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Report: Biocidal products in facade coatings campaign 2016-2017

Market monitoring of facade products containing biocidal products

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Executive Summary

1 Introduction

1.1 Background

Facade products such as paint, wood varnishes and plaster are often treated with biocidal products to protect them against infestation with algae and fungi on the facade. This is an effective way of preventing unwanted discolouration of the facade. However, studies have shown that active substances are leached out of facades by rain and may pass into bodies of water in relevant quantities. One frequently employed technique for extending the duration of action and reducing leaching is encapsulation of the active substances. They are then leached from the facade considerably more slowly, provided the overall recipe is optimised for this purpose.
Facade products containing biocidal products are not always recognisable as such by users, meaning that in some cases products of this type are used unintentionally and unnecessarily.

1.2 Objectives

As with all market monitoring performed by the Cantonal Chemicals Offices, the aim was to check the products available on the market for their conformity with chemicals legislation.
A second aim of this campaign was to find out whether and how recommendations for reducing emissions of biocidal products into bodies of water can be derived at the product level.

1.3 Procedure

The first step was to establish the market situation by means of online research and visits to companies in two cantons. The industry was then informed about the legal requirements for chemicals and the forthcoming campaign in a letter and a leaflet. In addition, information was prepared for the enforcement offices. About six months after this preliminary information had been sent, the enforcement offices collected facade products that were subsequently tested for the following active substances in the federal customs laboratory:

Active substance	**CAS No.**	**Effect**	**Permissible product type**				**Selection criterion**
Carbendazim	10605-21-7	Fungicide			PT7	PT10	CMR substance
Dichlofluanid	1085-98-9	Fungicide			PT7		Hazardous to the aqautic environment
Diuron	330-54-1	Algicide			PT7	PT10	CMR substance; Hazardous to the aqautic environment
IPBC (3-iodo-2-propinylbutyl-carbamate)	55406-53-6	Fungicide		PT6	PT7	PT10	Hazardous to the aqautic environment
OIT (octylisothi-azolone)	26530-20-1	Fungicide		PT6	PT7	PT10	Sensitising; Hazardous to the aqautic environment
Propiconazole	60207-90-1	Fungicide			PT7		Hazardous to the aqautic environment
Tebuconazole	107534-96-3	Fungicide			PT7	PT10	CMR substance
Terbutryn	886-50-0	Algicide			PT7	PT10	Hazardous to the aqautic environment
(Pyrithione zinc)	13463-41-7	Fungicide	PT2	PT6	PT7	PT10	Hazardous to the aqautic environment

The active substance pyrithione zinc was also classified as relevant (hazardous to the aqautic environment), but it was not possible to develop an analytical method in the course of this project.

In products containing encapsulated active substances, both the total active substance content and the free (in solution) active substance content were analysed because the latter parameter is used by some manufacturers to classify their products. However, there was no widely accepted method of determining this free content, and it turned out to be heavily dependent on the solvent used to prepare the samples.
The products were evaluated in terms of the chemicals legislation and rectifications were implemented by the cantons.

1.4 Legal context

The Chemicals Ordinance (ChemO; SR 813.11) stipulates the general requirements for classifying, labelling and the safety data sheet. These requirements are largely harmonised with the European requirements stated in the CLP Regulation for classification and labelling (CLP (EC) 1272/2008) and in the REACH Regulation for the safety data sheet (REACH (EC) 1907/2006).

Facade coatings that contain biocidal active substances must comply with the Ordinance on Biocidal Products (OBP, SR 813.12). This regulates the permitted biocidal active substances and divides the products into biocidal products and treated articles. The first category requires an authorisation, the second does not require a special procedure before being brought onto the market. Biocidal products normally have an outward action; they are used, for example, to refurbish a facade that has been disfigured by algae or moss. Treated articles do not have an external action; they contain biocidal active substances which are intended, for example, to protect the facade paint against algae growth.
Switzerland has a mutual recognition agreement for the authorisations of biocidal products with the EU (MRA; SR 0.946.526.81). It means that the OBP is technically equivalent to the biocidal product regulation (R (EU) No 528/2012; BPR); in the subsequent sections the articles of both legislations are referenced.

