



Sparkle microbiological water quality testing lab plc.

Statement of reliability of data:

Sparkle microbiological water quality testing lab PLC: which is legally registered nationally in Ethiopia; principal registration number of MT/AA/2/0041351/2010 on 10/09/2017 also legally accredited by Ethiopian National Accreditation Office (ENAO)

Business license is attached to this covering letter

Concerning the following laboratory analyses done for desert rose PLC:

- 1) Samples collected from MINCH filters at Desert Rose workshop in Addis Ababa on 11th-13th Jan 2018
- 2) Samples collected from MINCH filters in household around Lanqayrta on 22nd-26th Jan 2018

Sparkles hereby make the following statements

- 1) Samples were collected and tested solely by Sparkle staff without interference or observation from any party
- 2) Sample results documented and photographed solely under the control of Sparkle staff
- 3) The presentation of the results in the attached report are an accurate representation of the result we processed

Any inquiries concerning the laboratory analysis can be made either

- a) Through Desert Rose PLC, or
- b) Directly to Sparkle via
Email (fikadutaye16@gmail.com)
Phone +251 910 35 41 03

Name: FikaduTaye

Signature: _____

Position: General Manager




Phone NO +2519 10 35 41 03/ +2519 10 98 46 04/ +2519 11 02 13 07

የኢትዮጵያ ብሔራዊ አክራሪነት ደብዳቤ
የብቃት ማረጋገጫ ሪፖርት

1. የብቃት ማረጋገጫ ጥያቄ ያቀረበው ተቋም ስም ስፓርክል ማይክሮባዮሎጂካል የወ.ሀ ጥራት ፍተሻ ኃላፊነቱ የተወሰነ የግል ማህበር / Sparkle Microbiological Water quality testing PLC
2. ግምገማው የተካሄደበትን ቀን 11/11/09 ዓ.ም.
3. ግምገማ ያካሄዱት ባለሙያዎች ስም ጌቴ ብርሃኑ

ፊርማ 

ታዛቢ መሳይ ገመቹ

ፊርማ 

4. አስተያየት የአመልካቹ ስፓርክል ማይክሮባዮሎጂካል የወ.ሀ ጥራት ፍተሻ ኃላፊነቱ የተወሰነ የግል ማህበር / Sparkle Microbiological water quality testing PLC / የላቦራቶሪ አገልግሎት ለመስጠት ማሟላት የሚገባቸውን ዝቅተኛ መስፈርት ያሟሉ መሆኑን አረጋግጧል።



MINCH Filters in Harshin

*Performance and Quality Assurance
report from laboratory and field testing.*

Jan 26th 2018

to

March 26th 2018

MINCH performance & quality assurance. Mar 26th 2018

Objectives of this document

- To outline the various procedures in place to assure filter performance
- To present data from the most recent tests

Testing Protocols

Minch filters are tested in two main ways to assure the quality of the product

- 1) when the product leaves the factory - "workshop testing", and
- 2) after 1 month of use by users in the field - "field testing"

The tests conducted demonstrate the filters' ability to remove e.coli – a faecal contamination indicator. To do this the laboratory use an chromogenic media ([Chromagar® CCA](#)) which confirms e.coli bacteria with a bright blue indicator.

Workshop Testing

Before leaving the workshop a sample of filters are taken and bench tested for e.coli removal. They are first used for a few days with uncontaminated water. They are then charged with extremely contaminated water containing approximately 500 e.coli / 1ml. This is 50 times the normal concentration that we would expect from contaminated river water (10 e.coli / 1ml). Filters are left to run overnight. In the morning, samples are taken from both the contaminated challenge water, as well as from the outlet tap of each filter.

Field Testing

To make sure that our product is arriving in good condition and continues to perform under regular household use, we select a sample (over 10%) of delivered filters for testing one month after delivery. First, the sample households are visited and samples are drawn from their filters. This tests whether the water they are drinking is within safe limits.

However, we also test how the filter would perform if there suddenly was high levels of e.coli in the water source. To do this, we load the sample of filters with highly contaminated water of a known concentration. We remove the filter tap temporarily, so users are unable to drink the water during this second test. We also supply supplementary drinking water.

