



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Project Report Liquid Caps

Table of contents

1	Initial Situation	3
2	Procedure	4
3	Bought and tested products	4
4	Tests	4
5	Results	5
5.1	Aversive agents.....	5
5.2	Dissolution rate	5
5.3	Maximum mechanical Stress	6
6	Additional findings	6
7	Conclusions:	6
8	Order of Events	7
Annex 1		8
Annex 2		9

1 Initial Situation

Liquid Caps are pre-portioned, highly concentrated liquid laundry detergents in a thin film envelope that dissolves during the laundry process. The capsules are frequently colourful, emit a pleasant fragrance and are soft to the touch. This makes them very appealing, particularly to small children, and are confused with sweets. Due to the higher concentrations of surfactants than in conventional laundry detergents poisoning from Liquid Caps occurs more frequently and leads to chemical burns to the throat, swelling in the area of the respiratory tract, eye irritations and even to sporadically documented cases of coma or even death.

Following the increased number of accidents involving Liquid Caps the EU resolved in January 2016 (Number 3.3.3. Annex of the Regulation (EU) no. 1297/2014, Annex 1), *inter alia* that the film envelope must contain aversive substances, which on oral contact would cause the capsules to be immediately spat out. In addition, the capsules must retain their liquid content for at least 30 seconds when placed in water and have to resist a mechanical compressive stress of at least 300 N. These provisions are sensible in order to prevent accidents with Liquid Caps. In the context of the harmonisation of the Swiss Chemicals Law with the European Law these provisions were also adopted by Switzerland.

In the present project the Federal Office of Public Health (FOPH) wants to ascertain whether these requirements have been implemented for those Liquid Caps on the Swiss market, and to decide whether further measures need to be taken.



2 Procedure

In order to ascertain whether the requirements listed above have been implemented for Liquid Caps in Switzerland the FOPH bought 11 different Liquid Caps in retail shops and on the Internet. These were the only products that were found to be available on the Swiss market.

3 Bought and tested products

- Total 1 for all Caps
- Omo Dual Action Fresh Clean Caps
- Omo Ultimate Active DualCaps
- Ariel 3in1Pods Colorwaschmittel
- Ariel 3in1Pods Vollwaschmittel
- Persil Power-Mix Caps Universal
- Persil Power-Mix Caps Color
- Persil Duo-Caps Universal
- Persil Duo-Caps Color
- Coral Optimal Color Caps
- Coral Black Velvet Caps

4 Tests

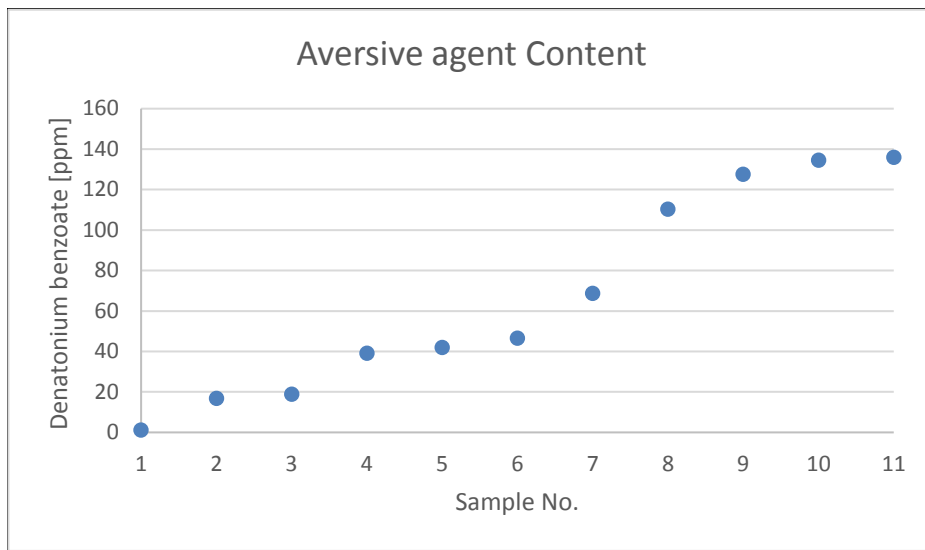
1. Do the envelopes of the Caps contain aversive substances (denatonium benzoate) or not?
The capsules shall contain an aversive agent which elicits oral repulsive behaviour within a maximum time of 6 seconds, in case of accidental oral exposure.
2. How long does it take for the Capsules to dissolve in water at 20 °C?
The capsule shall retain its liquid content for at least 30 seconds when the capsule is placed in water at 20 °C.
3. What is the maximum stress that the capsules can withstand?
The capsules shall resist mechanical compressive strength of at least 300 N under standard test conditions.