Legal references for the assessment of the legal conformity of the assessed facade coatings:

Category	Classification	Labelling	Biocidal active substances	Safety data sheet	Number of samples	Note
Mixtures	**ChemO** Self-regulation[1]	**ChemO** Self-regulation	No biocidal active substances permitted	**ChemO** Self-regulation	23	
Treated articles	**ChemO** Self-regulation	**ChemO** Self-regulation Specific labelling for treated articles **OBP** Self-regulation	**OBP** Self-regulation	**ChemO** Self-regulation	69	
Biocidal products	As stipulated in authorisation decision	As stipulated in authorisation decision	As stipulated in authorisation decision	**ChemO** Self-regulation	23	5 of which have no authorisation
Total					**115**	

[1] Self-regulation is the term used in the official translations of the Swiss Chemicals legislation. It stands for the self-responsibility and self-control of companies before placing chemical products on the market.

2 Results and discussion

2.1 Division into treated articles, mixtures and biocidal products

The inspected products were categorised according to their intended use. Treated articles occur mainly in the categories “mineral facade paint”, “plaster for exterior use” and “paint and varnish for wooden facades”. Some products in the categories “film protection” and “refurbishment products for exterior use” are on the market as mixtures although they ought to be authorised as biocidal products (Figure 1).

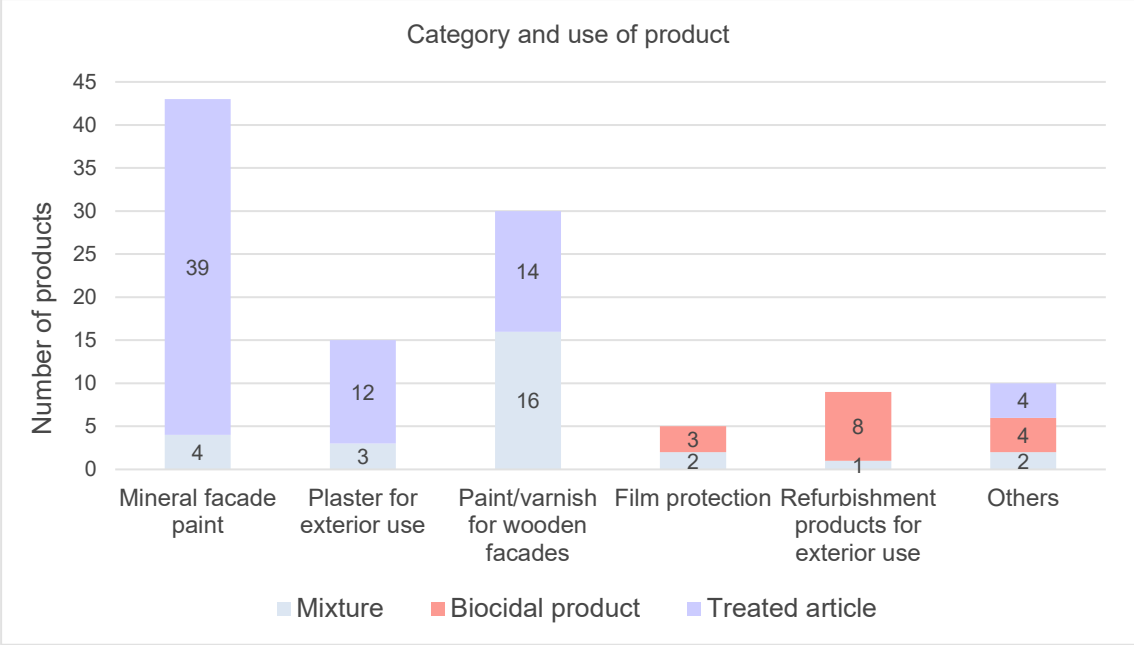

Figure 1: Breakdown of products by application. The results are shown as absolute figures (n=114). Biocidal products without authorisation (n=5) are shown in this figure as mixtures.

2.2 Treated articles

Most of the treated articles contained several biocidal active substances. These were added to the products partly at the manufacturing stage and partly at the point of sale. The fungicidal active substance ocytlisothiazolone (OIT, 59%) and the algicidal active substance terbutryn (44%) were the substances found most often in the treated articles. The algicidal active substances diuron (14%) and propiconazole (4%) and the fungicidal active substance carbendazim (5%) were found less frequently. The fungicides dichlofluanid and tebuconazole were not detected in any of the samples.

