

All information on this page is taken from the following website:

<http://www.sodis.ch/Text2002/T-Howdoesitwork.htm>

all Texts, Pictures, Graphics by SANDEC (Water & Sanitation in Developing Countries) at EAWAG (Swiss Federal Institute for Environmental Science and Technology), CH-8600 Dübendorf, Switzerland.

Key factors of SODIS application

Weather and Climate

SODIS requires sun radiation and temperature:

- => the container needs to be exposed **to the sun** for **6 hours** if the sky is bright or up to 50% cloudy
=> the container needs to be exposed **to the sun** for **2 consecutive days** if the sky is 100% cloudy,
=> during days of continuous rainfall, SODIS does not perform satisfactorily. Rainwater harvesting is recommended during these days.
=> if a water temperature of at least **50°C** is reached, an exposure time of **1 hour** is sufficient
- The most favourable region for SODIS lies between latitudes 15°N/ S and 35°N/ S. These semi-arid regions are characterized by high solar radiation and limited cloud coverage and rainfall (3000 hours sunshine per year). The second most favourable region lies between the equator and latitude 15°N/ S, the scattered radiation in this region is quite high (2500 hours sunshine per year).
(-> see [technical Notes Nr.5](#) on the www.sodis.ch website)

Water Turbidity

Suspended particles in the water reduce the penetration of solar radiation into the water and protect microorganisms from being irradiated.

- => SODIS requires relatively **clear water** with a **turbidity less than 30 NTU**.
- In water with higher turbidity than 30 NTU pathogens **will have to be inactivated by the temperature** rather than radiation (>50°C for at least an hour) or the water has to be filtered before being exposed to the sun.
- **Water Turbidity Test:** place the bottle, full with water, on the SODIS logo on top of a table in the shade and look through the bottle from top to bottom. Water turbidity is less than 30 NTU, if you can read the letters of the SODIS logo through the water.
(-> see [technical Notes Nr.7](#) on the www.sodis.ch website)

Material and Shape of the Containers




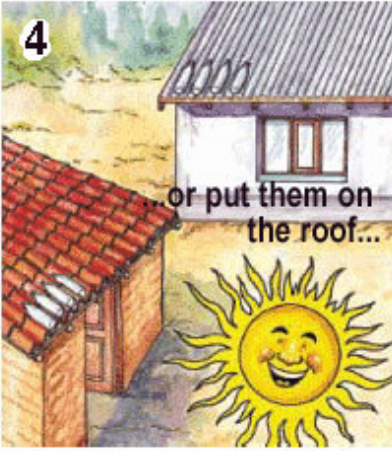


- Various types of transparent plastic materials are good transmitters of light in the UV and visible range of the solar spectrum. Plastic bottles made from **PET** (PolyEthylene Terephthalate) are preferred because they contain less UV-stabilisators than PVC (PolyVinylChloride) bottles.
- How to **distinguish PET and PVC:** Bottles of PVC often have a bluish gleam. If PVC is burnt, the smell of the smoke is pungent, whereas the smell of PET is sweet.
(-> see [technical Notes Nr.2](#) on the www.sodis.ch website)

- **Glass:** Also glass bottles can be used for SODIS. But it is not possible to construct shallow, large containers using ordinary window glass, as window glass does not transmit UV-radiation adequately.
- **Ageing of plastic bottles** (due to mechanical scratches and due to photoproducts) leads to a reduction of UV transmittance which will reduce the efficiency of SODIS. Heavily scratched or old, blind bottles should be replaced.
(-> see [technical Notes Nr.3](#) on the www.sodis.ch website)
- **Photoproducts:** Sunlight does not only destroy pathogenic microorganisms found in the water but also transforms the plastic material into photoproducts. Laboratory and field tests showed that these photoproducts are generated at the outer surface of the bottles. No migration of photoproducts or additives (UV-stabilisators) into the water was observed.
- **Migration of organic compounds:** the migration of organic compounds from reused and new PET Bottles into the water was examined by a team of researchers from the EMPA (Swiss Federal Laboratories for Materials Testing and Research). Adipate and phtalate such as DEHA and DEHP were detected in very low concentrations - the level of concentrations found in the water of reused and new PET-bottles were in the same magnitude as the concentrations of phtalate and adipate generally found in high quality tap water.
[More information](#) on the www.sodis.ch website)
- **Shape of Containers:** UV radiation is reduced by increasing water depth. At a water depth of 10cm and moderate turbidity of 26 NTU, UV-A radiation is reduced to 50%. This means that PET bottles do not have the most efficient shape for SODIS as they have a small area for sunlight exposure and have a water depth of 6-10cm. Containers with a larger exposed area per water volume would be more efficient. However, PET soft drink bottles are often easily available and thus more practical for the SODIS application.

Oxygen

- **Oxygen** plays an important role in killing the pathogens: Sunlight produces highly reactive forms of oxygen (oxygen free radicals and hydrogen peroxides) in the water. These reactive molecules contribute in the destruction process of the microorganisms.
Under normal conditions (rivers, creeks, wells, ponds, tap) water contains sufficient oxygen (more than 3 mg Oxygen per litre) and does not have to be aerated before the application of SODIS.

How do I use SODIS? (in pictures)

<p>1 Wash the bottle well the first time you use it</p> 	<p>2 </p> <p>Now fill up the bottle fully and close the lid</p>	<p>3 Place the bottles on a corrugated iron sheet</p> 
<p>4  or put them on the roof...</p>	<p>5 </p> <p>Expose the bottle to the sun from morning until evening for at least six hours</p>	<p>6 The water is now ready for consumption</p> 

Limitations of Sodis

- SODIS does not change the chemical water quality
- SODIS requires relatively clear water (turbidity less than 30 NTU)
- SODIS requires suitable weather conditions
- SODIS is not useful to treat large volumes of water