Electronic Environment Controller For Fruit Storage Room

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Abstract-
This is programmable electronic system developed to monitor actual temperature and relative humidity level of preservation room and to allow the variation of Temperature & Humidity between a safe levels. The system is user friendly and easy to handle.

I. INTRODUCTION

Today there is great craze of eating organic food i.e. organic fresh vegetables and fruits. This market is worldwide and there is need of export and import of vegetables and fruits, mainly fruits. But actual transport process takes time up to 2-4 days. In this time period fruits quality and freshness will degraded due to decaying process. The decay rate of quality of fruits is mainly affected by temperature and humidity. Adjusting or controlling these parameters in surrounding the decay process rate can be minimized or increased.

For each different kind of fruit needs different levels of temperature and humidity in surrounding atmosphere. In idle temperature and humidity conditions fruits can be preserved in good conditions for more time than normal temperature and humidity conditions. An electronic system can be very useful to monitor real-time environmental parameters and to control those using pre-programmed conditions.

Figure 1. Block diagram of temperature & humidity monitoring & controlling system

Above figure shows block diagram of temperature and humidity monitoring system.

This system uses a temperature sensor and a humidity sensor for each preservation room to calculate real time levels of temperature and humidity. The sensors convert temperature and humidity levels in proportional analog electrical voltages.

These analog voltage levels are converted to binary bits by using A/D converter controlled by microcontroller AT89C51 for further processing. There is relation between temperature and humidity as temperature increases humidity decrease & vice versa.

Humidity level can be controlled by varying temperature only. This reduces no of relays required for control devices and so reduces extra power consumption.

For each room only two temperature controlling devices are required on for increasing and other for decreasing temperature.

If temperature increases above certain level microcontroller signals the relay on which cooler is connected to turn on till temperature level falls down under safe...
4 I/O pins of microcontroller are used for two temperature sensors and two for humidity sensors. When humidity or temperature is sensed by the sensor then it is given to ADC where it is analog signal. ADC will convert that analog signal into digital. Here in this work we used digital signal is of 12 bits (which is widely used 10 bits) which is suitable for controller to process.

Depending on processed signal controller will compare these sensed values with predefined values of humidity and/or temperature required for specific fruit.

So by using this hardware and software there is increment in lifespan of fruits with good condition is around 2 to 5 days. For example Banana requires temperature range of 17 to 21°C and humidity of 85 to 95%. For this condition Banana can be preserved up to one month. This lifespan can be increased by 5 days. So if the required specific conditions of specific fruits are maintained by using “Electronic Environment Controller for Fruit Storage Room”, These fruits can be preserved for long duration.

II. CONCLUSION:

This paper studies the microcontroller based temperature & humidity monitoring & controlling system. Test results show that fruits life can be increased by 2-3 days on an average. If evacuated storage room is used then this life span can be increased by 2 weeks on an average but increases implementation cost.

III. REFERENCES:

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