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Impact of fouling on the performance of solar-driven multi-effect desalination systems

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A B S T R A C T

This work analyzes the adverse impacts of fouling-deposit accumulation on the performance of solar-powered multi-effect desalination (MED) systems. Using a validated dynamic model developed in the Engineering Equation Solver (EES) and operational data from the Plataforma Solar de Almería (PSA) MED pilot plant (Almería, Spain), we illustrate how fouling negatively affects heat transfer, reduces distillate production, and increases energy consumption. The results highlight the need for effective antifouling strategies to ensure economic profitability and ecological sustainability.

Keywords: Multi-effect desalination (MED); Fouling; Solar energy; Thermal desalination; Brine concentration; Freshwater production

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