

CHAPTER V CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

Based on the results and analysis obtained in this research, it can be concluded that :

1. The design of an eco-friendly solar refrigeration system featuring Peltier cooling and remote monitoring for sustainable and efficient energy consumption has been successfully created, but it has not achieved the desired temperature;
2. Remote temperature and humidity monitoring using the Blynk application has been successfully implemented and operates effectively;
3. Testing the DHT22 sensor yielded good regression values $R^2 = 0.9902$ for temperature with the AZ HT-02 and $R^2 = 0.9798$ for humidity with the FY-11;
4. The testing of the Peltier TEC 12706 reached a temperature of -2°C within two hours;
5. System testing, comparing two sizes of cooling rooms, revealed that a smaller cooling room (26 x 17 x10) cm achieved a temperature drop of 19.6°C ;
6. The system can operate using only solar panels or only an accumulator;
7. During testing, the lowest temperature recorded was 15°C , occurring between 08:00 AM and 10:00 AM. The greatest temperature drop of 11.7°C happened between 12:00 PM and 02:00 PM, with an average light intensity of 176.846,1538 Lux.

5.2 Recommendations

To achieve a target temperature of 0°C for the portable refrigerator using solar panel remote monitoring, the following recommendations are made :

1. Increase the number of Peltier TEC 12706 modules in the system to achieve the desired lowest temperature of 0°C;
2. Construct the cooling chamber from metal to prevent air leakage, ensuring the Peltier TEC 12706 functions optimally;
3. Increase the size of the cooling chamber to accommodate more items;
4. Add a relay to the DC fan to control the system's temperature and humidity more effectively.

