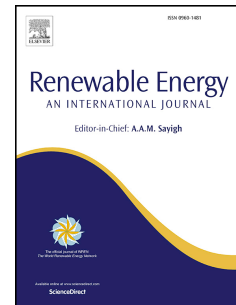


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# Thermal performance study of a multi-pass solar air heating collector system for drying of Roselle (*Hibiscus sabdariffa*)

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## Abstract

This article presents a study on the performance of a forced convective multi-pass solar air heating collector (MPSAHC) system assisted with granite as a sensible energy storing matrix. Experimental drying of Roselle was carried out in August 2015 at Solar Energy Research Site of Universiti Teknologi PETRONAS, Malaysia (4.385693° N and 100.979203° S). The present investigation was conducted under the daily average relative humidity, solar irradiance, ambient temperature and wind speed of 64.5%, 635.49 Wm<sup>-2</sup>, 32.24°C, and 0.81 ms<sup>-1</sup>, respectively. An average drying rate of 33.57 g·(kg·m<sup>2</sup>·h)<sup>-1</sup> was achieved while the system optical efficiency, collector efficiency, drying efficiency and moisture pickup efficiency of 70.53%, 64.08%, 36.22% and 66.95% were obtained, respectively. MPSAHC dryer was 21 h faster with fair color retention when compared to open sun drying approach (OSDA) that was conducted together

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