

SUMMARY

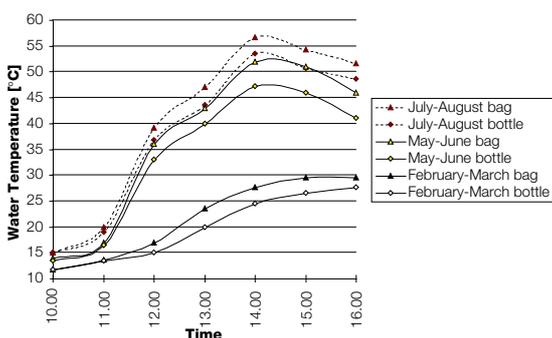
Plastic bottles made from PET are suitable containers for SODIS application. Higher treatment efficiencies can be achieved with plastic bags due to their larger area exposed to sunlight and smaller water depth. However, handling of plastic bottles is easier and more convenient to the users.

BACKGROUND INFORMATION

The SODIS treatment method bases on the synergetic effect of both water temperature and UV-A radiation (wavelength: 320-400 nm). Radiation with longer wavelength (> 400 nm) does not eliminate the bacteria efficiently enough and UV-B (280-320 nm) is only transmitted through special Pyrex glass and does reach the ground level at low intensity only. PET (Polyethyleneterephthalate) shows a good UV-A transmittance and therefore readily available PET-bottles are used for the SODIS-treatment.

On the technical side, PET-bottles are not the most efficient containers as they show a small area for sunlight exposure and have a water depth of 6-10 cm. As a consequence, the exposed area/water volume ratio is quite low which means that water is not heated up to maximum possible temperatures and the UV-A radiation intensity on the lower side of the bottle is reduced.

As an alternative, bags made out of a transparent and a black PET-sheet have been produced (SODIS-bags) with a larger area for sunlight exposure and water depth of less than 6 cm. This increases the exposed area/water volume ratio and therefore enhances the inactivation process.



Water temperature curves in bottles and bags. The average temperature difference is about 2-3 °C.

REFERENCES

SODIS News No. 1, February 1997, internal report
SODIS News No. 3, August 1998, internal report
Acra, A., Jurdi, M., Mu'alleem, H., Karahagopian, Y., Raffoul, Z., (1989). Water Disinfection by Solar Radiation - Assessment and Application. Technical Study 66e. IDRC, 1989, ISBN 0-88936-555-5. [P5]

Advantages of SODIS bags

- ☺ Faster heating up and to higher temperatures compared to the bottle
- ☺ More efficient inactivation of bacterias and viruses than with SODIS bottles

Disadvantages of SODIS bags

- ☹ The water out of SODIS plastic bags smells plastic
- ☹ Difficult to handle (filling and taking the water)
- ☹ The SODIS plastic bag is not durable (3-6 months only)
- ☹ A container is necessary to consume the water
- ☹ SODIS bags are not readily available
- ☹ Plastic is a problem for the environment

Advantages of SODIS bottles

- ☺ It is practical as it can be used directly at the table, no need for other container.
- ☺ Easy to handle (filling, carrying, taking the water)
- ☺ It is more prestigious
- ☺ The bottle is more durable. Even after several months, the bottle is still in good condition
- ☺ The bottle is easy available at low cost

Disadvantages of SODIS bottles

- ☹ Plastic is a problem for the environment
- ☹ Several bottles are needed to treat the water for the whole family.

Inactivation curves of SODIS bags and bottles