The first two tests were carried out by the Laboratory of the Directorate General of Customs, the third by RUAG AG. Additional parameters, such as for example opening the outer packaging, were not carried out.

5 Results

(All experimental results are listed in the Tables in Annex 2.)

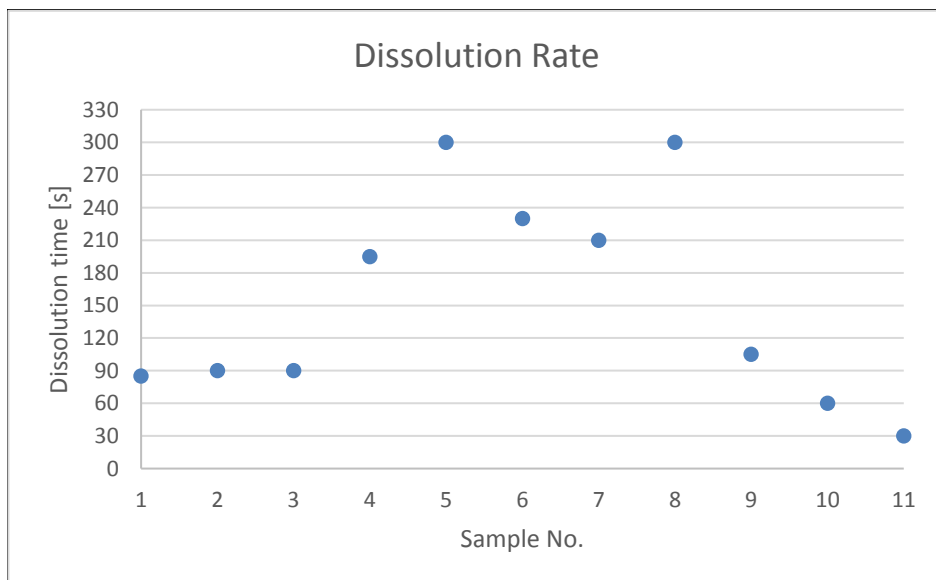
5.1 Aversive agents



All tested products contained an aversive agent. The content differs greatly from product to product. Product no. 1, for example, contains only 1.3 ppm denatonium benzoate. However, a minimum quantitative requirement is not specified in EC Regulation no. 1297/2014.

➔ All products fulfil the legal provision.

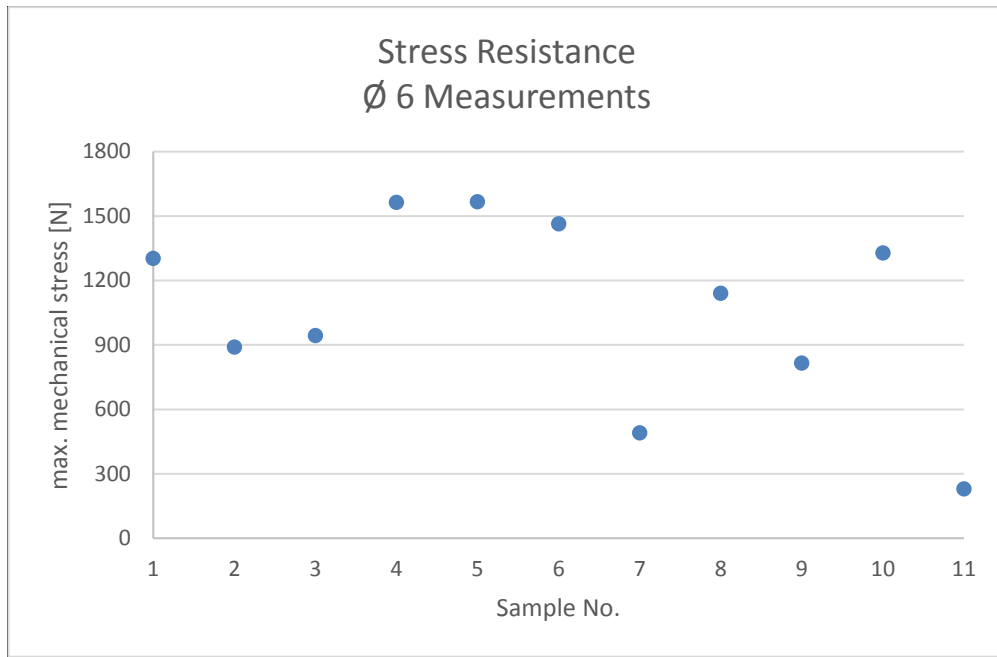
5.2 Dissolution rate



The time for the capsules to dissolve in water at 20 °C differs from product to product. EC Regulation no. 1297/2014 stipulates that this must be at least 30 seconds.

➔ All products fulfil the legal provision.