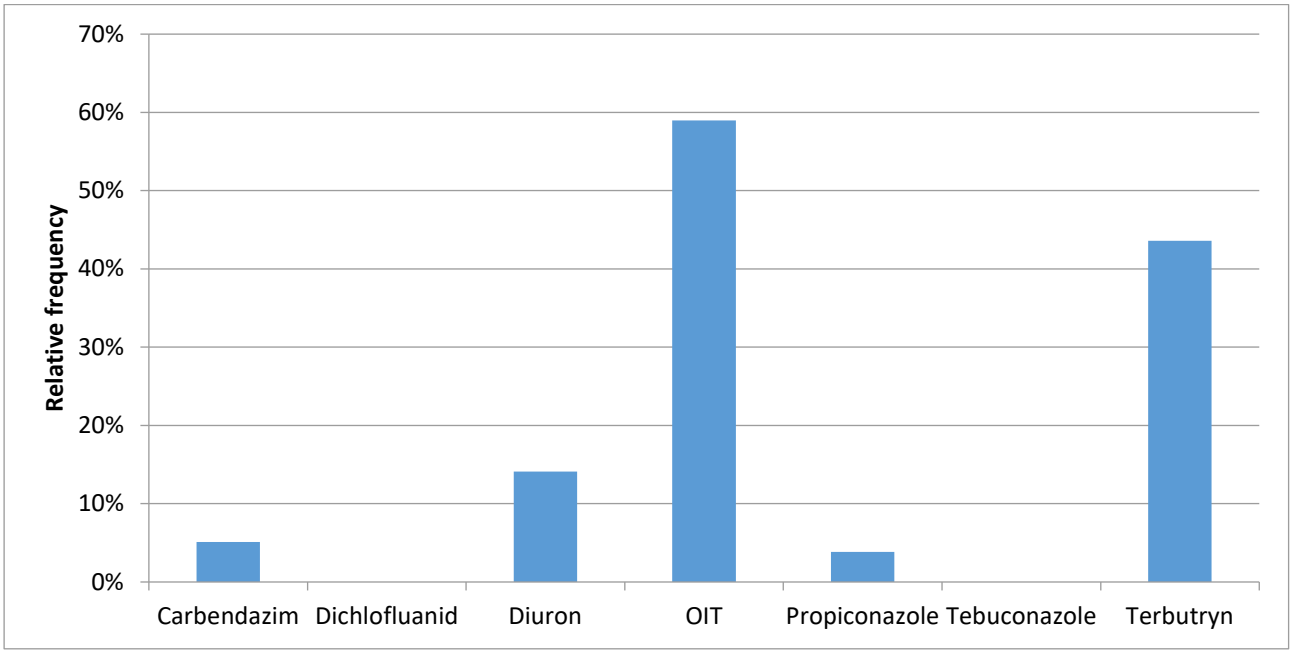

Figure 2: Frequency of analysed active substances in treated articles (note: the products may contain several active substances)

2.2.1 Concentration ranges of the biocidal active substances

The medians of the active substance concentrations in the treated articles were often between 100 and 1,000 mg/kg. The concentrations of the individual active substances were similar in paints for mineral substrates and wood paints, but in plasters the contents were typically lower by a factor of 2 - 4. There were differences between facade paints/plasters and paints for wood in terms of the frequency of active substances used. Wood paints contained terbutryn, diuron and OIT considerably less frequently, but IPBC and propiconazole more frequently.

The analytical investigations of the treated articles also showed that for treated articles the biocidal active substances with low considerationlimits, such as terbutryn and OIT, were often missing in section 3 of the safety data sheet. Terbutryn was listed correctly for only 39% of the examined treated articles in which, according to the results of the analyses, the threshold for consideration was exceeded.

