Economic impact of losing effective in-can preservatives

Final Report

For A.I.S.E.

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EXECUTIVE SUMMARY

This study has been carried out for the International Association for Soaps, Detergents and Maintenance Products (A.I.S.E.) to assess the economic impact of losing the detergent industries top-5 in-can preservative (ICP) agents respectively biocidal active substances: (i) Benzisothiazolinone (BIT), (ii) Methylisothiazolinone (MIT), (iii) Mixture of Chloromethylisothiazolinone and Methylisothiazolinone (3:1 Mixture of CMIT/MIT), (iv) Bronopol, and (v) Phenoxyethanol). Under the Biocidal Products Regulation (BPR), about 50 actives are currently allowed to be used as ICPs, however in practice only about 5-10 of these actives are technically compatible with detergents and maintenance products formulations.

The detergents' industry is concerned that authorities – in the context of the Biocidal Products Regulation (BPR) – take very conservative decisions that unnecessarily restrict (or ban) the use of these five key and other preservative actives. ICPs are required in water based formulations to ensure the durability of every day products used within the household care and professional care & hygiene sectors, such as in all-purpose hard surface cleaners, laundry detergents and hand dishwashing liquids. Liquid formulas of household care products are increasing in popularity relative to solids such as powders. In order to ensure the efficacy of these products and enable safe storage by users, ICPs are a necessary component in these formulations. Even with industrial hygiene measures during the manufacturing process of the products - which are already established and common in the sector - in-can preservation cannot be avoided.

A.I.S.E. initiated a survey in September 2017 that was completed by 59 companies. These companies have an EU market share of 71% and therefore the survey results can be considered to be representative for the sector. The main results of this survey are summarised below:

- On average 60% of companies total product portfolio (based on turnover) uses ICPs. This includes both large firms and Small and Medium sized Enterprises (SMEs).
- The turnover of EU products made with ICPs is estimated at €18.3 billion / year.
- The estimated R&D cost of reformulating away from these 5 ICPs to other ICPs allowed under BPR is ~€215 million. The average time required by large firms is four years (who have a number of products to reformulate) vs. SMEs who on average require around 2 years (as they typically have fewer products to reformulate). This would account for a large proportion of the R&D budget of the sector, meaning either: (i) other R&D activities being forgone, (ii) a reduction in profits or (iii) higher prices for end-users.
- Switching to another ICPs allowed under BPR, is also estimated to increase the average formula cost by 3% and increase production costs (on average by €1.8 million/company. The main impact to consumers noted (by 67% of respondents) was a reduced-shelf life of products meaning alternative ICPs would not be as effective.
- A more fundamental reformulation is whereby companies reformulate so that ICPs are no longer required. These alternatives may include formulations with reduced water composition, or a move away from liquids to solids or powder formulations that users would have to dilute in water before use. Developing these alternative formulations would require more time and be of a higher cost than developing products with a new preservative system. Therefore the costs would be higher than €215 million. However it is not possible to say without further R&D investment how much higher the costs would be.

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LIST OF ABBREVIATIONS

A.I.S.E.	International Association for Soaps, Detergents and Maintenance Products
BIT	Benzisothiazolinone
BPR	Biocidal Products Regulation
CMIT	Chloromethylisothiazolinone
EC	European Commission
FTE	Full Time Equivalent
HH	Household
ICP	In-Can Preservative
MIT	Methylisothiazolinone
PC&H	Professional Cleaning & Hygiene
R&D	Research and Development

1 INTRODUCTION

1.1 What are in-can preservatives?

In-can preservatives (ICPs) are required as a preservative in water based products to ensure the durability of every day products used within the household care and professional care & hygiene sectors, such as in laundry detergents and hand dishwashing liquids. Liquid formulas of household care products are increasing in popularity relative to solids such as powders[1]. In order to ensure the efficacy of these products and enable safe storage by users, ICPs are a necessary component in these formulations.

Possible alternatives to ICPs include options such as:

- Sterilisation/pasteurisation: this option would affect or even destroy product properties, and does not offer long-term protection once the products are opened
- Maintaining products in cold conditions throughout the supply chain and even at end users' place, which is not conceivable nor sustainable
- Germ-free production conditions: this option is not feasible nor affordable especially for SMEs and cannot prevent contamination during the use phase of the products
- Formulating products that do not need to be preserved:
    - Water-free liquid formulations: this is not possible for all type of products, it would require formulating either highly concentrated formulations that end users would need to dilute before use (potential safety concerns) or solvent based formulations (which have environmental concerns)
    - Solid/ powder formulations: this is only possible in a few areas such as laundry detergents, but would be against market demand.

1.2 Current regulatory status

Under the Biocidal Products Regulation (BPR), about 50 biocidal active substances can be used as ICPs, however in practice only about 5-10 of these substances are technically compatible with detergents and maintenance products formulations.[2] In 2016, A.I.S.E. undertook a survey to identify the main ICPs used by its members; the top-5 identified from this survey have informed the survey used in this analysis:

1. Benzisothiazolinone (BIT);
2. Methylisothiazolinone (MIT);
3. Mixture of Chloromethylisothiazolinone and Methylisothiazolinone (3:1 Mixture of CMIT/MIT);
4. Bronopol; and
5. Phenoxyethanol.

