to CLP. Preservatives declared online: BIT, MIT and phenoxyethanol.
H-60	BIT, phenoxyethanol	0.23 (BIT) <0.01 (MIT)	Correct labelling. BIT detected and labelled. Content of BIT is below the specific concentration limit (of 36 mg/kg) triggering EUH208 according to CLP. Preservatives declared online: BIT and phenoxyethanol.
H-61	Bronopol, OIT	<0.1 (BIT) <0.01 (MIT) 1.15 (OIT)	Correct labelling. OIT detected and displayed on the label. Product also labelled H317 which may be based on content of perfume (limonene). Concentration of OIT is below the specific concentration limit (of 1.5 mg/kg) triggering EUH208 according to CLP. Preservatives declared online: Bronopol, OIT.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-62	Bronopol, OIT	<0.1 (BIT) <0.01 (MIT) 0.96 (OIT)	Correct labelling. OIT detected and displayed on the label. Product also labelled H317 which may be based on content of perfume (citral, citronellol, limonene). Concentration of OIT is below the specific concentration limit (of 1.5 mg/kg) triggering EUH208 according to CLP. Preservatives declared online: Bronopol, OIT.
H-63	C(M)IT:MIT (3:1)	<0.1 (BIT) 0.12 (MIT) 1.3 (CIT)	Possible inconsistent labelling. EUH208 is displayed on label: "Contains mixture of 5-chloro-2-methyl-4-isothiazolin-3-one (26172-55-4) and 2-methyl-4-isothiazolin-3-one (2682-20-4) (3:1). May produce an allergic reaction" which is not perfectly in line with results (as concentrations of both MIT and CIT are below the specific concentration limit (of 1.5 mg/kg) for C(M)IT:MIT (3:1) triggering EUH208 according to CLP. Preservatives declared online: CIT and MIT (C(M)IT:MIT (3:1))
H-64	MIT, laurylamine dipropylenediamine, BIT	0.13 (BIT) 27 (MIT)	Correct labelling. Both BIT and MIT detected and included on the label. Product is also labelled with H317 which is in line with results as the concentration of MIT is above the specific concentration limit (of 15 mg/kg) which triggers H317 according to CLP. High level of MIT detected. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: MIT, laurylamine dipropylenediamine, BIT

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-66	BIT, MIT	<0.1 (BIT) 190 (MIT)	Possible inconsistent labelling. Both BIT and MIT are displayed on the label but only MIT is detected. H317 is displayed on the label which is in line with results as the concentration of MIT is above the specific concentration limit (of 15 mg/kg) triggering H317 according to CLP. Very high content of MIT. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: BIT and MIT.
H-67	MIT, BIT	<0.1 (BIT) <0.01 (MIT)	Possible inconsistent labelling. Label indicates presence of BIT and MIT, however none of these was detected. Preservatives declared online: MIT and BIT
H-69	None	<0.1 (BIT) 0.35 (MIT)	Not evaluated - non-EU product (not labelled according to CLP). MIT detected but not displayed on label. However, the product contains SLS (Sodium lauryl sulfate). According to information provided by stakeholder (AllergyCertified) raw materials containing SLS may be preserved by use of MIT. Preservatives declared online: No information provided/unknown
Laundry - Delicate/wool/silk			
H-72	MIT, BIT	<0.1 (BIT) 77.5 (MIT)	Inconsistent labelling. BIT and MIT labelled but only MIT detected at elevated concentrations. H317 is displayed on the label based on content of MIT which is in line with results as the concentration of MIT is above the specific concentration limit (of 15 mg/kg) triggering H317 according to CLP. Very high content of MIT. It is important to note that this product will not be allowed AFTER the approval date of MIT (unless reformulated) as the concentration of MIT exceeds 15 mg/kg. Preservatives declared online: BIT and MIT.