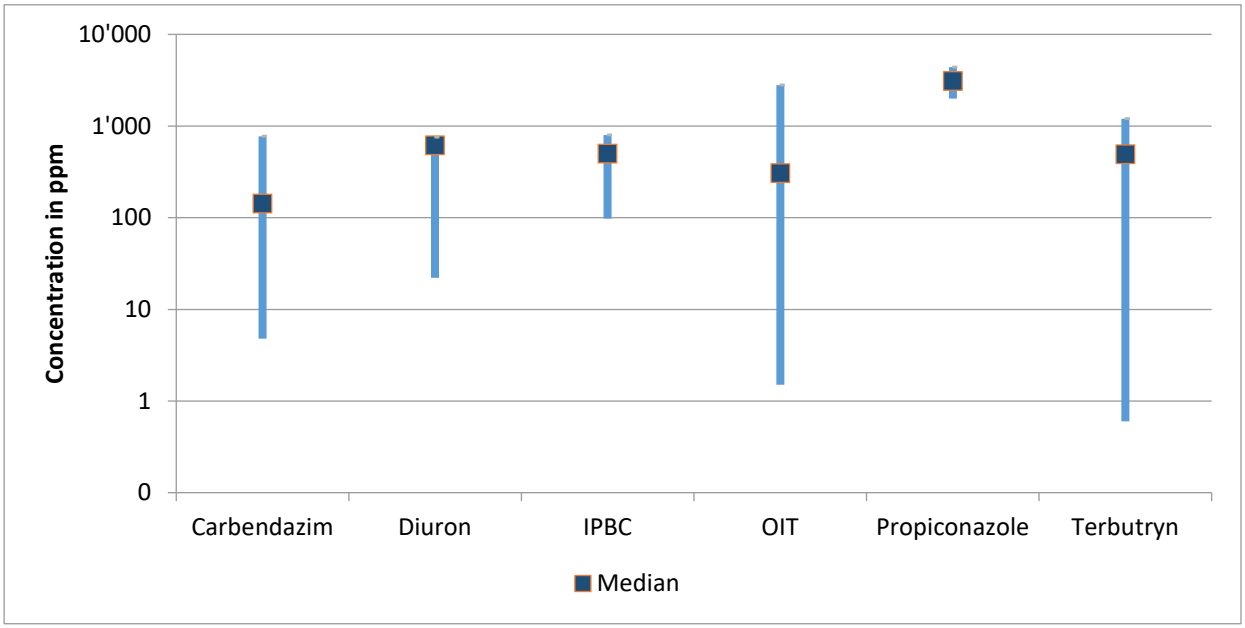

Figure 3: Total content of individual active substances in ppm (log scale)

2.2.2 Specific labelling of treated articles (TA)
There are two cases in which treated articles must be additionally labelled: when their biocidal properties are claimed, and if so specified in the inclusion decision for the active substance concerned. The latter was not the case for the products under investigation.
Only slightly more than half (56%) of the TA had a biocidal claim, so only these had to be specifically labelled.
Figure 4 shows the results of checking the labels of treated articles (Art. 31a para. 1a BPO; Art. 58 (3) BPR). Information about the biocidal treatment (e.g. the names of biocidal active substances or the product name of the biocidal product used) was not given for over 50% of the products. 44% of the products bore no information about use.
Only 14 products fulfilled all the criteria in Figure 4.