The detergents' industry is concerned that authorities – in the context of the Biocidal Products Regulation (BPR) – take very conservative decisions that unnecessarily restrict (or ban) the use of preservatives. The downstream consequences of hazardous classification (Classification & Labelling

[1] A.I.S.E., (2017a). *Preservatives: Key Biocidal Ingredients to Preserve Liquid Detergents - A call to secure their future availability*. International Association for Soaps, Detergents and Maintenance Products.
[2] A.I.S.E. survey 2016

Regulation vs Biocidal Products Regulation) drive industry into reformulation whilst some ingredients can be safely used in detergent & cleaning products.

This uncertainty means there is no predictability for A.I.S.E. members on their continued use which could result in significant disruptions within the industry[3].

For industry to innovate under BPR is very challenging, as it requires both a significant amount of time and investment for firms[4]. Cefic estimates that developing new active substances requires approximately 10-15 years from initial research and development to placing the new product on the market[5]. These costs are incurred up-front, with a significant time lag before first sales are achieved. This is particularly challenging for SMEs. According to A.I.S.E. formulating to a different preservative generally includes the following steps: screening for suitable preservatives depending on the product's characteristics, testing of lab samples and selection of the most suitable system(s), pilot plant testing, short and long-term stability testing, and main plant production testing. Moving to free-in can preservatives products would also need market acceptance and consumer habits changes (e.g. having a surface cleaner in the form of a solid capsule that you need to dissolve in water before use) which cannot be guaranteed[6]. In both cases, other elements have to be considered such as the sourcing/availability of new ingredient(s) and also financial checks and approval. These would add to costs of internal resources needed to reformulate.

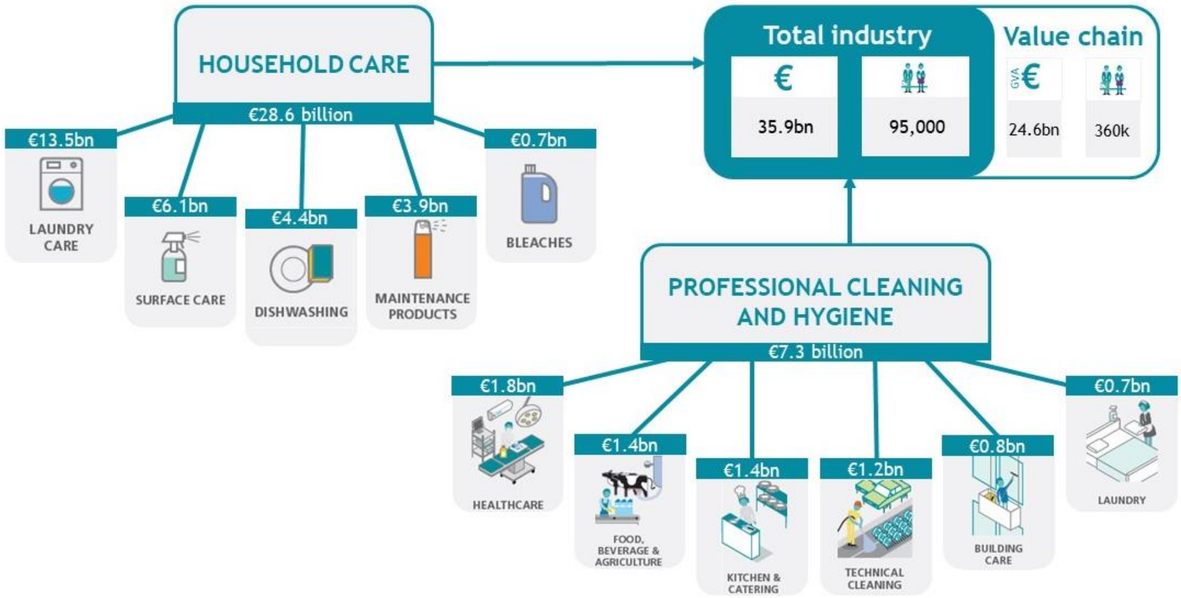
1.3 EU detergents and maintenance market

A.I.S.E. represents over 900 companies located in the EU who are active in the soaps, detergents or maintenance sector.[7] While six companies generate 65% of sales in the EU household care sector, this sector also includes hundreds of additional companies – in larger part Small and Medium sized Enterprises (SMEs) – who are primarily active at the national level and generate 20% of EU sales. The remaining 15% of EU sales are generated by own label brands. The professional cleaning and hygiene sector consists of more than 500 SMEs active in niche markets at national level as well as three multi-national companies active at a European level.[8]

As of 2017, the European market – here considered as including the EU countries, Switzerland and Norway - for detergents and maintenance products was estimated to have a total market value of €35.9 billion as shown in Figure 1.1.[9] The household care sector is the bigger sector accounting for €28.6 billion, while the professional cleaning and hygiene sector accounts for €7.3 billion.[10] The four biggest sectors in the household care sector, i.e. laundry care, surface care, dishwashing and maintenance products can be split in further sub-categories.

[3] A.I.S.E., (2017a).
[4] Cefic. (2017). Position Paper: Annex I – Innovation in the biocides industry – general considerations relevant for preservatives.
[5] Cefic, (2017).
[6] A.I.S.E., (2017a).
[7] A.I.S.E. (2018). Activity & Sustainability Report 2017-18. Retrieved from: https://www.aise.eu/documents/document/20180619141803-aise_ar17-18_def_web.pdf
[8] A.I.S.E. (2016a). *A manifesto for economic growth & competitiveness in Europe by the household care and professional cleaning & hygiene industry.*
[9] A.I.S.E. (2018).
[10] A.I.S.E. (2018).

Figure 1.1: EU detergents and maintenance market.



Source: Adapted from data in A.I.S.E. (2018).

