(103)

Increasing the Food Availability by Reducing Post-Harvest Losses with Photo-Voltaic Power System in a Disaster

Nawarathna R.A.G.C.N.M.*, Rupasinghe C.P.

Department of Agricultural Engineering, Faculty of Agriculture, University of Ruhuna, Sri Lanka
**nawarathnassck@gmail.com*

Abstract

Public services are interrupted during disaster and people faced difficulties without facilities such as electricity, sanitation, water and communication. Availability of fresh food become constraint at the disaster and lead the people into hunger and malnutrition. Electrical power based fresh food storage systems are unable to function at the disaster due to electricity failure. Photovoltaic (PV) power system is a possible renewable energy which can be used to operate storage system to increase the food availability through reducing postharvest losses by controlled through proper maintenance of storage system. This paper addressed different relative humidity (RH) levels in storage for increasing the self-life of vegetables such as *Solanum melongena*, *Cucumis sativus*, *Brassica oleracea*, *Citrus aurantifolia*, *Abelmoschus esculentus*, *Ipomoea batatas* and *Solanum lycopersicum* for five days along the storage room using PV power. Temperature was maintained between 21º C and 23º C using an air conditioner machine (1500 W) with regulating different RH levels, such as 55%, 65% and 75% of ambient air (28.8±1.1º C, 78.7±6.7%) and with three replicates. Keeping quality of vegetables were assessed by firmness, Brix value, pH value, weight loss percentage, Hue angle and Chroma value. Energy consumption for operating PV powered air conditioner was 15.75 kWh in five day storage period. This power can generated by area of 2.93 m^2 solar panel under Global Horizontal Irradiation (GHI) of 1962.0 kWh/m^2/year in Dambulla (DL1) Sri Lanka. *Solanum melongena* in RH 65%, *Brassica oleracea***,** *Citrus aurantifolia* and *Solanum lycopersicum* in RH 75% were observed higher firmness value. *Cucumis sativus* in RH 75% and all other vegetables in RH storage resulted lowest weight loss percentage compared to ambient condition. *Cucumis sativus*, *Citrus aurantifolia*, *Brassica oleracea* and *Ipomoea batatas* in RH 75% and *Abelmoschus esculentus* in RH 55% were observed same value compared to pre storage Chroma values. *Abelmoschus esculentus* in RH 55%, *Cucumis sativus* in RH 75% and *Brassica oleracea* in RH 65% were observed higher hue angle. *Solanum lycopersicum* in RH 65% were observed lowest pH value. *Brassica oleracea*, *Citrus aurantifolia*, *Solanum lycopersicum* and *Ipomoea batatas* were observed lowest Brix value in RH 75% condition. The results concluded that RH 65% was the better storage condition for *Solanum melongena*, RH 55% for *Abelmoschus esculentus* and RH 75% for *Cucumis sativus*, *Brassica oleracea*, *Citrus aurantifolia*, *Ipomoea batatas* and *Solanum lycopersicum* to increase the food availability by using PV power system.

Keywords: PV power, Relative humidity, Storage, Tropical vegetables, Quality parameters.