

# **Evaluation of Metrological Characteristics of a Computerized Conductivity Meter of Irrigation Solution Based on the Uncertainty Theory**

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There is a gap in the research on the metrological characteristics of computerized conductivity meters of industrial greenhouses. To make up for this gap, this paper explores these characteristics of modern computerized conductivity meters for irrigation solution, based on uncertainty theory, instrumental analysis of liquid media, theory of probability and mathematical statistics, etc. The author designed a conductivity meter for irrigation solution based on an analog conductivity sensor for Arduino, and measured output voltage and solution temperature. Based on the measured results, both the basic uncertainties (noise properties of electronic components) and additional uncertainties (solution temperature dynamics) of the computerized tool were evaluated. The results show that the designed conductivity meter has a basic relative uncertainty within  $\pm 0.61$  %; the relative additional uncertainty could be improved from 10.5 to 3.21 % through piecewise linear approximation of the measured conductivity; the total relative critical uncertainty of conductivity measurement was not more than  $\pm 3.82$  %. The research findings lay the basis for high-quality online monitoring of irrigation solution when growing greenhouse flora.

**Keywords:** *electrical conductivity, greenhouses, Arduino, piecewise linear approximation, hardware components, software.*