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Tags # AFRICA # CAMBODIA # DIRTY WATER # KENYA # RCSI # SCIENCE # SODIS

Sunlight can make this dirty water clean...and save lives

Today is World Water Day...but clean tap water is a pipe dream for 780 million people across the globe.

Mar 22nd 2014, 4:30 PM 12,383 Views 40 Comments [Share](#) 41 [Tweet](#) 34 [Email](#) 47

DIRTY DRINKING WATER is a known death trap...but Irish scientists may have a solution.

Researchers from the RSCI can prove that simply exposing dirty water in a plastic bottle to sunlight can kill all but the most resistant bugs.

Professor Kevin McGuigan and his team have already shown that solar disinfection of water (SODIS for short) almost halves the rate of diarrhoea in Kenya, Cambodia and Uganda. Now the team are working on ways to scale up SODIS, upping the effort in the battle against waterborne disease, which kills about one child every 21 seconds.

Harnessing the Sun

Clean tap water is a pipe dream for 780 million people worldwide but SODIS is designed to be used in the home and only needs sunlight, patience and cheap reusable plastic bottles to work.



Image: Dirty Water via Shutterstock

"You put whatever drinking water you have available in the bottle, place it in direct sunlight and then after a minimum of six hours the water should be safe to drink," explains McGuigan.

Direct sunlight kills microbes in the water by a combination of heat and UV sterilisation, a process that is effective even when the sun is not 'splitting the sky'.

"If it is cloudy, we recommend that you put the water out for two consecutive days," says McGuigan, who has even shown that SODIS can work in Ireland.

During sunny days in June we have put bottles out on the windowsill here and we got complete inactivation of Eschericia coli after two hours, so if you get the sun you get a good effect.

When SODIS was trialled in villages in Cambodia and Kenya, the rate of diarrhoea fell by 40 to 50 per cent.

“We haven’t yet found an important waterborne pathogen that isn’t susceptible to SODIS,” says McGuigan. “Protozoans such as cryptosporidium are more resistant but it can still be accomplished; it just takes a good wallop of energy.”

Limitations

The major benefit of SODIS is the low price tag but this brings its own unique problem.

“The simplicity is its biggest advantage and its biggest disadvantage,” explains McGuigan.

🗨️ If people see plastic bottles lying in the ditches and you give them a plastic bottle as the solution to unsafe drinking water, there’s not a lot of psychological value placed with the technology.

Even though SODIS has been given the thumbs up by the World Health Organisation (WHO) for use in emergency settings, McGuigan maintains that “the biggest barrier is that people just don’t know about it”.

Another challenge is dissolved solids in the water. Current advice is that if a newspaper headline is still readable through a bottle of cloudy water standing on top, then SODI will still be effective – otherwise it needs to be filtered. In trials, SODIS had a surprise advantage over chlorination, a more widely used method of decontamination.

“The Cambodians thought SODIS was fantastic,” continues McGuigan.

🗨️ They loved the simplicity and the taste of the water. They don’t like the taste of chlorine, neither do the Maasi people in Kenya.

Building on Success

McGuigan and his team are now working on ways to scale up and enhance the technique.

“There’s a lot of work associated with SODIS because the most you can disinfect in one go is a two-litre bottle. If you have a family of five or six kids, it’s quite a burden of work.”

Working in collaboration with the Plataforma Solar de Almería in Spain, McGuigan and his team developed a half-pipe reflective cradle that concentrates and focuses sunlight to a 14-litre water bottle.

The system is being tested in Uganda by Rosemary Nalwanga, a PhD student in the Makerere Kampala University, who is co-supervised by McGuigan and Dr Brid Quilty in DCU as part of the “Water is Life” project, funded by Irish Aid. While the price tag of the system (it cost \$200 to make the prototype) puts it out of range of most households, it would be cost-effective in schools or on a community basis.

McGuigan has a curious end-goal for SODIS – he hopes that it become obsolete.