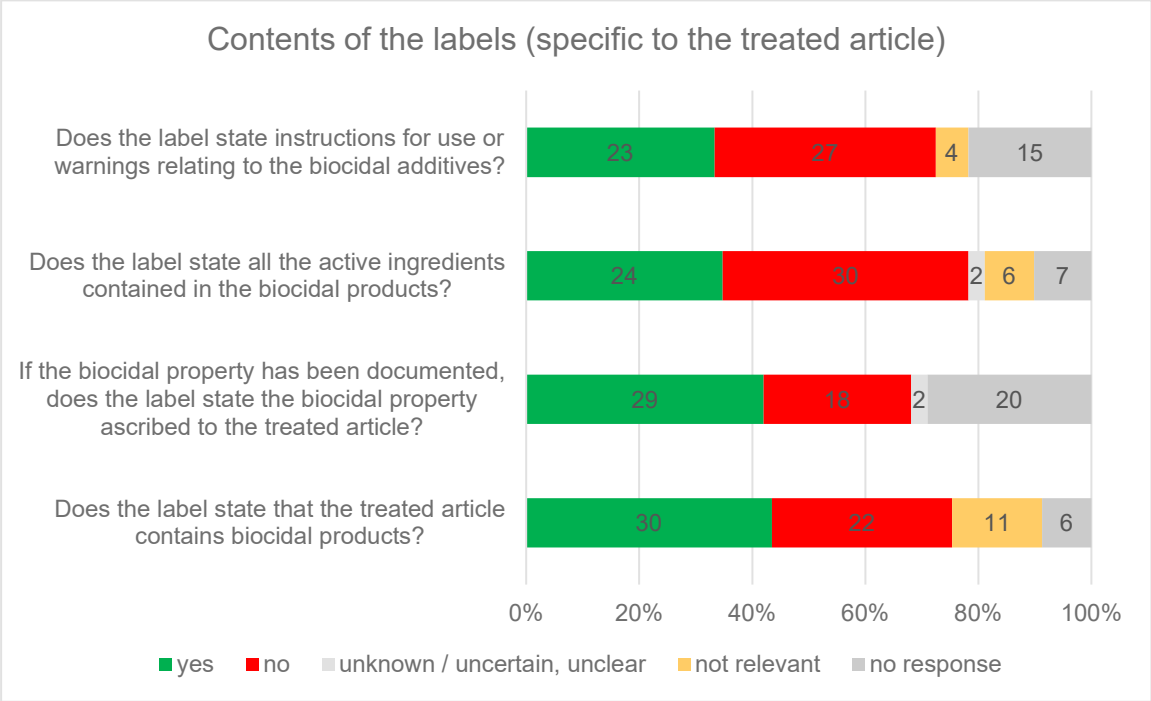

Figure 4: Examination of the content of the labels in accordance with Art. 31a para. 1a BPO. The figure shows the results in percent (%); the absolute number of products evaluated (n=69) is shown in the bars.

2.2.3 Classification and hazard labelling of the treated articles and mixtures
The hazardousness of a product is determined by its ingredients and their concentrations. The hazard pictograms provide the first indication of the product's main hazards. These are described in more detail by the hazard statements. Biocidal products with an authorisation were not included in this evaluation because in these cases the labelling is determined by the authorities. Figure 5 therefore only shows products brought onto the market under self-regulation by the manufacturer.

The necessary hazard statements were missing from 32 of the 98 products, 19 products were not checked for hazard statements. Pictograms and signal words were compliant on almost 90% of the products checked.

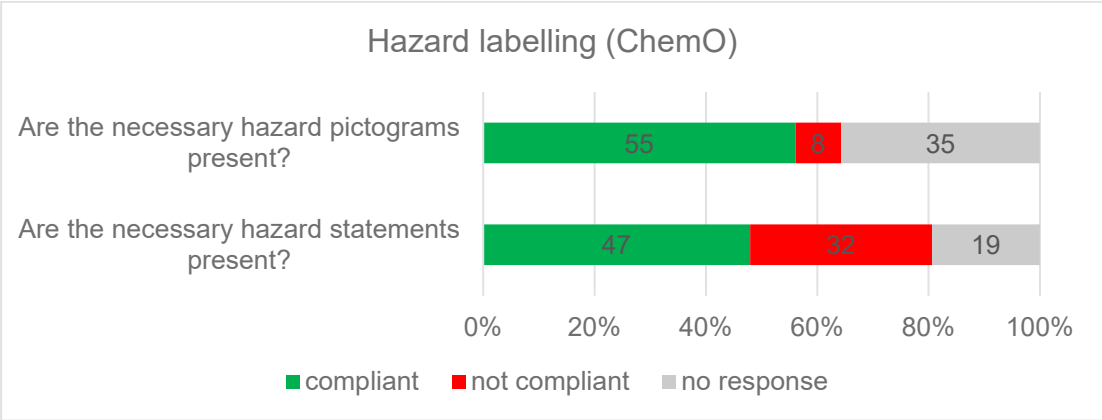

Figure 5: The results of checking the hazard labelling against the requirements of the Chemicals Ordinance. Figure 6 shows the results in percent (%); the absolute number of products evaluated in each case is shown in the bars. This figure does not include biocidal products with an authorisation (n=98).

2.3 Biocidal products

Biocidal products are subject to official orders and are thus not self-regulated.

2.3.1 Specific labelling in accordance with BPO (BPR):
Figure 6 shows the percentage of products categorised by number of deficiencies observed. It summarises 16 selected points of Art. 38 BPO (Art. 69 (2) BPR). 20% of the biocidal products tested (three products) had no deficiencies. The other products had deficiencies.
Five out of 23 biocidal products did not have the required authorisation; these have not been included in the figure. The biocidal products without an authorisation had an even higher deficiency rate. None of them complied with the labelling requirements of Art. 38 BPO (Art. 69 (2) BPR). The sample is of course small, but it still probably reflects the situation on the market.
The declaration of the biocidal active substances has been implemented well on the authorised biocidal products.
As mentioned at the start of the chapter, deficiencies in the implementation of the labelling requirements set out in Art. 38 BPO (Art. 69 (2) BPR) cannot be tolerated. Only the information about the authorised applications and the instructions for use were compliant for all of the biocidal products checked. This data is part of the authorisation decision.

2.3.2 Hazard labelling in accordance with ChemO (CLP):
The implementation of the hazard labelling (pictograms, signal word, hazard statements and precautionary statements) was also checked. The pictograms, signal word and disposal information were implemented correctly. The hazard statements on four products did not correspond to the authorisation decision. The results for hazard labelling in accordance with the ChemO (CLP) can therefore be considered relatively good. The conformity of the hazard labelling of biocidal products with authorisation is considerably better than that of products that are self-regulated.

