PERFORMANCE OF A SIMPLE PASSIVE CONVECTIVE SOLAR VEGETABLE DRYER

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The performance of a simple solar vegetable dryer, perhaps an ideal system for the single local farmer user as it operates without any external power source, is reported. In this, a body of air is heated in the sun by means of an absorber plate and thent this air is allowed to pass through a flat bed of pre-treated newly harvested vegetables - Snakegourd (Tricosanthes Anguina), by natural convention.

The dryer consists of a rectangular box shaped dryer consists of a rectangular box shaped drying chamber covered on top by a insulating plate and mounted on a tall column, and a solar air heating unit in which the absorber plate is a corrugated galvanized iron (roofing) sheet, with its top surface painted matt black and placed between a glass plate and a wooden insultation bottom plate. With this arrangement the drying chamber could be rotated about the column which enables drying throughout the day.

The required air flow rate was estimated using parameters such as the moisture content of the fresh vegetables to be dried, relative humidity of air inside the chamber and the time duration; the design of the heating unit being optimised accordingly. The chamber was capable of handling about 1 kg of vegetables at a time and the maximum air temperature attained with this system was about $64^{o}C$, which was found to be the best temperature for the retention of Vitamic C content of the dried products.

With this system, a maximum drying rate of about 1.5 gm/m was obtained for fresh snakeground but it was found that after three days of continuous drying (only during day time), the moisture content could be reduced only upto 14% (wet basis), the rate of drying beyond this being negligibly small. This can however, be attributed to the high relative humidity (35%), of hot air used for drying.

This system was also found to be more suitable for the retention of the important nutrients in the dehydrated products, when compared to direct exposure to sunlight. The dehydrated products retained about 15% of the Vitamin C content while its chlorophyll content reduced only marginally.

References

Sangasena K.et.al (1996) Proc. Sri Lanka Ass. Advmt. Sci., 42, 64,

Ong. K.S. ESCAP Expert Working Committee Meeting on the Use of Solar Energy, (1979) Bangkok, , pg. 147

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