ABSTRACT

The Development Of A Computer Model Of A Solar Crop Drier With A View To Practical Application

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A solar crop drier is modeled by dividing the task into sub-tasks and analyzing each individually, these being "Insolation", "Psychrometric Properties", "Collector" and "Drying Parameters". The conditions considered pertain specifically to Barbados but may easily be applied to other Caribbean countries. Our flat plate collector design employs a double absorber system with selective surfaces on the upper surfaces of the absorber and back plates. At air speeds of around 0.1 m/s, air temperatures rise over 100 °C with the absorber close to 150 °C. Both temperatures are higher than those obtained for most flat plate collectors under the same conditions. These high air temperatures result in relative humidities well below 10 %, and increase drying potential significantly. The versatility of our model allows crucial design parameters to be identified and varied to achieve optimum performance. For a minimum supply of specific input data, drying times may be calculated for specific materials. The algorithms developed frequently use iterative solutions, so that a trade off is made between accuracy and computational time.