After the test we run double strength chlorinated water through the filter for safety. Users are informed to use the filter after the chlorine taste has disappeared on the 2nd day.

Laboratory Analysis

Samples are both drawn and analyzed by employees of "Sparkle PLC", an independent water testing company. Samples are drawn into specialized sterile, Whirlpack® bags. Within 6 hours they are processed by vacuum filtration through cellulose acetate membranes with pore size of 0.45 microns to retain all bacteria. Membranes are placed on chromogenic media [Chromagar®](#) and incubated for 18 hours at 37° in accordance with the manufacturers instructions. After 18 hours samples are removed, photographed and the blue, confirmed e.coli colonies are enumerated. Samples sizes, filter serial numbers, and counts are then uploaded onto a server where they are available for analysis. Each sample can be traced to a filter serial number, and each result has a photographed plate for evidence and for cross-checking.

RESULTS EXECUTIVE SUMMARY

- **Tests of untreated water in households of Harshin district show that contamination levels of between 0 and 500 e.coli / 100 ml are typical of Birkad water**
- **Filters used with natural waters typically demonstrate total removal of e.coli**
- **Filters have been tested both before leaving the workshop, and in the field, with water “spiked” with e.coli concentrations of 50,000 – 190,000 e.coli / 100ml. This test is extremely challenging, representing 100-400 times the e.coli levels detected in Birkad water.**
- **Filters tested with “spiked” water confirm removal to be better than 99.99%**
- **Some filters have been tested twice (or more) with elapsed periods of 2 or 3 months between tests. Filter performances are typically 99-100% with no signs of deterioration of performance**

MINCH performance & quality assurance. Mar 26th 2018

Results Detail

Field Testing: 26th March 2018

In conjunction with the 4th delivery of MINCH filters to Dabayl Wayne, independent field testing was done on 1-month old MINCH filters delivered to Lanqayrta for the 3rd delivery.

Table 1 shows levels of e.coli in collected untreated water.

Table 1: Challenge (Raw) water concentration

Source	Sample Household	Label	Date	Sample (ml)	Count	Raw water e.coli concentration. (CFU/100ml)	
Birkad	HA 150	HA 150/RAW/100ml/24.3.2018	2018-03-26	100	434	434	image
Birkad	HA 205	HA 205/RAW/100ml/24.3.2018	2018-03-26	100	286	286	image
Rain	HA 195	HA 195/RAW. RAIN/25.3.2018	2018-03-26	200	363	182	image
Rain	HA 193	HA 193/RAW. RAIN/100ml/24.3.2018	2018-03-26	100	14	14	image
Unknown	HA 159	HA 159/RAW/200ml/24.3.2018	2018-03-26	200	4	2	image

Therefore: average contamination for Birkad water was 241 CFU/100ml .

average contamination for Rain water was 98 CFU/100ml.

Table 2 shows levels of e.coli in treated water for 13 filters.

Table 2: Treated water produced by 1-month old filters in Lanqayrta.

Lab Tech	Sample Type	Filter Serial No	Date	Sample Size	Treated water e.coli (CFU/100ml)	Untreated Water Source	Untreated water e.coli (CFU/100ml)	Treatment efficiency	Plate image
Fikadu	Treated	HA 195	2018-03-26	300	1	Rain Water	98 CFU/100ml	99.45%	image
Fikadu	Treated	HA 193	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 125	2018-03-26	300	0	Birkad Water	241	100%	image
Fikadu	Treated	HA 133	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 135	2018-03-26	200	0			100%	image
Fikadu	Treated	HA 137	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 124	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 150	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 153	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 159	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 175	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 202	2018-03-26	300	0			100%	image
Fikadu	Treated	HA 205	2018-03-26	300	0			100%	image

MINCH performance & quality assurance. Mar 26th 2018

Filters with multiple test dates spanning multiple months

Because of the large numbers of samples collected in the field, some filters were tested twice, on different dates. Table 3 gives an overview of the consistency of performance for all filters with multiple test dates.