1.4 Aims and objectives of this study

A.I.S.E. together with other industry stakeholders have raised their concern on the future availability of ICPs with biocides authorities at national and EU level. Member States acknowledged the issue but asked for more information on the economic impact. A.I.S.E. initiated a survey in September 2017, where its members were asked to assess the economic impact of losing the detergent industry top-5 in-can preservative agents. The responses from this survey have been used within this report to quantify the impacts of not being able to use these top-5 substances anymore.

2 A.I.S.E. SURVEY RESULTS

2.1 Introduction

A survey was carried out in September 2017 by A.I.S.E. (henceforth 'the survey'), where its members were asked to assess the economic impact of losing the top-5 preservative agents used by the sector, based on 2 scenarios:

- Reformulate company's portfolio with the other in-can preservatives allowed under BPR (either approved or in the review program, or in BPR Annex I)
- Redesign/reformulate company's portfolio so that in-can preservatives are not needed, for example formulations with reduced water-level, or solid/ powder formulations that the user will have to dilute in water before use.

The survey questionnaire can be found in **Appendix 1**. Survey respondents provided a mixture of quantitative and qualitative information which have been collated and form the basis for the analysis presented in this report.

2.2 Number of responses

A total of 59 A.I.S.E. members took part in the survey operating across the household care (HH) market sector, the professional cleaning & hygiene (PC&H) sector, or both HH and PC&H. A breakdown of survey respondents and the corresponding market they serve is presented in Table 2.1. The majority of survey respondents (49%) stated they operate in the household sector, with almost a third of respondents stating that they produce products for both households and professional cleaning & hygiene.

Table 2.1: Survey respondents by market sector.

Market sector	Number of respondents	%
Household (HH)	29	49%
Professional Cleaning & Hygiene (PC&H)	13	22%
Both HH & PC&H	17	29%
Total survey respondents	**59**	**100%**

Table notes:

1. Total sample size =59 (i.e. number of companies that responded to the survey with data). A.I.S.E. assisted in providing information on two respondents that did not indicate which sector they operated in.

The overall market share of respondents was determined using Euromonitor[11] data for the household care sector in 2017. Euromonitor contained market information for 10/59 respondents; Table 2.2 shows the estimated market share of these 10 respondents (66%).

[11] Further details on Euromonitor can be found at: http://www.euromonitor.com/

Table 2.2: Survey respondent market share.

	Number of respondents	Market share (%)
Market share of respondents who have market share reported in Euromonitor	10	66%
Assumed market share of respondents who did not have turnover data within Euromonitor data	49	5%
TOTAL	**59**	**71%**

Table notes:

1. Euromonitor does not report market share below 0.1% - assumption is those respondents not included in Euromonitor each have 0.1% market share (this may overestimate the market share of these respondents). However as Euromonitor data does not include PC&H sector assuming these respondents have a market share of 0.1% would therefore overall underestimate the total market share of these respondents.

As the respondents represent a good proportion of the market share, the results derived from this survey can be considered to be representative for the sector.

2.3 Products that need in-can preservatives

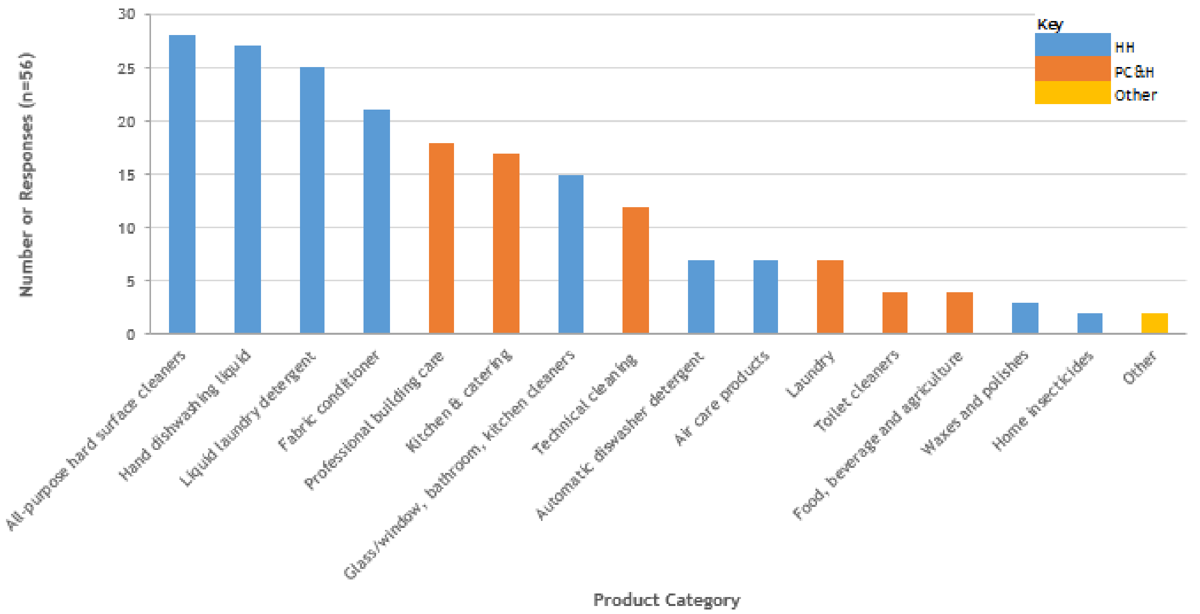
Respondents were asked to indicate what products in their portfolio need in-can preservatives (Question 1). A.I.S.E. responses have been categorised by product type using the A.I.S.E. Activity and Sustainability report[12] and the A.I.S.E. product portfolio definitions for over-arching product categories[13].