5.3 Maximum mechanical Stress



The maximum mechanical stress that the capsules withstand under standard conditions differs greatly from product to product. EC Regulation no. 1297/2014 stipulates that this must be at least 300 N. Unfortunately, neither the test protocol nor the evaluation is specified in the text. For example, it is not clear whether the maximum mechanical stress for ALL capsules of a product, or the mean of a measurement series should be greater than 300 N.

Except for one product (sample no. 11), all products fulfil the provision of 300 N. For sample no. 11 the maximum mechanical stress (\emptyset from 6 measurements) was found to be 229 N. It should be noted that the stress stabilities of the capsules of an identical product within a measurement series are very different. Even if the mean of 6 measurements, apart from the abovementioned exception, was always above 300 N, nevertheless the maximum mechanical stress of individual capsules was less than 300 N.

➔ All products except no. 11 fulfil the legal provision.

6 Additional findings

1. The distribution and the offer of Liquid Caps appear to have diminished or are relatively lower in Switzerland. In particular, they represent niche products with the major distributors, such as Migros, Denner or Aldi, or are no longer offered.
2. Hazard warnings for the capsules were only present in only 3 of the 11 tested products.

7 Conclusions:

In regard to the content of aversive agents, the dissolution rate and the minimum stress resistance, it appears that the Liquid Caps on the Swiss market do indeed meet the new legal provisions. The minimum mechanical stress value for one sample only was found to be somewhat below the specified value.

Based on these results and because the Liquid Caps that are presently available in Switzerland have probably mostly already been tested in the present campaign, no further Swiss-wide actions are considered to be necessary at the present time.

As all except one product originate from the EU space (the only "Swiss" product is also manufactured in the EU), labelling requirements may only be established in cooperation with the European authorities.

8 Order of Events

Mid-August 2016: purchase of 11 products in retail stores and in the Internet
September 2016: analysis of 11 products by the Laboratory of the Directorate General of Customs and RUAG
End of September 2016: conclusion of the investigation

24.11.16 / PK

Annex 1

Annex of the Regulation (EU) no. 1297/2014:

6.12.2014	EN	Official Journal of the European Union	L 350/1
-----------	----	--	---------

In Part 3 of Annex II to Regulation (EC) No 1272/2008 the following section 3.3 is added:

‘3.3 Liquid consumer laundry detergents in soluble packaging for single use

Where a liquid consumer laundry detergent in dosages for single use is contained in a soluble packaging, the following additional provisions shall apply:

3.3.1. Liquid consumer laundry detergents contained in soluble packaging for single use shall be contained in an outer packaging. The outer packaging shall fulfil the requirements of section 3.3.2 and the soluble packaging shall fulfil the requirements of section 3.3.3.

3.3.2. The outer packaging shall:

- (i) be opaque or obscure so that it impedes the visibility of the product or individual doses;
- (ii) without prejudice to Article 32(3), bear the precautionary statement P102 “Keep out of reach of children” at a visible place and in a format that attracts attention;
- (iii) be an easily reclosable, self-standing container;
- (iv) without prejudice to the requirements of section 3.1, be fitted with a closure that:
 - (a) impedes the ability of young children to open the packaging by requiring coordinated action of both hands with a strength that makes it difficult for young children to open it;
 - (b) maintains its functionality under conditions of repeated opening and closing for the entire life span of the outer packaging.

3.3.3. The soluble packaging shall:

- (i) contain an aversive agent in a concentration which is safe, and which elicits oral repulsive behaviour within a maximum time of 6 seconds, in case of accidental oral exposure;
- (ii) retain its liquid content for at least 30 seconds when the soluble packaging is placed in water at 20 °C;
- (iii) resist mechanical compressive strength of at least 300 N under standard test conditions.’

Annex 2

Content of aversive agents:

Sample	Denatonium benzoate [ppm]
1	1.3
2	16.9
3	18.9
4	39.2
5	42
6	46.6
7	68.8
8	110.4
9	127.6
10	134.6
11	136.1

Dissolution rate:

Sample	Dissolution rate [s]
1	85
2	90
3	90
4	195
5	300
6	230
7	210
8	300
9	105
10	60
11	30

Maximum mechanical Stress:

Maximum mechanical Stress [N]											
Measuremen t	Sample										
	1	2	3	4	5	6	7	8	9	10	11
1	1432	900	1150	2580	1453	923	788	880	691	1037	285
2	964	690	562	1200	1930	1926	589	1253	768	1881	159
3	1530	757	788	1344	1308	1679	84	1083	721	961	331
4	1754	696	999	1483	1820	1081	551	1528	1388	1104	194
5	1171	1784	871	1728	1332	1467	760	1067	596	1155	303
6	965	511	1295	1043	1553	1708	172	1037	730	1829	322
∅	1303	890	944	1563	1566	1464	491	1141	816	1328	229