

Improvement of the performance of hemispherical distillers through passive and active techniques	
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<p><b>Abstract:</b> The primary goal of the present work is to compare the thermo-economic performance of modified hemispherical distillers by various types of enhancing materials. Three different cases of enhancing materials: (I) Copper oxide Nanofluid, (II) Copper chips, and (III) Copper oxide Nanofluids and copper chips sandwiched between wick material were tested. Each case was applied to the system without an external condenser (MHSS) and with an external condenser (MHSSC) and compared with a conventional one (CHSS). The outcomes were compared regarding system temperatures, hourly yield, daily productivity, thermal performance, and cost per liter of distilled water. According to the findings, the proposed modifications could augment the performance in the ranges of 25.4–79.11 % (productivity), 58.4–79.11 % (energy efficiency), and 7.85–167.42 % (exergy efficiency). Especially, Case III was the most enhanced case in terms of thermoeconomics and distillate water productivity. In this case, MHSSC exhibited a daily distillate water output and a thermal efficiency 79.11 % and 79.107 % better than CHSS, with values of 5.66 L/m<sup>2</sup> and 56.15 %, respectively. Additionally, MHSS had the highest daily exergy efficiency, at 2.38 %, indicating a 167.42 % improvement. Moreover, the cost of one liter of distillate water for the MHSS and MHSSC was about 0.029 \$/L, with a cost reduction of 20.68 % compared to CHSS.</p>	