“The ultimate goal is a safe effective water source. It would be better off investing in pumps and better pump technology.”

However, there is caution. “It costs \$3,000 to sink a borehole. SODIS is an effective treatment for almost no cost.”

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COMMENTS (40)



Jarlath Murphy

7y

Mar 22nd 2014, 4:52 PM

Have to say this is impressive research.

98



Joy Herron

6y

Mar 22nd 2014, 6:51 PM

If your in a situation where you need to solar disinfect your water I'd say the leaching of Bpa and other chemicals is the least of your worries

69



Kevin McGuigan

4y

Apr 1st 2014, 7:34 AM

We've looked for genotoxic effects from chemicals leaching from the SODIS bottles and all we can say is that we haven't been able to find any after 6 months in strong sunshine at the solar research facility in Southern Spain. In the absence of any further data we recommend that the bottles are replaced after 6 months. Full details of the experiments are available at: Ubomba-Jaswa E, Fernández-Ibáñez P, McGuigan KG. A preliminary Ames-fluctuation assay assessment of the genotoxicity of drinking water that has been solar disinfected in polyethylene terephthalate (PET) bottles. Journal of Water & Health. 2010;8(4):712-719.

1

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Lm group

6y

Mar 22nd 2014, 4:48 PM

If only they had sun light in roscommon then they could drink the water, they got the meters though, what a balls of a country

59



Glen

4y

Mar 22nd 2014, 4:35 PM

It would be nice if we could do that for our fluoridated water.

45



Vincent Lee

4y

Mar 22nd 2014, 6:37 PM

Why are you against fluoride?

21



BlueSkyThinking

5y

Mar 22nd 2014, 9:43 PM

You can Glen, it just won't remove the fluoride!

6



graham galvin

6y

Mar 22nd 2014, 4:35 PM

Just wait till the EUSSR shuts down their research. After all water is not a right in their eyes.

41



cosmological

6y

Mar 22nd 2014, 4:51 PM

Without water we're goners. Just think how we take it for granted every day.

38



Dirk Diggler

7y

Mar 22nd 2014, 11:05 PM

Not for long though.

6



Niall Sheridan

7y

Mar 22nd 2014, 5:33 PM

"Clean tap water is a pipe dream for 780 million people worldwide" is the quote of the week for me in the Journal. Most of the residents of County Roscommon are included in this figure! We have been under boil water notices for months. And Irish Water and the FG/Lab fascists want us to cheerfully pay up! No hope!

34



Patricia Ann McCarthy Moore

6y

Mar 22nd 2014, 4:59 PM

That is an extremely usefull discovery. It appears they respect the wishes of the Masai tribe in Kenya. Why not extend the same respect to Irish people who do not want fluoride and chlorine in the water.

25

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graham galvin

6y

Mar 22nd 2014, 5:04 PM

@patricia but then how else would they keep us passive & complete walkovers. Fluoride combined with corrie & the X factor have worked wonders so far.

28



Neal Ireland Hello.

4y

Mar 22nd 2014, 5:14 PM

Please don't compare the traditions of one of the worlds's great cultures with the paranoia of a load of nuts who have a phobia of toothpaste.

31

SEE 3 MORE REPLIES ▼



Brian Canavan

6y

Mar 22nd 2014, 5:04 PM

Sure Bear Grylls said that and demonstrated that years ago

21



ipsum oleum

7y

Mar 22nd 2014, 6:23 PM

Not knocking the idea as it works but this idea is at least 10 years old and I recall that it worked even better in glass bottles.

18



Dublin Living

5y

Mar 24th 2014, 8:46 AM

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There is a difference between an idea and systematically proving it really works.



Dublin Living

5y

Mar 24th 2014, 8:50 AM

I should add the other key part is that this research looks at the actual improvement in people's health as a result of the solar disinfection, that is, the reduction in diarrhea. Diarrhea is very dangerous if untreated and kills something like 3 million people per year.