Table 3: Overview of consistency of performance

Serial No	Test Date					
	17 th Dec 2017	13 th Jan 2018	25 th Jan 2018	27 th Jan 2018	4 th Feb 2018	26 th March 2018
HA 137			100.00			100.00
HA 148			100.00	100.00		
HA 150			100.00	99.99		100.00
HA 153	100.00		100.00			100.00
HA 159			*	100.00		100.00
HA 175			100.00	100.00		100.00
HA 176			100.00			
HA 193			100.00			100.00
HA 195			100.00			99.45
HA 202			100.00			100.00
HA 205			100.00			100.00
HA 213		100.00			100.00	
HA 223		100.00			100.00	
HA 225		100.00			100.00	
HA 227		99.97			100.00	
HA 233		99.98			100.00	
HA 234		100.00			100.00	
HA 237		100.00			100.00	
HA 238		99.99			100.00	

In particular it should be noted that between the test dates of 25th Jan 2018 and 26th March 2018 there is no decline in performance of performance of any filters. Likewise for filters tested in Jan 2018 and Feb 2018.

The longest span of multiple test dates is for filter HA 153 which covers over 3 months.

MINCH performance & quality assurance. Mar 26th 2018

Workshop Testing: 11th - 13th Jan 2018

In this test, filters were fed with challenging water containing high levels of e.coli before leaving the workshop in Addis Ababa. Table 4 Shows estimates of contamination based on 1/10th and 1/100th dilutions of the challenge water with pure water (in order to make the plate countable).

Table 4: Challenge (Raw) water concentration

Lab Tech	Sample Type	Label	Date	Sample (ml)	Count	Dilution	Raw water e.coli concentration. (CFU/100ml)	
Fikadu	RAW	Raw/1ml/11.1.2018	2018-01-13	1	260	1	26000	image
Fikadu	RAW	RAW/1:10/1ml/11.1.2018	2018-01-13	1	57	10	57000	image
Fikadu	RAW	RAW/1:100/11.1.2018	2018-01-13	1	11	100	110000	image

A conservative estimate of 50,000 CFU/100ml in the challenge water was therefore used.

Table 5 lists e.coli contamination for treated water produced by 16 different filters when charged with the challenge water above. All filters removed more than 99.9%. The majority remove 100%

Table 5: Treated water produced by sample filters before leaving workshop in Addis Ababa.

Lab Tech	Sample Type	Filter Serial No.	Sample Label	Date	Sample Size	Treated water e.coli (CFU/100ml)	Challenge water e.coli (CFU/100ml)	Treatment efficiency	Plate image
Fikadu	Treated	HA 233	233-T/100ml	2018-01-13	100	20	50000	99.96	image
Fikadu	Treated	HA 227	227-T/100ml	2018-01-13	100	15	50000	99.97	image
Fikadu	Treated	HA 235	235-T/100ml	2018-01-13	100	3	50000	99.994	image
Fikadu	Treated	HA 215	215-T/100ml	2018-01-13	100	1	50000	99.998	image
Fikadu	Treated	HA 225	225-T/100ml	2018-01-13	100	1	50000	99.998	image
Fikadu	Treated	HA 234	234-T/100ml	2018-01-13	100	1	50000	99.998	image
Fikadu	Treated	HA 238	238-T/100ml	2018-01-13	100	1	50000	99.998	image
Fikadu	Treated	HA 209	209-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 211	211-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 213	213-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 217	217-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 219	219-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 223	223-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 231	231-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 236	236-T/100ml	2018-01-13	100	0	50000	100	image
Fikadu	Treated	HA 237	237-T/100ml	2018-01-13	100	0	50000	100	image

MINCH performance & quality assurance. Mar 26th 2018

Field Testing: 22nd - 26th Jan 2018

Table 6 shows e.coli contamination levels of input & output water for 14 Filters that were delivered on 28th Dec 2017. All of the filters had been used for 4 weeks by the users in Lanqayrta.