Figure 2.1 presents the types of products categories affected, as a count of the number of responses that mentioned products that fall under these product categories. Amongst the different products that require ICPs, all-purpose hard surface cleaners, hand dishwashing liquids, and liquid laundry detergents are the most common household care products in respondent's product portfolios that might be affected (respectively 28, 27 and 25 responses). For professional cleaning & hygiene, the most common products affected are used for building care and products for kitchen & catering (18 and 17 responses respectively).

[12] A.I.S.E. (2017b).

[13] HH care products include: laundry care, surface care (incl. toilet care), dishwashing maintenance products and bleaches. PC&H products include: healthcare, food & beverage, kitchen & catering, building care, laundry and technical cleaning.

Figure 2.1: Product categories that use in-can preservatives.



Graph notes:

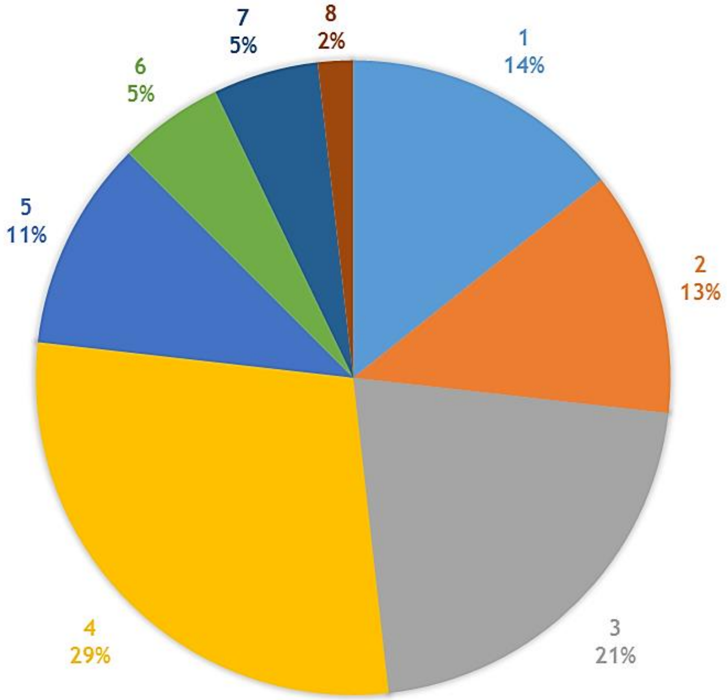
1. Based on sample of 56 respondents. One respondent noted that they do not use any of these five in-can preservatives (ICPs) and one HH respondent (who uses 3/5 ICPs) did not indicate which products they use them in. One respondent indicated that they use ICPs in cosmetics products only, a category not covered by A.I.S.E..

The survey did not collect quantitative information, such as the number of products or formulations (e.g. the number of all-purpose hard surface cleaners) within a respondents' product portfolio that would be affected if ICPs could no longer be used. Despite this limitation, the number of product categories using ICPs does function as a useful proxy of overall effort, where if a company operates across multiple product categories, they would need to expend more effort and resources to reformulate these products if regulation were to change.

As shown in Figure 2.2 around 50% of respondents indicated that three to four product categories in their product portfolios use ICPs. Around 23% of respondents have five to eight product categories in their product portfolios that use ICPs. Looking at the responses of the five largest firms[14], they have indicated that 4 or more product categories in their respective portfolios require ICPs. On the other hand, the majority of smaller firms (48%) are expected to reformulate 4 or less. **This would indicate that both large and smaller firms may face large reformulation costs, depending on the number of formulations or products that would require reformulating under each product category.**

[14] Five largest firms defined by market share (%) based on Euromonitor data from 2017.

Figure 2.2: Number of product categories that use in-can preservatives.



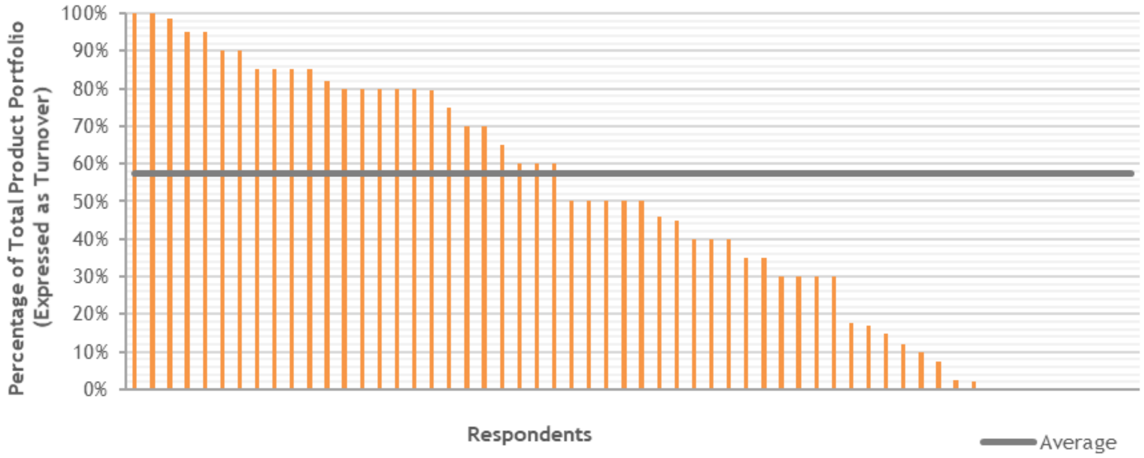
Graph notes:

1. The number at each segment indicates the quantities of product categories using ICPs. The percentage indicates the share of respondents.
2. Based on sample of 56 respondents. One respondent noted that they do not use any of these five in-can preservatives (ICPs) and one HH respondent (who uses 3/5 ICPs) did not indicate which products they use them in. One respondent indicated that they use ICPs in cosmetics products only, a category not covered by A.I.S.E..
3. Large firms have to reformulate across 4+ product categories, whilst just over half of small firms will have to reformulate between 1-3 product categories. Note there will be several formulations with a single product category so the number of product categories affected is only a proxy of the scale of effort required.

