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Design improvement of curing drum by externally re-heated exhaust air re-circulation for black lime production

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The present study evaluates methods of improvement of energy utilization and reduction of drying cost. A previous design for a curing drum designed by the Industrial Technology Institute was modified by hot air recirculation after external reheating. Performance in terms of specific energy utilization and thermal efficiency of existing curing drum and modified designs were evaluated. Results showed that the modified dryer yielded an average thermal efficiency of 35%, compared to the existing dryer which had no significant efficiency improvement by internal air recirculation. Externally re-heated hot air re-circulation showed both energy savings and enhanced the sensory quality of the black lime produced. The improvement could be attributed to heat recovery via external hot air recirculation after re-heating, better temperature and humidity control, and thermal insulation. The enhancement increases with increasing reflux ratio especially for operating at lower air flow rate with higher inlet temperature. The present study clearly showed that externally reheated hot air re-circulation can be applied for energy saving and improvement in quality of high temperature dehydrated products.

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