

SUMMARY

Plastic bottles made from PET are recommended for SODIS use as they should not contain substances hazardous to health. Good transmittance of UV-A light is required when glass bottles are to be used for SODIS.

BACKGROUND INFORMATION

Plastic: Preference for PET

Plastic mineral-water and soft-drinks bottles are gradually replacing glass. Plastic bottles are made of either PET (polyethylene terephthalate), or PVC (polyvinyl chloride), both containing additives like UV-stabilisators to increase their stability or to protect them and their content from oxidation and UV radiation. Additives are large molecules which hardly imigrate through the PET material. Still, they are a potential health risk. In PET, additives are much less used than in PVC (less than 1% for PET), making PET the preferred material for SODIS treatment. Various types of transparent plastic materials are good transmitters in the UV and visible range of solar spectrum.

PET or PVC? A simple Test

There are several simple methods to determine wether a bottle is made of PVC or PET. One is the appearance. Bottles made of PVC have often a bluish gleam. This bluish hue is especially marked at the edges of a piece of bottle material that has been cut out. If PVC is burnt, the smell of the smoke is pungent, whereas the smell of PET is sweet. PET burns more easily than PVC.

Glass: UV-A Transmission

The transmission for ultraviolet radiation is largely determined by the content of iron oxide in the glass. Ordinary window glass in thicknesses of 2 mm or more is practically opaque to UV-radiation. Certain specific glasses (Pyrex, Corex, Vycor, Quartz Glasses) transmit significantly more ultraviolet radiation than the ordinary window glass. However, for an appropriate technology like SODIS large scale utilization of these special glasses may not be very attractive due to their high costs and rare availability in the developing areas of the world.

The advantages of PET are

- ☺ Low weight
- ☺ Relatively unbreakable
- ☺ Transparent
- ☺ Taste-neutral
- ☺ Chemical stable

The disadvantages of PET are

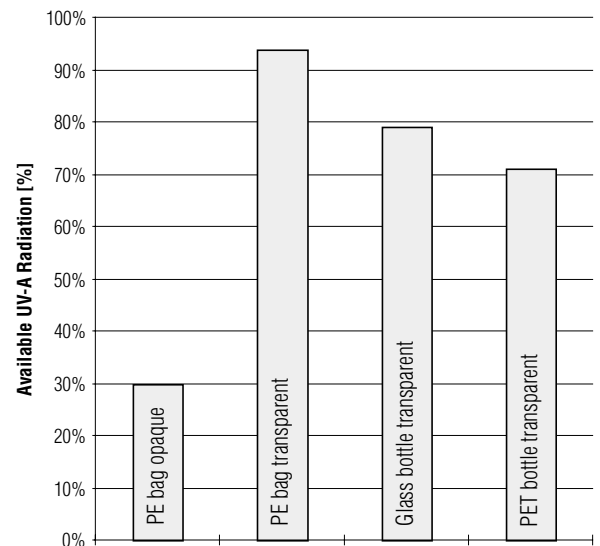
- ☹ Limited heat resistance (deformations above 65 °C)
- ☹ Scratches and other ageing effects

Advantages of Glass

- ☺ No scratches
- ☺ No photoproducts
- ☺ Heat resistance

Disadvantages of Glass

- ☹ Easily smashed
- ☹ High costs
- ☹ Weight



UV-transmission of PE, Glass and PET (examples)

REFERENCES

Solar Water Disinfection. Proceedings of a Workshop held at the Brace Research Institute, Montreal, Que., Canada. IDRC, 1988 [P6]
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