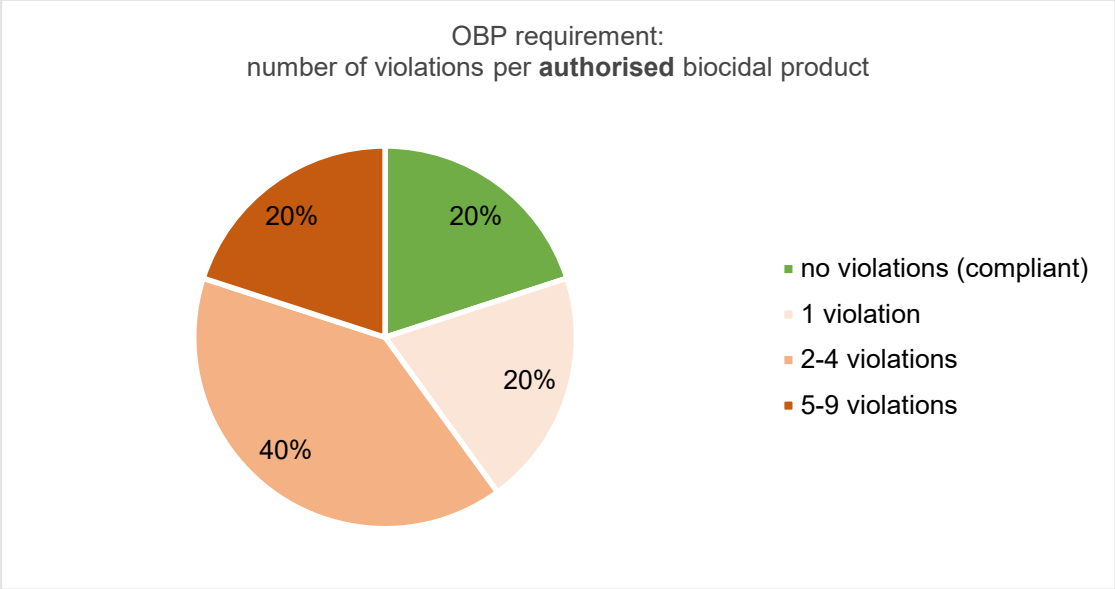

Figure 6: Number of violations per authorised biocidal product. The results are shown in per cent (%). (n = 15)

2.3.3 Safety data sheet

The safety data sheet (SDS) is the central element in transmitting information about a hazardous product. It provides professional operators and the trade with the data needed to handle the respective products correctly. It contains data on the potential hazards and the physical and chemical, toxicological and ecotoxicological properties and the precautionary measures for safe handling (Art. 18 ChemO). It must be produced in accordance with the requirements defined in Art. 20 ChemO (annex II REACH) and the national (non-harmonised, i.e. non-Europe-wide) requirements. The data required under national law checked during this campaign were: the address of the Swiss manufacturer, and the Swiss emergency number (the information hotline operated by Tox Info Suisse).
The results of reviewing the safety data sheets cover all categories of products checked.

Safety data sheet: Section 1 Adaption to national regulations:
The summarised results of reviewing the national requirements for safety data sheets are shown in Figure 7. The national requirements were not implemented correctly in 40% of the products checked. This means that either the address of the Swiss manufacturer/authorisation holder or the Swiss emergency number, or both, were missing.

Safety data sheet: Sections 1 to 3 (not adapted to national regulations):
At least one non-conformity in Sections 1 to 3 was noted in 56% of the products checked. The classification of the products was stated correctly in Section 2 for almost 90% of the products checked. However, in almost 40% of cases the labelling information did not correspond with the information on the product label.
The classification and concentration of the substances listed in Section 3 were stated correctly in 60% of cases.
The results of reviewing Sections 1 to 3 of the safety data sheets are comparable for the different product types mixtures, biocidal products and treated articles.

