

Design and Development of Solar Photo-Voltaic Powered Cold Storage System

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Project Objectives

- Design and Implementation of energy efficient solar Powered Cold storage system for fruits and vegetables.
- To control the temperature and humidity for various fruits and vegetables under different operating conditions.
- Testing and demonstration of solar Powered Cold storage system for fruits and vegetables.

Description

Selected perishables, potato and tomato are stored in different temperature and RH combinations in environmental chambers and deep freezers to find the best combination for shelf life extension. The effect of cold temperature on ripening and extending the shelf life are being monitored. The quality parameters such as physical (loss in weight, moisture content, color), chemical (TSS, pH/acidity, bioactive compounds) textural (firmness) and microbial (total plate count, yeast & mould) parameters were evaluated periodically to ensure the safety and quality of the end produce.

Quality Analysis of Potatoes

Freshly harvested potatoes were procured and stored under following four different temperature and humidity combinations. Shelf life study was carried out at every one week interval, till the potatoes maintain acceptable level of physical appearance.

Physiochemical properties (such as water content, pH, soluble solids, reducing sugars, protein, texture and color), textural properties and microbial load of potatoes were evaluated. The quality parameters such as weight loss, shrinkage, visual defects, colour, moisture content, pH, total soluble solids, ascorbic acid, and lycopene and textural properties of tomatoes were accessed at every 5 days interval.

Estimation of the Cooling Capacity of the System

The cooling load calculations were carried out to estimate the required cooling capacity for storage of 2 Kg of freshly harvested ripened tomatoes in Environmental chamber operating at 20°C temperature and 80% humidity.