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-74	Phenoxyethanol, Didecyltrimonium Chloride, BIT	<0.1 (BIT) <0.01 (MIT)	Possible inconsistent labelling. Label indicates presence of BIT; however, BIT was not detected. Preservatives declared online: Phenoxyethanol, Didecyltrimonium Chloride, BIT
H-75	BIT, MIT	<0.1 (BIT) 4.45 (MIT)	Inconsistent labelling. BIT and MIT labelled but only MIT was detected. The label also displays H317 based on the content of MIT which is not in line with results as the concentration of MIT is below the specific concentration limit (of 15 mg/kg) triggering H317 according to CLP. According to results the product should be labelled EUH208 instead. Preservatives declared online: BIT and MIT.
H-77	Benzyl alcohol	<0.1 (BIT) <0.01 (MIT) 5,500 (benzyl alcohol)	Correct labelling. Benzyl alcohol indicated on the label and detected at elevated concentration. Concentration of benzyl alcohol is below the concentration limit (of 10000 mg/kg) triggering H317 but above the concentration limit (of 1000 mg/kg) triggering EUH208 according to CLP (mandatory as of 1 st of September 2025 (due to harmonised classification of benzyl alcohol as Skin Sens 1B; H317 applicable as of 1 st of September 2025 (ATP21))). Preservatives declared online: Benzyl alcohol.
H-78	MIT and CIT	<0.1 (BIT) 0.23 (MIT) 0.073 (CIT)	Possible inconsistent labelling. EUH208 is displayed on label: "Contains MIT and CIT. May produce an allergic reaction" which is not perfectly in line with results (as concentrations of both MIT and CIT are below the (specific) concentration limit (of 1.5 mg/kg) for MIT and 1000 mg/kg for CIT triggering EUH208 according to CLP. Preservatives declared online: CIT and MIT

Product	Preservatives listed on the label	Measured preservative content, mg/kg	Label evaluation
H-81	Benzyl alcohol	<0.1 (BIT) <0.01 (MIT) 5,550 (benzyl alcohol)	Correct labelling. Benzyl alcohol indicated on the label and detected at elevated concentration. Concentration of benzyl alcohol is below the concentration limit (of 10000 mg/kg) triggering H317 but above the concentration limit (of 1000 mg/kg) triggering EUH208 according to CLP (mandatory as of 1st of September 2025 (due to harmonised classification of benzyl alcohol as Skin Sens 1B; H317 applicable as of 1st of September 2025 (ATP21))). Preservatives declared online: Benzyl alcohol.

Mapping and chemical analysis of preservatives used in cleaning and washing products

Liquid washing and cleaning products require preservation to prevent foilage during storage. However, the widespread use of allergenic preservatives can lead to skin sensitisation and allergic contact dermatitis. The incidence of contact allergy caused by some of these substances has been shown to be increasing.

It was assessed that knowledge is lacking concerning the extent of use and concentration of preservatives in washing and cleaning products that are available to Danish consumers. This project maps their use, quantifies the content, discusses health-related issues, and helps to clarify the need for further regulation.

Market information shows that a small number of preservatives (phenoxyethanol, ethanol, methylisothiazolinone (MIT), benzisothiazolinone (BIT) and sodium benzoate) dominate, and that preservatives are often used in combination. Of 53 products analysed, 29 contained two or more preservatives. The most common combination was MIT and BIT (16 products).

MIT occurred most frequently in the analysed products. The highest concentration (190 ppm) was found in a hand-dishwashing liquid purchased in the EU. In seven cases the measured concentration exceeded the forthcoming EU limit value.

Recent EU approvals set maximum limits (360 ppm (BIT); 15 ppm (MIT)) applicable by 1 October 2026 (BIT) and 1 February 2027 (MIT). The limits equal the substances' specific concentration limits triggering classification as Skin Sens. 1A (H317) under the CLP Regulation.

Possible labelling discrepancies were observed for 31 of the 53 products analysed. Such inconsistencies make it difficult for consumers to avoid specific substances. Clear and reliable product labelling is important for consumer safety - especially for people who are already sensitised to certain chemicals.



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