

AN EXPERIMENTAL STUDY ON PV POWERED FORCED CIRCULATION SOLAR BAGASSE DRYER

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Abstract

This study is concerned with the feasibility of using a small photovoltaic powered fan to improve bagasse drying rates in a small scale forced convection solar tunnel bagasse dryer. The study consisted of two main parts. An experimental and numerical study aimed at determining whether a small photovoltaic fan would influence the drying rate was first undertaken. In the experimental study a small scale bagasse dryer of 10 kg capacity was designed and developed. The dryer incorporated a solar heated solar collector and was fitted with a low cost 10 watt DC fan. A set of drying experiments were carried out. Loads of 10 kg wet fresh bagasse was used. The experiments were conducted with different electric powers supplied to the fan. The findings of the study indicate a significant improvement in drying rates can be achieved by incorporating a low power photovoltaic powered fan into the dryer. A feasibility study of bagasse dryer using solar energy shows that a considerable amount of bagasse can be saved if a real dryer whose cost lies within the maximum permissible value, subject to an acceptable pay back period, can be identified.

Keywords: Solar bagasse dryer, Drying rate, Effectiveness, Optimization.