



## Prevent drinking water recontamination with passive chlorinators

May 5, 2023 | Paul Donahue

Topics: Drinking Water | Water & Development

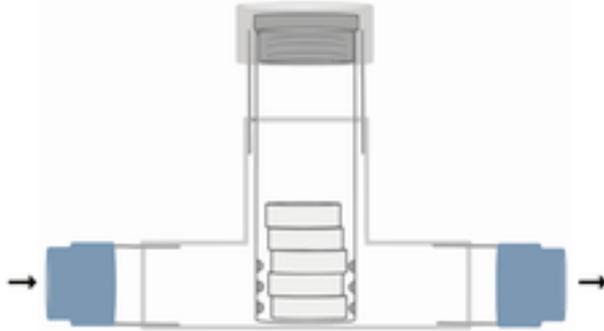
**In many parts of rural Kenya and other parts of the world, people rely on collecting drinking water from community water points, typically with 20 L plastic jerry cans. Even though the water may have been safe for consumption at the point of collection, it is prone to recontamination during transport to and storage in the individual households, especially in environments with hygienically critical conditions. Biofilms that grow inside these plastic containers and poor water, sanitation and hygiene (WASH) conditions can lead to recontamination.**

### Chlorination

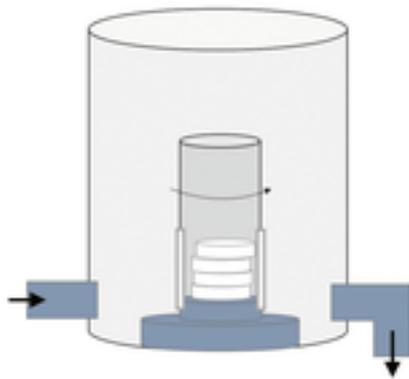
Chlorination is a water treatment strategy that provides residual disinfection, reducing recontamination risks during transport and storage. Because studies have found that users' compliance with chlorinating water in the household can be inadequate, installing a chlorinator at the point of collection would circumvent the need to establish user compliance. This would also increase the proportion of safe chlorinated water available for consumption.

### Producing and testing two kinds of chlorinators at Eawag

Although passive chlorinators are available in markets and stores worldwide, their operation and maintenance costs are often prohibitive and limit their use. Locally produced chlorinators can be a good alternative. This Safe Water Promotion research group project constructed and tested two different types of chlorinators at Eawag, the Swiss Federal Institute of Aquatic Science and Technology. These tests were successful and were replicated in Kenya.



The T-chlorinator adapted from Orner et al., by Eawag consists of a cylinder that is placed inside a T-fitting. The cylinder contains the chlorine tablets, which are eroded by the flow of water. The chlorinator is installed in-line between the clean water tank and the kiosk's tap.



The AkvoTur chlorinator designed by Eawag is installed right after the water tap. At the bottom of the container is a cylinder in which are placed the chlorine tablets. The cylinder has slits on each side; water enters through one slit, eroding the tablets, and exits through the opposite slit.

### Producing and testing the chlorinators in Kenya

Both chlorinators were produced with locally available materials and tools in Kenya. They were installed at four water kiosks managed by Fundifix Limited, a local water service provider, in Kitui County in eastern Kenya. The assessment criteria were: can the chlorinators be locally produced and installed, the availability of chlorine supply, their robustness, ease of operation and the dosage consistency.



**Passive, locally manufactured chlorination system installed in a water kiosk in Kenya.**  
(Photo: Lisa Appavou)

The installation of the tap-attached AkvoTur was the fastest and the easiest. It was robust, easy to operate and had a dosage consistency of 69%. The T-chlorinator, however, had a better overall performance. Even though it was more complicated to fabricate and install, it was more robust and had a higher dosage consistency (89%) if automatic drainage was available. The automatic drainage ensures that the water can drain from the T-chlorinator by gravity.

### **Kenyan research project featured in Sandec News**

An article about this Safe Water Promotion research group project in Kenya is just one of many articles in the annual magazine of the Department of Water, Sanitation and Solid Waste (Sandec). Sandec News highlights the department's current research, as well as information on publications in the sector and digital learning initiatives.

The magazine is available [online](#).

Cover picture: Fundifix staff producing chlorinators in Kenya. (Photo: Lisa Appavou)

### **Funding / Cooperations**

Fundifix Limited in Kenya University of Oxford in UK

### **Original publication**

Bouman L., 'Locally Produced Passive Chlorinators in Kenya', [Sandec, News, 23 \(2022\), 48-49](#).



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during transport and storage is a common challenge of water
supply in low-income settings, especially if water is collected manually. Ch
lorination is a strategy to reduce recontamination. We assessed seven low-co
st, non-electrically powered chlorination devices in gravity-driven membrane
filtration (GDM) kiosks in eastern Uganda: one floater, two in-line dosers,
three end-line dosers (tap-attached), and one manual dispenser. The evaluat
ion criteria were dosing consistency, user-friendliness, ease of maintenance
, local supply chain, and cost. Achieving an adequate chlorine dosage (?2
mg/L at the tap and ? 0.2 mg/L after 24 h of storage in a container) was c
hallenging. The T-chlorinator was the most promising option for GDM kiosks:
it achieved correct dosage (CD, 1.5-2.5 mg/L) with a probability of 90 per c
ent, was easy to use and maintain, economical, and can be made from locally
available materials. The other in-line option, the chlorine-dosing bucket (4
0 per cent CD) still needs design improvements. The end-line options AkvoTur
(67 per cent CD) and AquatabsFlo® (57 per cent CD) are easy to install and
operate at the tap, but can be easily damaged in the GDM set-up. The Ventur
i doser (52 per cent CD) did not perform satisfactorily with flow rates &gt;
6 L/min. The chlorine dispenser (52 per cent CD) was robust and user-friend
ly, but can only be recommended if users comply with chlorinating the water
themselves. Establishing a sustainable supply chain for chlorine products wa
s challenging. Where solid chlorine tablets were locally rarely available, t
he costs of liquid chlorine options were high (27-162 per cent of the water
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Dössegger, L.; Tournefier, A.; Germann, L.; Gärtner, N.; Huonder, T.; Etenu, C.; Wanyama, K.; Ouma, H.; Meierhofer, R. (2021) Assessment of low-cost, non-electrically powered chlorination devices for gravity-driven membrane water kiosks in eastern Uganda, *Waterlines*, 40(2), 92-106, [doi:10.3362/1756-3488.20-00014](https://doi.org/10.3362/1756-3488.20-00014), [Institutional Repository](#)

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<https://www.eawag.ch/en/info/portal/news/news-archive/archive-detail/prevent-drinking-water-recontamination-with-passive-chlorinators>