SEE 1 MORE REPLY ▼



Pat O'Brien

6y

Mar 22nd 2014, 5:29 PM

Not to put a dampener on what looks to be a really great fund. Are there not concerns about carcinogens leeching into the liquid from bottles left in the sun. Didn't Cheryl Crow attribute her breast cancer to drinking bottled water that had been left in her car too long.



Joseph Siddall

5y

Mar 22nd 2014, 6:30 PM

Pat, urban myth utterly without any scientific foundation. Some very dodgy "research" tried to show the effect but failed miserably. Didn't stop silly people believing it though.



Daisy Chainsaw

7y

Mar 22nd 2014, 10:32 PM

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The water would have to be boiled and reboiled in the bottle. Leaving water in your car might get it to lukewarm, nowhere near the level that could cause cancer.

Don't believe those "OMG!! [insert ordinary everyday object] can KILL U!!!eleventy!!" posts on Facebook. Check the likes of Snopes or HoaxSlayer before you forward on another pointless chain letter.



SEE 2 MORE REPLIES ▼

 **Daire**
4y

Mar 22nd 2014, 5:00 PM

Have your water quality tested doesn't cost much look it up on Google...



 **Lorcan**
4y

Mar 22nd 2014, 5:12 PM

Had our water tested just on the limit of EU standard for flouride. Going to send results to Irish Water and ask them why I should be paying for this!



 **BlueSkyThinking**
5y

Mar 22nd 2014, 9:45 PM

That's great Lorcan, you're getting twice the protection than the rest of Irish drinkers. Ireland's limit is half the EU limit. In the USA they accept four times the amount of fluoride than is allowed in Ireland.



 **Geraldine Stroud**
6y

Mar 22nd 2014, 7:55 PM

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We live on the outskirts of County Sligo and do not have supply of water unless God makes it rain – then it is only suitable for flushing the toilet and showering if you shut your mouth. I will not pay any water charges, already buy bottled water for cooking and drinking!

  10



Siobhan Duffy

4y

Mar 23rd 2014, 1:53 AM

Is rain water that contaminated ? I rember acid rain n that from school

  1



OC 95

5y

Mar 22nd 2014, 11:54 PM

Wasn't it not so long ago they were telling women not to leave bottles of water in the car because sunlight sets off some chemicals that's in the plastic bottles into the water and that it could cause breast cancer!! Now there telling people to leave water in sunlight!!???

  9



Siobhan Duffy

4y

Mar 23rd 2014, 1:51 AM

I'm sure that was da usual Facebook scaremongering that does da rounds !

  4



Stefan Eckhardt

5y

Mar 22nd 2014, 8:50 PM

I had the joy of having Prof. McGuigan and Dr. Quilty as my supervisors for my final year project in college. They're sound folks! Brilliant work being done.

  7



Padraig Culbert

7y

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Mar 22nd 2014, 8:39 PM

SODIS won the Red Cross Prize in 2006. Slow news day???



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Science of Beer

5y

Mar 23rd 2014, 12:55 AM

The water is disinfected by sunlight not sterilized, this is old news, peer reviewed papers going back years..



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Robert Squires

5y

Mar 22nd 2014, 5:06 PM

Water ,we just can't live with out it .



Colm Molloy

6y

Mar 22nd 2014, 7:20 PM

Water great idea



Mary Kavanagh

6y

Mar 23rd 2014, 12:45 AM

Very impressive. And it even works here – if we ever got a decent day's sunshine. Good news for Africa and other places with dirty water.



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Adam Harris



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Caoimhín De Barra



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Ciarán Cuffe

I believe that the unions are targeting industrial action at a minority and that this sets a worrying precedent for all minority groups, writes Adam Harris.

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There are vast tracts of underutilised lands close to the city centre, they should be used to build high-quality apartment blocks with generous courtyards and play areas, writes Ciaran Cui

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