Table 6: Field Filter performance (n=14, Challenge water = natural Birket water)

Filter Serial	Sample Date	CHALLENGE (INPUT) WATER			TREATED (OUTPUT) WATER		
		Sample size (ml)	Plate Count	Image	Sample size (ml)	Plate Count	Image
HA 175	2018-01-25	40	18	image	100	0	image
HA 148	2018-01-25	50	14	image	100	0	image
HA 150	2018-01-25	50	5	image	100	0	image
HA 159	2018-01-25	50	0	image	100	0	image
HA 137	2018-01-24	100	19	image	100	0	image
HA 193	2018-01-24	50	1	image	100	0	image
HA 202	2018-01-24	50	1	image	100	1	image
HA 112	2018-01-24	50	0	image	100	0	image
HA 153	2018-01-24	100	0	image	100	0	image
Ha 195	2018-01-24	45	0	image	100	0	image
HA 125	2018-01-24	No sample available in household			100	0	image
HA 130	2018-01-24	No sample available in household			100	0	image
HA 176	2018-01-24	No sample available in household			100	0	image
HA 205	2018-01-24	No sample available in household			100	0	image
AVERAGE RAW WATER CONTAMINATION (CFU / 100 ml)							9.9
AVERAGE CHALLENGE WATER CONTAMINATION (CFU / 100 ml)							0.07

Table 7 lists contamination levels of input and output water for the same filters when challenged with highly contaminated water.

Table 7: Field Filter performance (n=14, Challenge water = Birket water spiked with contamination)

Lab Tech	Sample Type	Filter Serial No.	Sample Label	Date	Sample Size	Treated water e.coli (CFU/100ml)	Challenge water e.coli (CFU/100ml)	Treatment efficiency	Plate image
Fikadu	Treated	HA 150	HA 150/T/100ml	25.1.2018	100	11	190000	99.994	image
Fikadu	Treated	HA 148	HA 148/T/100ml	25.1.2018	100	0	190000	100	image
Fikadu	Treated	HA 159	HA 159/T/100ml	25.1.2018	100	0	190000	100	image
Fikadu	Treated	HA 175	HA 175/T/100ml	25.1.2018	100	0	190000	100	image
Fikadu	Treated	HA 125	HA 125/T/100ml	24.1.2018	100	246	50000	99.508	image
Fikadu	Treated	HA 112	HA 112/T/100ml	24.1.2018	100	1	50000	99.998	image
Fikadu	Treated	HA 130	HA 130/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 137	HA 137/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 153	HA 153/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 176	HA 176/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 193	HA 193/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 195	HA 195/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 202	HA 202/T/100ml	24.1.2018	100	0	50000	100	image
Fikadu	Treated	HA 205	HA 205/T/100ml	24.1.2018	100	0	50000	100	image

MINCH performance & quality assurance. Mar 26th 2018

Table 8 Shows the basis for estimating the e.coli concentration in the challenge water used on 25th and 24th of Jan respectively for the results of Table 7. Note that these are 1/100th dilutions of challenge water so that the plate counts were readable.

Table 8: Challenge (Raw) water concentration

Lab Tech	Sample Type	Label	Date	Sample (ml)	Count	Dilution	Raw water e.coli concentration. (CFU/100ml)
Fikadu	RAW	RAW/1:100/1ml	25.1.2018	1	19	100	190000 image
Fikadu	RAW	RAW/ /1:100/1ml	24.1.2018	1	5	100	50000 image

Summary of results: Field Testing: 22nd - 26th Jan 2018

Table 6 shows that the natural birket water that the community are using to charge the filters is contaminated with roughly 10 e.coli / 100ml at the time of sampling. This could vary in case of AWD outbreak. Of the 14 filters sampled, all filters except 1 had zero e.coli count. Only 1 single e.coli was detected in 14 samples of MINCH treated water.

Table 7 shows that even when the same filters are challenged with highly contaminated water (50,000 – 190,000 e.coli / 100ml the filters offer excellent protection. Thirteen filters remove 99.99% or more. One filter demonstrates a removal 99.5% In aggregate, the average removal for the whole sample of filters taken together was **99.98%**

Report Conclusion: MINCH testing

The conclusions from both the workshop and the field testing presented here are:

- MINCH filters are leaving the workshop with excellent performance, and continue to demonstrate excellent performance in the field 1 month after field use by communities in Harshin district.
- Communities are offered significant protection from ingesting e.coli through their drunk water. This is assumed to translate to better health if the same households are also practicing safe hygiene in conjunction with continuous use of the filter as per the usage and cleaning instructions.