2.4 Total portfolio affected

Respondents were asked to indicate what percentage of their total product portfolio uses ICPs, and to provide an estimate of the corresponding turnover of this percentage (Question 2). Figure 2.3 shows the percentage of total product portfolio affected by ICPs, where each bar represents one respondent. On average, 57% of a company's total portfolio of products, expressed as turnover, (as shown by the grey line) uses ICPs.

Figure 2.3: Percentage of total product portfolio that use ICPs.



Graph notes:

1. Based on a sample size of 50. A total of 9 respondents did not answer this question.
2. 5 respondents did not provide a single percentage value, but rather a range. The midpoint of this range has been used.
3. All percentage values provided have been interpreted as total product portfolio affected expressed as a percentage of turnover. However, it is possible that some respondents have expressed the total product portfolio affected as a percentage of stock keeping units (sku). The difference between the two units of measure is not expected to be significant.

The question also asked for the corresponding turnover (in Euros) that could be affected. 31 survey respondents provided this information on turnover, which totalled €5,957 million. For those respondents that provided a percentage estimate of the impact, but not a corresponding turnover, their corresponding turnover was estimated using their turnover data as reported by Euromonitor turnover (for 2017), for the household care sector. This was possible for 9 respondents. A further 15 respondents' turnover affected was estimated using the percentage of their product portfolio affected and the average turnover affected by respondents in their corresponding sector (i.e. HH, PC&H or both HH and PC&H).

The total respondent turnover affected was estimated to be €11,243 million, as shown in Table 2.3. The majority of this stems from the affected turnover in the HH sector, where over €10,600 million worth of sales could be affected if regulation on ICPs were to change.

Table 2.3: Total market turnover for respondents and extrapolated to EU-28.

Market sector	Aggregated turnover affected - Respondents only (€ million)	Market turnover affected extrapolated to the EU-28 (€ million)
HH	10,653	17,364
PC&H	590	962
Total	**11,243**	**18,327**

Table notes:

1. Respondent data is based on a sample size of 31. A total of 28 respondents did not provide data and 9 respondents turnover affected were calculated using their % of portfolio affected and turnover data available in Euromonitor for those that produce products for the HH sector. 2 respondents turnover will be underestimated using Euromonitor data as they sell to both the HH sector and PC&H, but Euromonitor data only has data for the HH sector.
2. 15 respondents turnover affected were calculated using their % of portfolio affected and the average turnover affected by respondents in their corresponding sector (i.e. HH, PC&H, or both HH and PC&H).
3. The total market turnover affected in the EU-28 accounts for respondents + non-respondents to the survey. It has been uplifted based on the total market share of the respondents who provided turnover data (=37%).

The respondent's aggregated turnover affected was used to extrapolate to the total market turnover affected for the whole of the EU-28 (i.e. accounting for those that data not take part in the survey). Table 2.3 shows that the total market turnover affected in the EU is estimated at €18,300 million, where again the HH sector accounts for the majority of the impacted turnover.

According to Euromonitor, the total turnover in the household care sector is estimated at €28,513 million, indicating that the estimated affected turnover in the EU-28 represents 64% of total turnover. The largest five firms account for 28% of the turnover affected in the EU-28 with smaller firms representing 36%. **Therefore, based on the two approaches presented (one based on percentage values and one based on monetary values), it is estimated that ~60% of total turnover is affected.**

2.5 Economic impact of reformulating with the other in-can preservatives allowed under BPR (either approved or in the review program, or in BPR Annex I)

2.5.1 R&D costs to find workable and sustainable alternatives

Respondents were asked to indicate what the research and development (R&D) costs and/or the full time equivalent (FTEs) to find workable and sustainable alternatives for products in their portfolios that use ICPs, and how long this would take (Question 3.1). For this question, respondents were specifically asked about using other in-can preservative(s) allowed under BPR (either approved or in the review program, or in BPR Annex I).

The consensus from the respondents is that developing these alternatives using other in-can preservative(s) active substances allowed under BPR would require a massive effort in terms of time and resources. Respondents highlighted that the costs associated with this R&D include stability and performance testing, toxicology testing and staff costs.

In total 32 respondents estimated what their R&D costs would be in monetary terms. A further 24 respondents provided an estimate of the FTEs required for this undertaking, and 40 respondents provided the time required in years to complete this task. For those that did provide both R&D costs and FTE information, it was not entirely clear if FTE estimates were factored into the R&D cost estimate or not. Bearing this in mind, Table 2.4 presents the total R&D cost for respondents and extrapolated to the EU-28 by market sector.

Table 2.4: Total R&D costs for respondents and extrapolated to EU-28.