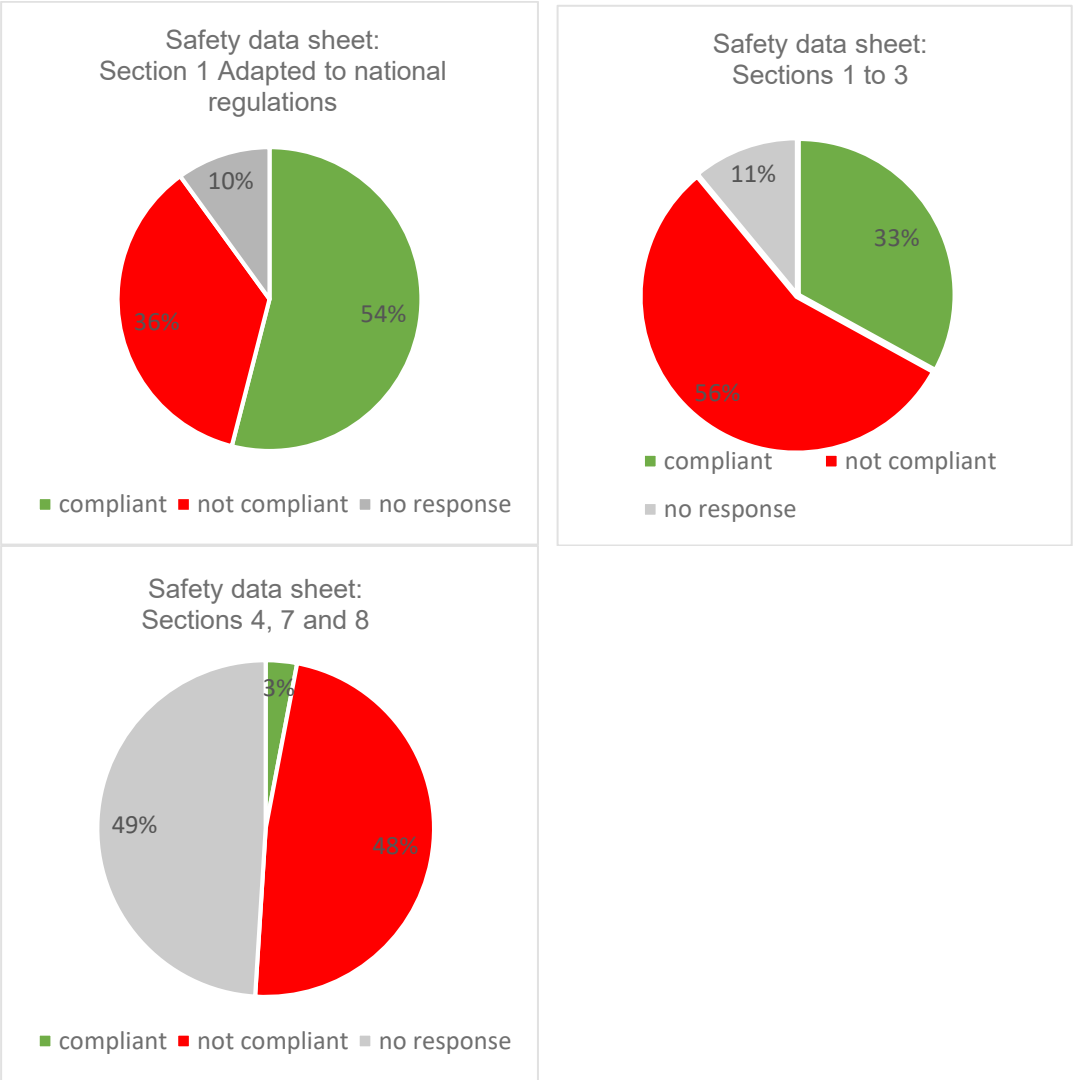

Figure 7: Review of safety data sheets. The results are shown in % (n=116). The evaluation includes the results for all 3 product categories reviewed (mixtures, biocidal products and treated articles).

Safety data sheet: Sections 4, 7 and 8:
Deficiencies in Sections 4, 7 and 8 of the safety data sheets were found for 48% of the products; this aspect was not reviewed for 49%; there were no deficiencies in just 3%.
The first-aid measures listed in Section 4 were adequate in all the safety data sheets reviewed.
The presence of protective measures for handling and storage (incompatibilities between products stored together) or recommendations for specific final uses in Section 7 were reviewed for 30 products; this data was not adequate for 40% of the products reviewed.

The results of reviewing Section 8[2] show that between 35% and over 70% of the products did not state the necessary information about protection of the respiratory tract (71% non-compliant), the hands (58% non-compliant), the eyes (35% non-compliant) or the data on workplace exposure thresholds (60% non-compliant). The required information about precautionary measures for adolescents and pregnant women was non-compliant in 100% of the safety data sheets.

