

# MEDECINAL HERB DRYING USING A PHOTOVOLTAIC ARRAY AND A SOLAR THERMAL SYSTEM

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## Abstract

Drying of medicinal herbs should take place as soon as possible after harvesting, otherwise insects and fungi, which thrive in moist conditions, render them unusable. However, tremendous amount of energy is required for accomplishing the drying process. Conventional drying methods such as open sun drying and conventional-fuel dryers are not suitable; since they may yield a less quality product and/or may increase the drying cost and/or time. Moreover, they may not be reliable and environmentally safe. Therefore, the trend is toward using a controlled-nonconventional drying methods, to improve the quality of the product to be dried and at the same time to decrease the drying cost and time. These methods use renewable energy sources for their operation, which are highly recommendable. This work proposes and develops a new controlled drying method; which uses a solar collector and a bio-gas fuel to heat the drying air, and a stand-alone photovoltaic (PV) system to feed the electrical load of the dryer. The designed control technique ensures correct and continuous operation of the dryer's subsystems. Also, this work presents the dynamic modeling for the different components in the solar thermal system, which is responsible for heating the drying air. The results indicate the high effectiveness of the drying method.