

Applicability of the SV36 as a Water Disinfectant for Microbial treatment in Drinking Water.

Abstract

The SV36 disinfectant, a non-chlorine liquid formulation manufactured by SV36 LLC (USA), was subjected to a one-year laboratory validation under the coordination of the Appropriate Technology Centre (ATC), Ministry of Water and Environment (MWE). The objective was to determine its microbial disinfection efficiency, optimal dosage, and effect on physio-chemical parameters of drinking water. Three iterative improvements were tested between April 2024 and January 2025 at the National Water Quality Reference Laboratory (NWQRL) and the National Water and Sewerage Corporation (NWSC) Central Laboratory. Results indicated complete microbial removal (*E. coli* and Total coliforms) in the third formulation, meeting Uganda's potable water standards. However, Turbidity and Total Suspended Solids (TSS) remained slightly above acceptable limits due to the colour and composition of the disinfectant.

The SV36 shows strong potential as a low-cost, point-of-use water disinfectant for household and small community applications. Further refinement of the formulation and integration with post-treatment filtration are recommended prior to large-scale promotion.



Introduction

The SV36 disinfectant is a liquid formulation manufactured by SV36 LLC (USA), designed to address microbial contamination in drinking water. The product was subjected to laboratory validation for one year under the coordination of the Appropriate Technology Centre (ATC), Ministry of Water and Environment (MWE). The SV36 was evaluated under controlled laboratory conditions to determine its disinfection efficiency, optimal dosage, and effects on physio-chemical parameters of water. The validation process involved three iterative testing phases conducted between April 2024 and January 2025 at the National Water Quality Reference Laboratory (NWQRL) and the National Water and Sewerage Corporation (NWSC) Central Laboratory. Each phase followed improvements to the formulation made by the promoter after previous test results. The recommended dosage was two drops of SV36 per litre of water, expected to inactivate microbial contaminants effectively.

About the Technology

The SV36 is a non-chlorine liquid disinfectant formulated to inactivate microbial contaminants in untreated water through oxidative mechanisms that disrupt bacterial cell walls and metabolic processes. The product, prepared as a 0.36% solution, was designed for ease of application at the household or small-community level, requiring no mechanical or electrical equipment. It is applied at a dosage of two drops per litre, providing effective microbial control within a 45-minute contact time. The technology's simplicity and non-metallic composition make it suitable for decentralized water treatment. Validation of SV36 was undertaken to confirm its microbial disinfection efficiency, user safety, and compliance with Uganda's potable water quality standards (EAS 12:2018) under controlled laboratory conditions.

Testing approach and Laboratory analysis

Three sets of laboratory experiments were undertaken, each involving raw (untreated) water and treated samples dosed with varying quantities of SV36 solution (1, 2, or 4 drops per litre). Parameters tested included physio-chemical (pH, Colour, Turbidity, Total Dissolved Solids (TDS), Electrical Conductivity (EC), and Total Suspended Solids (TSS) and microbial (E. coli and Total Coliforms (CFU/100 mL)) indicators. Analyses were conducted using standard laboratory procedures, and results were compared against Uganda National Drinking Water Standards and EAS 12:2018.

Performance of the SV36 across successive Improvements

The SV36 was progressively improved through three iterative tests. Each version demonstrated increasing microbial inactivation efficiency and physio-chemical stability.



Table 1: Comparative Water Quality Results for SV36 Disinfectant across three formulations (April 2024 – January 2025)

Parameter	Units	First formulation			Second formulation			Third formulation			Drinking water standards (EAS12:2018)
		Raw water	Treated water		Raw water	Treated water		Raw water	Treated water		
			2drops	4drops		1drop	2drops		2drops	4drops	
Color	PtCo	175	227	158	-	-	-	-	-	-	50
Turbidity	NTU	27	33	39	5.79	10.43	9.25	3.72	10.8	20.3	25
Ph	Units	6.4	6.1	6.1	7.66	7.53	7.57	8.14	8.05	7.95	5.5-9.5
EC	µs/cm	74	71	73	3	3	4	2	3	3	2500
TDS	mg/l	52	50	51	77.312	79.68	78.208	184.96	186.9	185.6	1500
E. Coli	CFU/100ml	41	<1	<1	30	0	0	95	0	0	<1
Total Coliform	CFU/100ml	>2400	31	34	12000	20000	14000	200	0	0	<1

The consolidated results illustrate a clear improvement in microbial removal efficiency across successive formulations of SV36, while physicochemical characteristics remained generally within or close to acceptable limits.

Microbial parameters:

The first and second formulations achieved significant reductions in E. coli counts, with complete elimination observed in the second and third formulations. Total coliforms were initially reduced but not eliminated in the first two trials however, the third formulation achieved complete removal of both E. coli and Total coliforms, fully complying with Uganda's drinking water standards (EAS 12:2018).

Physical parameters

pH: The pH values remained stable throughout all tests, ranging between 6.1 and 8.1, which falls within the acceptable range of 5.5–9.5. This indicates that the SV36 does not significantly alter the acidity or alkalinity of treated water.

TDS and Electrical Conductivity (EC):

Both parameters remained below the standard limits i.e., 1,500 mg/L for TDS and 2,500 µS/cm for EC, confirming that SV36 does not contribute to dissolved solids or affect the ionic balance of treated water.

Turbidity and Colour:

Turbidity values were slightly above the acceptable limit of 25 NTU, ranging between 9 and 39 NTU across the three tests. Colour values also exceeded the standard threshold of 50 PtCo, particularly in the first formulation. These changes are attributed to the inherent colour and particulate nature of the disinfectant.

Conclusion

The third SV36 improvement achieved complete microbial removal in accordance with Uganda's potable water standards. However, physio-chemical parameters, particularly Turbidity and Total Suspended Solids (TSS) remained above the acceptable range, attributed to the colour and composition of the disinfectant.

Overall, the disinfectant is microbiologically effective but requires further optimisation to improve the physical clarity of treated water.

Recommendations

The promoter is therefore advised to adhere to the following:

- i. Formulation improvement: Reduce colour-causing or particulate components to limit increases in turbidity and TSS.
- ii. Dosage optimization: Maintain microbial efficacy with the lowest effective concentration (two drops per litre) to minimize physical impacts.
- iii. Post-treatment filtration: Introduce a simple activated carbon or sand filter as a post-treatment step where feasible.
- iv. Extended field trials: Pilot SV36 in household and small community setups under real-world conditions to assess usability, taste perception, and maintenance requirements.

About Water, Sanitation and Hygiene Technologies (WASHTech)

WASHTech was an action research initiative in Burkina Faso, Ghana and Uganda that aimed to facilitate cost-effective investments in technologies for sustainable water, sanitation and hygiene services. <http://washtechafrika.wordpress.com> or www.washtechtechnologies.net

Technology Applicability Framework (TAF)

The TAF is a participatory evaluation tool that identifies blockages, scalability and performance of a technology. With blockages identified, a clear picture is formed of areas where collective action towards improving the success of a WASH service in a given context may be taken.



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