Market sector	Aggregated total R&D cost - Respondents only (€ million)	Total R&D cost extrapolated to the EU-28 (€ million)
HH	135 - 140	199 - 206
PC&H	8 - 10	12 - 14
Total	**144 - 150**	**211 - 220**

Table notes:

1. 10 respondents did not provide any quantitative information. 3 respondents did not provide a response to any part of the question.
2. 32 respondents provided R&D cost data. 2 respondents gave R&D cost as a range, in these cases the mid-point of the range was used as their R&D cost.

3. 24 respondents provided FTE estimates. An additional 20 respondent's FTEs were estimated as the average FTE required for small firms. One respondent's FTE was estimated as the maximum FTE required amongst large firms who respondents, with another respondent's FTE estimated as the average FTE required by large firms.
4. 40 respondents provided time required in years. Of which 6 gave time required as a range, in these cases the mid-point of the range was used as their time required. An additional 5 respondent's time required were estimated as the average time required for small firms. With another respondent's time required estimated as the maximum time needed for large firms.
5. The total R&D cost in the EU-28 accounts for respondents + non-respondents. It has been uplifted based on the total market share of the respondents who provided R&D data (=54%).
6. Each FTE required has been valued at a fixed value of €100,000. This assumption may not effectively capture staff costs, which are likely to vary across EU member states as well as by the type of workers required in the R&D for suitable alternatives.

The costs have been presented as a range whereby the lower value excludes those respondents where it is unclear if FTEs have been factored into their estimated R&D costs, representing a sample size of 33. The higher value includes the respondents FTE costs along with their reported R&D costs. As a result, the aggregated total R&D cost for respondents is estimated between €144 and €150 million, which is attributed primarily to the HH sector in their development of alternatives using other in-can preservative(s) allowed under BPR. **Respondents representing the largest five firms estimated that on average their R&D efforts would take 4 years, whilst on average smaller firms required less time stating 2 years.** This could be because large firms (on average) will have more products to reformulate.

The respondent's aggregated total R&D cost was used to extrapolate to the total R&D cost for the whole EU-28 (i.e. accounting for non-respondents). **Table 2.4 shows that total R&D cost in the EU-28 ranges between €211 and €220 million.** The HH sector bares the majority of this cost estimated between €199 and €206 million. As the uplift factor used for the extrapolation is based on Euromonitor market share data, which only considers the HH sector, the estimated costs may be an underestimation for those firms representing the PC&H sector. Additionally, the estimate does not adequately account for those firms that serve both the HH and PC&H sectors.

It is estimated that around €0.2 billion in total would need to be spent on R&D for the EU-28 (see Table 2.4) over a 2-4 year period. **The estimated cost to reformulate products using the top-5 ICPs would therefore consume a large proportion of the annual R&D budget estimated for the sector**, as shown in Table 2.5. Therefore, companies would have to either: (i) forego other R&D activities, (ii) forego some profit, or (iii) pass the cost onto consumers through higher prices, to cover the cost of reformulation.

Table 2.5: Estimate of profits and R&D expenditure of the EU detergent and maintenance sector (2017).

	Household care sector	Professional cleaning & hygiene sector	Total
Annual Turnover (2017)	€28.6 billion	€7.3 billion	€35.9 billion
Estimated profits (2017)	€2.7 billion	€0.7 billion	€3.3 billion
Estimated R&D expenditure (2017)	€0.3 billion	<€0.1 billion	€0.3 billion

Table notes:
1. Turnover for 2017 is taken from A.I.S.E. (2018).
2. Estimated profits and R&D expenditure is derived based on data extracted from Eurostat. See Appendix 2 for further details.

The only other comparative available is from the A.I.S.E. (2016b)[15] study whereby it is estimated that companies spend 2-3% of turnover on science. This would give an upper budget of up to €0.7-1 billion per year. The estimated cost to reformulate products using the top-5 ICPs would still consume a significant proportion of the annual R&D budget estimated for the sector.

2.5.2 Impact on formula cost

Respondents were asked to estimate what the impact (increase) on formula cost would be of losing the top-5 ICPs (Question 3.2). Table 2.6 presents the minimum, maximum, average, and median increase in formula cost.

Table 2.6: Impact on formula cost (all respondents) and breakdown by firm size.

Increase in formula cost	Large Firms (% of formula cost)	Small Firms (% of formula cost)	All Firms (% of formula cost)
Minimum	1.5%	0.15%	0.15%
Maximum	25%	33%	33%
Average (mean)	8%	5%	5%
Median	4%	3%	3%
Number of Responses (n)	4	32	36

Table notes:

1. 16 respondents did not provide any quantitative information. 5 respondents did not respond.
2. 11 respondents provided a range of formula cost %, a midpoint of this range has been used.
3. One respondent provided a range of formula cost % for specific product categories, the midpoint of the minimum and maximum of this range has been used.
4. Large and small firms have been defined by market share (%) based on Euromonitor data from 2017. Of the 59 survey respondents, a total of 5 are classed as large firms, with the remaining 54 respondents classed as small firms.

Respondents all agreed that products will become more expensive as the cost of a new preservation system could be between 2 to 10 times higher. On average (mean), respondents estimated that the formula cost would increase by 5%. The highest reported cost increase is 33%, with a minimum of less than 1%. The large range in values can be attributed to the difficulty companies have in assessing increases in formula costs. Given this large range, the median increase of 3% seems a more reasonable estimate.

2.5.3 Impact on production costs

Respondents were asked to estimate the impact on production costs resulting from switching from the top-5 ICPs (Question 3.3) to using other in-can preservative(s) allowed under BPR. A total of 54 respondents answered the question; of which 31 provided a quantitative response.

