Methods for household water treatment

	Thermal treatment (Boiling)	Chemical disinfection with free chlorine	Chemical coagulation–filtration and chlorine disinfection	Solar disinfection with UV + heat (SODIS system)	UV disinfection with lamps	Membrane, porous ceramic or composite filters	Granular media filters Slow sand filters
Disinfectant residual	No	Yes	Yes	No	No	No	No
Chemical changes in water	No	Yes, may cause taste and odour	Yes, may cause taste and odour	No	No	No	No
Microbial regrowth potential in treated water	Yes, with storage beyond 1–2 days	No, if chlorine residual is monitored and maintained	No, if chlorine residual is monitored and maintained	Yes, with storage beyond 1–2 days	Yes, with storage beyond 1–2 days	Yes, but container provides safe storage	Yes, but container provides safe storage
Skills level and ease of use	Low skills, easy to use	Low skills, easy to use with training	Moderate training needed	Low skills, easy to use	Moderate training needed	Low skills, easy to use with training	Low skills, easy to use with training
Availability of needed material	Requires a source of fuel	Requires source of free chlorine, regular monitoring of chlorine residual and safe storage vessels (See Appendix 14)	Requires chemical coagulants, free chlorine, two containers, a filter cloth	Requires plastic bottle and dark surface	Requires UV radiation units, replacement lamps, and reliable source of electricity	Requires a filter, regular cleaning and maintenance	Requires a sand filter, regular cleaning and maintenance
Acceptability	High	High to moderate	High to moderate	High to moderate	Moderate to low	Moderate to low	Moderate to low
Length of treatment time	Minutes to tens of minutes	30 minutes	30 minutes	6–12 hours (full sun) to days (if cloudy)	Seconds to minutes, depending on the water volume treated and the reactor design	Depending on the filter 1–3 litres/hour	1 litre per minute
Comments	High cost (fuel)	Not effective against *Giardia* and *Cryptosporidium oocysts*	Combined treatment with coagulant and disinfectant effect	Suitable in areas with high sunlight exposure	Ineffective in turbid-waters. Considerable maintenance and high cost	Depends on the pore size and use of silver or other chemical agents	Considerable maintenance and high cost

Notes

- Effective dosage of chlorine may be affected by the parameters of the water to be treated (temperature, pH, turbidity and total organic carbon). High-turbid water will require more free chlorine to reach the recommended FRC levels than low-turbid water.
- Recommendations are to dose with free chlorine at about 2 mg/L to clear water (< 10 nephelometric turbidity units) and twice that (4 mg/L) to turbid water (> 10 nephelometric turbidity units), with a contact time of at least 30 minutes. However, even low-turbid water can have high chlorine demand due to the total organic carbon load that is not detected by nephelometric testing. Temperature and pH may also affect chlorine requirements. Regular testing of FRC and dose adjustment of free chlorine is therefore essential.
- In high-turbid waters, additional treatment may be needed (filtration, sedimentation, coagulation or flocculation) to remove suspended particles and reduce turbidity.

Sources: World Health Organization. Guidelines for drinking-water quality. Fourth edition. Geneva: WHO;2017 (http://www.who.int/water_sanitation_health/publications/2011/dwq_guidelines/en/)
World Health Organization. WHO International Scheme to Evaluate Household Water Treatment Technologies. Geneva: WHO; 2016 (http://www.who.int/household_water/scheme/household-water-treatment-report-round-1/en/)
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