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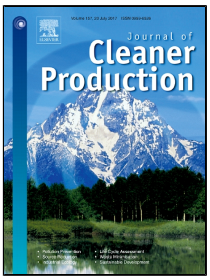

Experimental performance assessment of a vacuum cooling system through exergy analysis method

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Experimental performance assessment of a vacuum cooling system through exergy analysis method

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ABSTRACT

The food industry, especially the cooling of the food, is a major consumer of energy. The high energy consumption forces the food cooling industry for new refrigeration systems and cooling foods with the low energy consumption. Vacuum cooling method is fast and an evaporative process while it has many advantages such as shorter processing times, improved product shelf life, consequent energy savings, safety and quality. In the open literature, there is no study that has investigated exergy analysis, exergetic efficiency and Coefficient of Performance (COP) of vacuum cooling to the best of the authors' knowledge. The performance of the vacuum cooling system using mushroom (Agaricus Bisporus) is determined through these metrics. The results have indicated that the COP value of the vacuum cooling reaches 12 and the exergy efficiency is maximum 80 percent for 23.9 °C. Both the exergetic efficiency and COP values for the vacuum cooling are achieved at the lowest pressure. The variations of energy and exergy of evaporation and the exergy rate of the product for the vacuum cooling are also given.

Keywords: Vacuum cooling; energy; exergy; mushroom; pressure; temperature; exergetic

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