Respondents considered the costs of artwork change, changing labels such as list of ingredients and the modification of production plants requiring investments in water and waste systems. Four respondents stated that there would be no impact stating that once a new preservative is found the cost in production would not change. Three respondents estimated that it would take 6 months to a year to implement the necessary changes to artwork or production plants. But overall, it was concluded that the impact on production costs would depend on the type of product in question, the alternative preservative(s) found, and how much re-formulation is needed. As a result of all these

[15] A.I.S.E. (2016b). The Household Care and professional cleaning and hygiene products industry: A socio-economic analysis. The Huggard Consulting Group.

variables it was difficult for respondents to provide estimates at this stage, since there is no clear idea on the alternatives available.

Table 2.7 presents the minimum, maximum, average, and median increase in production costs. On average, respondents estimated that the impact on production costs could amount to €1.8 million, with responses ranging between €0.001million and €40 million. It is unclear from the survey responses if these are annual costs or one-off cost. This range in production costs is partly explained by the difference between estimates provided by large and small firms, shown in Table 2.7. On average, large firms estimate that the impact on production costs would amount to approximately €15.8 million. For small firms, the average impact on production costs is estimated at roughly €275,000. The discrepancy reflects not only firm size, the number of products affected, but also the lack of information that firms have to base these estimates on.

Table 2.7: Increase in production costs (all respondents) and break down by firm size

Impact on production costs	Large Firms (€ million)	Small Firms (€ million)	All Firms (€ million)
Minimum	Confidential	0.001	0.001
Maximum	Confidential	4.6	40.0
Average (mean)	15.8	0.3	1.8
Median	Confidential	0.1	0.1
Number of Responses (n)	Confidential	28	31

Table notes:

1. 12 respondents did not provide any quantitative information. 4 respondents concluded there would be no impact on production costs. 5 respondents did not respond.
2. 3 respondents provided a range of the impact on product costs, a midpoint of this range has been used.
3. Large and small firms have been defined by market share (%) based on Euromonitor data from 2017. Of the 59 survey respondents, a total of 5 are classed as large firms, with the remaining 54 respondents classed as small firms.

2.5.4 Impact on the supply chain

Respondents were asked to provide an idea of the impact on the supply chain (economic or other) of losing the top-5 ICPs (Question 3.4). 10 respondents did not answer the question, with an additional 5 stating that there would be no impact. Those stating no impact assumed there would be no impact on product quality or other effects, except perhaps the price of the product. 14 respondents stated that the impact is currently unknown at this point, as it is difficult to evaluate without knowing what alternatives will be used to replace the top-5 ICPs and the necessary testing of these alternatives has not been undertaken.

Based on 30 respondents who noted a possible impact, these ranged from product quality e.g. reduced shelf life or product effectiveness to economic impacts such as higher prices or reduction in supply. The most frequently mentioned impact is reduced shelf-life of products (67%). Economic consequences such as reduced supply and competition was also mentioned (17%), including the complete loss of certain products on the market as result of a total ban (e.g. if reformulation has not been possible/viable). There could also be a higher risk of contamination by workers or consumers using the product (13%). It is important to not consider these impacts in isolation, but rather as knock-on effects of each other. For example, one respondent stated that without ICPs, not only does the shelf-life decrease but the product is also less stable, making storage and handling of products by workers and consumers more important.

2.6 Economic impact of formulating products that do not need ICPs

2.6.1 R&D costs to design/formulate products that do not need in-can preservatives

Respondents were asked to estimate the R&D costs and/or the FTEs to develop alternatives that do not need ICPs for their entire product portfolio, and to specify how long this would take (Question 4.1). These alternatives may include formulations with reduced water composition, the move away from liquids to solids or powder formulations that users would have to dilute in water before use. As this is a fundamentally different product to what they currently produce, it was difficult for respondents to answer this question. 9 respondents stated that it would not be possible, as such reformulation is not viable for the products they produce, an issue for those producing certain car care products and wipes.

It was generally agreed, that developing these alternative formulations would require more time and be of a higher cost than developing products with a new preservative system. Therefore the costs would be higher than €220 million as estimated in Table 2.4. However it is not possible to say without further R&D investment how much higher the costs would be.

2.6.2 Potential drawbacks of such alternatives

Respondents were asked to consider the potential drawbacks of producing products that do not need any ICPs (Question 4.2). Respondents stated drawbacks such as (i) reduced product quality (i.e. shelf-life), (ii) issues with the technical performance of the product, and (iii) health and safety concerns. Again the response rate is limited with 7 respondents not providing any feedback. A further 8 respondents stated that the drawbacks of such products is unknown, primarily as it is difficult to evaluate this hypothetical situation.

For the remaining 43 respondents:

- The majority (49%) stated that the main drawbacks of these reformulations would be higher economic costs. This includes additional investment in plants, the cost of raw materials and changes to product costs.
- 35% of respondents have concerns regarding the technical performance of the alternatives, mentioning the stability, functionality, and higher risk of contamination.
- 33% of respondents stated a potential drawback as being the complete loss of the product on the market (e.g. when it is not possible / viable to reformulate with an ICP).
- 23% of respondents mentioned health and safety drawbacks such as issues with sanitation and risk of sensitisation.
- 14% of respondents mentioned issues related product quality such as reduced shelf-life and product efficacy.
- 5% of respondents mentioned higher consumer prices as a point of concern.
- 5% of respondents mentioned market acceptance as a drawback, with respect to product formulations being accepted or consumer expectations being a barrier to acceptance.