The results of the review of safety data sheets are not gratifying. With the exception of the information on first aid in Section 4, the average rate of non-compliance was 30% and above in all other reviewed sections. Implementation of the safety data sheets is inadequate, particularly given

[2] Section 8 of the safety data sheet was not reviewed for all products. Here the numbers of samples refer only to the tested samples and not to the total number.

that safety data sheets are the most important means of communication along the supply chain between manufacturer, distributor and operator.
The high deficiency rate in terms of listing biocidal active substances with a low threshold for consideration (particularly terbutryn, with a 49% deficiency rate) in Section 3 could be due to the fact that the M-factors for this active substance were not taken into account. It is also possible that for biocidal products and treated articles containing encapsulated biocidal products only the free concentration of the biocidal product stated by the manufacturer was taken into account. However, Section 3 requires the total concentration of active substances to be stated. Individual manufacturers state the total content with the free content in brackets.
With biocidal products and treated articles containing encapsulated active substances it was frequently unclear whether the concentration given in Section 3 was the total concentration or the free concentration of the biocidal active substance, or whether indeed the active substance was encapsulated or not.

2.3.4 Missing active substances in treated articles

There was no information in Section 3 of the SDS about the biocidal active substance used in about 20% of the treated articles. This proportion was up to 50% for active substances with a low threshold for consideration.

2.4 Encapsulated active ingedients

The expected high proportion (80–90%) of products with encapsulated active substances was not confirmed in this project. However, encapsulation is rarely used as a promotional argument and is therefore not communicated very often.
In products with encapsulated active substances, part of the active substance is present in capsules and the rest is present in free form outside the capsules. According to the manufacturer's information, the amount present in free form is relatively small (approx. 10% of the total content). Many manufacturers classify their products on the basis of the free content. It was found, however, that the freely available portion is dependent on the polarity of the solvent. The stated free portion of 10% is likely to be accurate only for purely aqueous solutions. A distinction must therefore be made between two situations: fluid paint in the pot and the dried product on the wall. The first of these two situations is relevant for hazard labelling, the second for the effect of reducing leaching by rain – and thus for ecological benefit.
According to the principles of the globally harmonised system for the classification and labelling of chemicals (GHS), classification should be based on the total active substance content (encapsulated plus free portion) or on tests where available. It was found, however, that for many of the treated articles either only the freely available portion had been taken into account, or the active substances had not been taken into consideration at all. For 40% of the treated articles the total concentration of active substances determined by analysis had not been taken into account correctly when classifying aquatic toxicity, and for around 20% of the treated products the measured total concentration of OIT had not been taken into account when determining the sensitising effect (EUH 208).

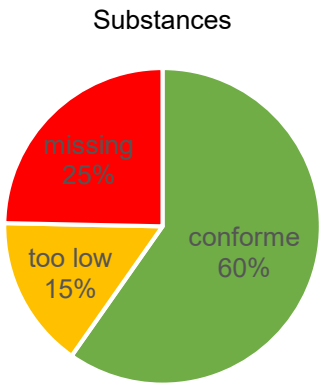

Figure 8: Consideration of the chronic aquatic toxicity of the active substances for labelling purposes, calculated on the basis of the total contents determined by analysis (treated articles, n = 77).

2.5 Further information and findings

Biocidal active substances in product type 7 (protective coatings) are usually referred to as “film protection” by the manufacturers. Many facade products can be ordered with or without film protection. The film protection is often added at the point of sale, meaning that the company concerned then becomes the manufacturer within the meaning of the chemicals legislation. The companies are often not aware of this.

3 Summary and outlook

The campaign showed that there is a high rate of non-compliance among facade products. As in previous campaigns, deficiencies in labelling and in the safety data sheets were common. About 70% of the products tested originated from the EU or the EEA. The specific labelling requirements for treated articles were also not implemented adequately. Additionally, it is regrettable that not all of these requirements are mandatory, so in practice it is not always possible for the user to tell whether film protection has been added to a product or not.

There is a need for further clarification of the analytics and of the inclusion of encapsulated biocidal active substances in the classification of treated articles. A possible change in the portion of freely available biocidal active substances while facade products are in storage also requires further investigation.

The high proportion of facade products containing encapsulated active substances is gratifying from the point of view of aquatic protection; the active substances are leached from the facade to a considerably lesser degree than is the case with non-encapsulated active substances. On the downside, it is regrettable that terbutryn, an active substance with particularly high aquatic toxicity that is poorly degradable, is contained in almost half the products.