

Solar Disinfection Potentials of Aqua Lens, Photovoltaic and Glass Bottle Subsequent to Plant-Based Coagulant: For Low-Cost Household Water Treatment Systems

Authors : Yonas Lamore, Abebe Beyene, Samuel Fekadu, Moa Megersa

Abstract : Unaffordable construction cost of conventional water treatment plant and distribution system in most developing countries makes difficult to provide safe and adequate water for all households, especially for the rural setup. Water treatment at the source can be the best alternative. Solar disinfection is one alternative among point of use treatments. In this study, aqua lens, photovoltaic box and glass bottle were used subsequent to plant coagulants to evaluate microbial reduction potentials. Laboratory- and field-based experiments were conducted from May to August 2016. The Escherichia coli, total coliforms and heterotrophic plate counts were used as indicator organisms. The result indicated that aqua lens (AL), photovoltaic box (PV) and glass bottle (GB) have high inactivation rate subsequently almost for all indicator organisms in short solar exposure time. Total coliforms were inactivated in AL (SD = 15.8 °C, R2 = 0.92) followed by PV inactivation temperature association (SD = 11.6 C, R2 = 0.90), and the GB concentrator was inactivated (SD = 10.9 °C, R2 = 0.70) at turbidity level of 3.41 NTU. As the study indicated, aqua lens coupled with Moringa oleifera coagulant can be an effective with minimum cost for household water treatment system. The study also concludes heterotrophic bacteria were more resistant than other types of bacteria in SODIS with similar exposure time.

Keywords : acrylic glass, aqua lens, moringa olifera, photovoltaic box, solar disinfection, water treatment

Conference Title : ICWEEM 2024 : International Conference on Water, Energy and Environmental Management

Conference Location : New York, United States

Conference Dates : October 10-11, 2024