MINCH performance & quality assurance. Mar 26th 2018

Acknowledgements

Independent laboratory analysis by Sparkle

Contact: Fikadu Taye, fikadutaye16@gmail.com, +251 910 35 41 03

Sparkle PLC, Reg No. **MT/AA/2/0041351/2010**

MINCH filters supplied by Desert Rose PLC

Project contact: Andrew Smith, samuel.sommer@minchfilter.com +251 912 023 759

Website: www.minchfilter.com

Local Project partner: Oxfam GB,

Project contact: Jack Frith-Powell, jack.frith-powell@oxfam.org +251 966 69 85 64

Copyright & Intellectual Property

The rights of ownership and/or use of the information in this document are reserved. No rights of third parties to use the information are intended. No part of this document can be used without the express written permission of the legal entities that contributed..



ቤሪ ቁ./serial **№ 054892**



የግዢ ከፋይ መለያ ቁ. /TIN 0055054751
 የንግድ ምዝገባ ቁ. MT/AA/2/004/035/2008
 Principal Registration No.
 የፊደላዊ ንግድ ሊሰጥ ቁጥር
 Previous License No.
 የንግድ ሥራ ሊሰጥ ቁጥር MT/AA/14/665/699126/2010
 Business License No.
 ቀደም ተሰጠበት ቀን
 Previous Date of issuance
 የተሰጠበት ቀን 29/1/2010
 Date of issuance

የንግድ ሥራ ሊሰጥ

በንግድ ምዝገባ ሊሰጥ አዋጅ ቁጥር 980/2008
መሰረት ተሰጠ

Business License

Issued Under Commercial Registration and Business license
proc.No 980/2016

የግለሰብ/ድርጅት ስም አገርካል ውሃ ውስጥ ያለ በሽታ አምጪ ህዋስ የሚ
ያለ የተ የግ ማህበር

ዜግነት በኢትዮጵያ የተመዘገበ

የንግድ ስም ፍቃዱ ታይ ወንድሙ

ሥራ አስኪያጅ ስም ፍቃዱ ታይ ወንድሙ

የንግድ ድርጅት አድራሻ ስም

ዞሪያ	አዲስ አበባ	ዞን/ክፍለ ከተማ	አቃቂ ታሊቲ
ከተማ	አዲስ አበባ	ወረዳ	04
ክፍለ	---	የቤት ቁጥር	አዲስ የክፍለ ቁጥር 418
ጎሳ ቆ	---	ሰልክ ቁጥር	091035413
ፋክስ	---	ኢ-ሜይል	---

1. Manager/Owner Name SPARKLE MICROBIOLOGICAL WATER QUALITY TESTING LABO

2. Nationality Registered in Ethiopia

3. Trade Name

4. General Manager Name FIKADU TAYE WENDIMU

5. Business Address

Region	Addis Ababa	Zone/Sub City	Akaki Kality
City	Addis Ababa	Woreda	04
Kebele	---	House No.	አዲስ የክፍለ ቁጥር 418
P.O.Box	---	Tel.No	091035413
Fax	---	E-mail	---

የንግድ ሥራ ዘርፍ
(891) የቴክኒካዊ ፍተሻ/ትንተና ተያያዥ አገልግሎቶች

6. Sector of Business
(891) Technical testing, analysis and related services

የንግድ ሥራ መስክ
በጀርባ ገደ ይመልከቱ

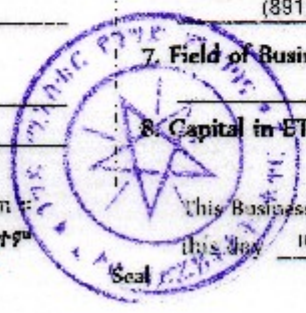
7. Field of Business
See back page

ካርታል በሊት ብር 15,000.00

8. Capital in ETB 15,000.00

ይህ የንግድ ሊሰጥ ዘጠኝ 29/1/2010 በ አዲስ አበባ ተሰጠ ስም
የሃላፊ ስም/Name of Official ማህተም
ፊርማ/Signature

This Business License is issued in Federal
this day 10/1/2017



የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ
ንግድ ሚኒስቴር
የንግድ ምዝገባ ሊሰጥ

29 JANUARY 2010