APPENDIX 1: A.I.S.E. SURVEY QUESTIONS

A.I.S.E. carried out in September 2017, where its members were asked to assess the economic impact of losing the top-5 preservative agents used by the sector under 2 scenarios. The scenarios are described in Section 2.1 of the main report.

The survey distributed to A.I.S.E. members consisted of the following questions:

1. What are the products in your portfolio that need in-can preservatives?
2. Which part of your total portfolio (considering detergents, cleaning & maintenance products only) does it represent? What is the corresponding turnover in Euros?
3. If you can no longer use BIT, MIT, CMIT/MIT, Bronopol and Phenoxyethanol in the future, what would be the economic impact for your company of reformulating your portfolio with the OTHER in-can preservatives allowed under BPR (either approved or in the review program, or in BPR Annex I).
    1. What would be the R&D costs and/or FTE's (Full Time Equivalent) to find workable and sustainable alternatives for your portfolio - please consider cost of human resources (research, discussion with suppliers...), testing costs (e.g. stability tests, performance tests etc.) - specify how long it would take.
    2. What would be the impact on formula cost?
    3. What would be the impact on production costs? (e.g. artwork changes, investments in the plants)
    4. What would be the impact (economic or other) in the supply chain? (e.g. reduced shelf life, more waste)
4. If you can no longer use BIT, MIT, CMIT/MIT, Bronopol and Phenoxyethanol in the future, a potential alternative (medium-long term) could be to design/formulate products that do NOT need in-can preservatives, for example formulations with reduced water-level, or solid/ powder formulations that the user will have to dilute in water before use, etc.
    1. Can you estimate (roughly) the R&D costs and/or FTE's (Full Time Equivalent) to develop such alternatives for your entire portfolio? Please specify an estimation of how long it would take.
    2. What would be the potential drawbacks of such alternatives? Please quantify them if possible.
5. Do you have other remarks?

APPENDIX 2: EUROSTAT DATA

In order to put the estimated costs of reformulation into context, data is required on the how much the EU detergent and maintenance market currently spends on R&D and if any increase in costs is affordable. Currently information on profitability and how much R&D is spent is not readily available to A.I.S.E or through market providers (e.g. Euromonitor data).

Therefore in the absence of information directly provided by the industry, data was retrieved from Eurostat Structural Business Statistics (SBS) on the manufacture of soap and detergents, cleaning and polishing preparations for the EU-27 (NACE code 20.41). An overview of what is included in the NACE code 20.41 dataset is shown below.

20.41 Manufacture of soap and detergents, cleaning and polishing preparations

This class includes:
- manufacture of organic surface-active agents
- manufacture of paper, wadding, felt etc. coated or covered with soap or detergent
- manufacture of glycerol
- manufacture of soap, except cosmetic soap
- manufacture of surface-active preparations:
  • washing powders in solid or liquid form and detergents
  • dish-washing preparations
  • textile softeners
- manufacture of cleaning and polishing products:
  • preparations for perfuming or deodorising rooms
  • artificial waxes and prepared waxes
  • polishes and creams for leather
  • polishes and creams for wood
  • polishes for coachwork, glass and metal
  • scouring pastes and powders, including paper, wadding etc. coated or covered with these
This class excludes:
- manufacture of separate, chemically defined compounds, see 20.13, 20.14
- manufacture of glycerol, synthesised from petroleum products, see 20.14
- manufacture of cosmetic soap, see 20.42

Data on turnover or gross premiums written (€ million), gross operating surplus (€ million) and total intra-mural R&D expenditure (€ million) were used to derive the average profit and R&D expenditure relative to turnover based on five EU member states (as data was not available at EU-27/28 level). The five EU member states chosen were the five Member States with the highest total average turnover during the five-year data time interval[16]. Data extracted from Class 20.41, provided totals for the aforementioned factors as well as a break down by firm size based on number of employees. The results for all firm sizes are shown in Table A.1.

[16] Five EU member states used in the calculations: Germany, Spain, France, Italy and the United Kingdom.

Table A.1: Gross operating surplus and total intra-mural R&D expenditure as a percentage of turnover, for all firms

Selected Member States	Unit	2002	2003	2004	2005	2006	2007	Average
Gross operating surplus	% of turnover	9.7%	9.4%	9.8%	9.3%	9.4%	8.0%	**9.3%**
Total intra-mural R & D expenditure	% of turnover	0.6%	1.2%	1.3%	0.8%	1.0%	0.7%	**0.9%**

Using the percentage numbers in Table A.1 and based on the latest available turnover data for the EU detergent and maintenance market for 2017, it is estimated that in 2017, the industry spent €0.3 billion on R&D and made €3.3 billion in profits.

Table A.2: Estimate of profits and R&D expenditure of the EU detergent and maintenance sector (2017).

	Household care sector	Professional cleaning & hygiene sector	Total
Annual Turnover (2017)	€28.6 billion	€7.3 billion	€35.9 billion
Estimated profits (2017)	€2.7 billion	€0.7 billion	€3.3 billion
Estimated R&D expenditure (2017)	€0.3 billion	<€0.1 billion	€0.3 billion

The only other comparative available is from the A.I.S.E. (2016b)[17] study whereby it is estimated that companies spend 2-3% of turnover on science. This would give an upper budget of up to €0.7-1 billion per year.

[17] A.I.S.E. (2016b). The Household Care and professional cleaning and hygiene products industry: A socio-economic analysis. The Huggard Consulting Group.