TEMPERATURE AND HUMIDITY ALERT SYSTEM IN OIL PALM TISSUE CULTURE LABORATORY VIA SMS AND EMAIL NOTIFICATION

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ABSTRACT

Malaysian Palm Oil Board (MPOB) is currently undertaking the latest technology on the establishment of a tissue culture laboratory for production of high yield clone oil palm. The main purpose of the tissue culture laboratory was to produce superior planting material through tissue culture or cloning process. This project is expected to be implemented in monitoring the growth of oil palm seedlings by using appropriate method. Furthermore, the usage of wires needs to be minimize as highly as possible to create a well organized and a systematic laboratory. The application of SHT11 sensor on oil palm tissue culture equipped with an alert system is the best solution to overcome the problems that currently occurred in MPOB laboratory. Information such as temperature and humidity can be obtained as the SHT11 sensor is used as the single-chip relative humidity and temperature multi-sensor module. For this purpose, SMS alerts and email notifications are developed by using SMS Gateway and mail server to enable the user to monitor the parameter data. Once the normal range of temperature and humidity is exceeded, the user will be triggered via SMS and email. An accomplishment of the system has been carried out by using open source software such as SMS Gateway, Mail Server, Apache, MySQL and PHP. Test has been performed and the results clearly showed the capability and the potential of the alert system itself.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Oil palm (*Elaeis guineensis* Jacq.) is one of the most important oil bearing crops in the world. However, genetic improvement of oil palm through conventional breeding is extremely slow and costly, as the breeding cycle can take up to 10 years. This has brought about interest in vegetative propagation of oil palm. Since the introduction of oil palm tissue culture in the 1970s, clone propagation has proven to be useful, not only in producing uniform planting materials, but also in the development of the genetic engineering field.

By using tissue culture, the favorable qualities of plants can be precisely controlled, so that each plant is identical for the particular quality. This makes tissue culture an important aspect in the development of the oil palm industry, especially in the generation of superior and uniform oil palm planting materials [1]. To provide high quality seedlings, the most critical parameter that should be observed thoroughly are temperature (range between 25°C to 30°C) and humidity (range between 45% to 90%), since these two factors have a great influence to the performance of tissue culture. A well oriented monitoring system should be performed and requires man power to perform the observation.