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Final Report
IODINE / IODIDE RELEASE EFFICIENCY OF LIFESTRAW™
LF64
(Non-GLP Study)

Study No. A-82-05-04

for

Sponsor
VESTERGAARD FRANDSEN A/S
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Study Completion Date
May 31, 2006

Test Facility
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STUDY INFORMATION

Study Title: Iodine / Iodide release efficiency of Lifestraw™ LF 64 (Non-GLP Study).

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Study No.: A-82-05-04

Test items
Active Ingredient Iodine (I₂) and Iodide (I⁻)

Test matrix: Effluent water from the filtration through Lifestraw™ LF 64

Analysis Starting Date: February 9, 2006

Analysis Termination Date: May 31, 2006

Study Completion Date: May 31, 2006

SIGNATURE

D. Frauchiger
Project Manager

Date

Staff involved:

Daniel Frauchiger, Heliana Kola, Lionel Moery,
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ARCHIVES

- Proposal (copy, at request)
- Chromatograms (copies, at request)
- Raw data (copies, at request)
- Final report (original)

VESTERGAARD FRANDBSEN A/S
Ch. de Messidor, 5-7
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Switzerland

Laboratory Project Folder with:

- Proposal (copy)
- Chromatograms (originals)
- Raw data (originals)
- Final report (copy)

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1. INTRODUCTION

VESTERGAARD FRANDBSEN A/S approached Battelle Geneva to conduct a study on the Iodine and Iodide release efficiency of Lifestraws™. A proposal describing the project has been prepared by Battelle on December 1st 2005. This proposal has been accepted and signed by VESTERGAARD FRANDBSEN A/S on December 12th 2005, allowing Battelle to conduct the work.

These Lifestraws™ are produced by VESTERGAARD FRANDBSEN A/S and are used in countries where the drinking water supply is an issue. The Lifestraws™ remove health related contaminants present in the water, by filtration on an adsorbing material. The disinfection system present in the Lifestraws™, based on iodine, destroys health related bacteria. The Lifestraws™ are then a convenient tool for preparing drinking water in this type of countries.

2. OBJECTIVE

The objective of this study was to determine the Iodide / Iodine release efficiency of Lifestraw™ LF 64 provided by VESTERGAARD FRANDBSEN A/S.

3. METHODOLOGY

The filtration experiment was set up as follows:

- A volume of 700L of Geneva tap water has been passed through the Lifestraw™ at a flow of 150 mL/min (note : in the proposal we planned to filter only to the first 250L but this has been changed to 700L after discussion with the sponsor's representative once we got the first results).
- The sampling of the effluent water (filtrate) took place each 50L: the following 15 points have been sampled: T=0L (before filtration), T=50L, T=100L, T=150L, T=200L, T=250L, T=300L, T=350L, T=400L, T=450L, T=500L, T=550L, T=600L, T=650L and T=700L.
- The Iodine and Iodide analysis has been performed only on the following 11 points: T=0L (before filtration), T=50L, T=100L, T=150L, T=200L, T=250L, T=300L, T=400L, T=500L, T=600L and T=700L.

- The filtration through the Lifestraw™ has been performed following the below parameters:
 - 50% ON – 50% OFF cycles of 25 minutes each
 - 150 mL/minute constant flow
 - 3.75L are filtered each 50 minutes
 - The sampling took place after the passage of 50L through the device, i.e. after 11 hours 7 minutes.
 - The filtrations started at 7:00 am and the sampling took place at 6:07 pm
 - Once the sampling was complete, the flow was stopped until the next morning
 - No sampling took place during the week-ends; the experiment was stopped between Friday evening and Monday morning.

- The water used for the experiment had the following characteristics:
 - Total dissolved solids : 200 – 500 mg/L (Geneva tap water : 414 mg/L)
 - pH : 7.5 +/- 0.5
 - Temperature : 20 +/- 2.5 °C
 - TOC < 1.0 mg/L
 - Turbidity < 1 NTU
 - Active chlorine (Cl₂) < 0.1 mg/l

- Iodine (I₂) has been analysed by a colorimetric method (reaction with dipropyl-p-phenylenediamine, production of a dark red coloured compound, measurement with a UV-VIS spectrophotometer Kontron Uvikon 860). The detection limit is 0.03 mg/l for Iodine (I₂).

- Iodide (I⁻) has been analysed by Ion Chromatography equipped with a conductivity detector (Dionex DX 500 Ion Chromatograph, ED 50 Electrochemical Detector, analytical column AS11 from Dionex). The detection limit is 0.1 mg/l for Iodide (I⁻).

4. RESULTS

The effluent water has been sampled every 50L and kept frozen until analysis. The following 11 points were analyzed: T=0L (before filtration), T=50L, T=100L, T=150L, T=200L, T=250L, T=300L, T=400L, T=500L, T=600L and T=700L. The results are given in table 1.

Note : The T=0L (blank) results are below the method detection limits (i.e. < 0.03 mg/l for I₂ and < 0.1 mg/l for I⁻).

Table 1 : Results

IODINE/IODIDE Analysis : Lifestraw™ LF 64 final results

Sponsor name: Vestergaard – Frandsen A/S
 Location : Denmark
 Study No.: A-82-05-04
 Test Matrix : Filter Lifestraw™ LF64

Compound analyzed : Iodine (I2)/ Iodide (I-)
 Analytical method : Colorimetry (I2) and Ion Chromatography (I-)
 Limit of quantification : 0.03 mg/L for iodine and 0.1 mg/L for iodide

AMOUNT OF WATER PASSED THROUGH THE FILTERS (L)	NR. OF FILTER	IODINE (I2) (mg/L)	IODIDE (I-) (mg/L)	Observations
0	Filter Nr. LF 64	<0.03	<0.1	
50	Filter Nr. LF 64	<0.03	<0.1	
100	Filter Nr. LF 64	<0.03	<0.1	
150	Filter Nr. LF 64	<0.03	<0.1	
200	Filter Nr. LF 64	<0.03	<0.1	
250	Filter Nr. LF 64	<0.03	<0.1	
300	Filter Nr. LF 64	<0.03	<0.1	
400	Filter Nr. LF 64	<0.03	<0.1	
500	Filter Nr. LF 64	<0.03	<0.1	Tendency to clog
600	Filter Nr. LF 64	Stopped	Stopped	LF64 clogged
700	Filter Nr. LF 64	Stopped	Stopped	LF64 clogged

5. Conclusion

The experiment could assess the amount of Iodine and Iodide released by the Lifestraws™ LF 64. No Iodine or Iodide has been detected in the LF 64 effluent water up to 500L of filtration. LF 64 showed a tendency to clog after 500 L approximately. Therefore, Iodine/Iodide analysis on the 600L and 700L LF 64 effluent water could not be performed.