

## ABSTRACT

### DESIGN DEVELOPMENT AND TESTING OF HEATING SYSTEM OF COMPUTER CONTROLLED HEATING SYSTEM FOR HOMOGENEOUS TEMPERATURE DISTRIBUTION

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The main objective of this thesis was to determine heat distribution in both vertical and horizontal direction of rooting media mainly consisted of water and perlite substance. The second objective was to design an alternative hot-water piping system to obtain better heat distribution through the rooting media. Therefore, the hot-water piping system were designed, built and tested. The heat distribution test results of both systems were compared. The randomized, complete block experimental design included two heating systems, three rooting depths, three temperature levels (18, 22, 26 °C) and, three humidity levels (%40, %60, %80). Therefore 54 different treatments were tested. To determine the differences between the two systems, the independent samples t-tests were applied on sensor readings obtained from both systems. Analyses of Variance (ANOVA) were performed to determine the significance of each variable involved in the experimental design. The results showed that there were time-dependent fluctuations in temperature for both heating system. However, the low numbers of fluctuation in the hot water-piping system were observed. Heating of rooting media through the hot water-piping system was suggested for the real-time computer-controlled rooting systems.

**Key words:** Rooting, rooting automation, automatic control