**Appendix 13. Methods for household water treatment**

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|  | **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/>)

OXFAM. Technical Brief – Household water treatment and Storage. 2007 (<https://supplycentre.oxfam.org.uk/water-treatment-11-c.asp>)