

ABSTRACT

Formalin is a hazardous chemical that is often misused as a food preservative, including in white tofu, even though its use is prohibited due to its toxicity to health. This study was conducted to design a microcontroller-based formalin detection system and compare the accuracy and consistency of two types of gas sensors, namely the HCHO sensor and the MQ-8 sensor. Sensor calibration was performed using three formalin solution concentrations: 0.5 ppm, 2 ppm, and 3 ppm, while testing was conducted at concentrations of 1 ppm, 1.5 ppm, and 2.5 ppm. This calibration method uses logarithmic linear regression with input in the form of ADC value differences (ΔADC) and output in ppm units. Testing was conducted under two conditions: with and without a heater. The results showed that the HCHO sensor had higher accuracy than the MQ-8 sensor, both with and without a heater. The average accuracy of the HCHO sensor without heating reached 72.85%, while the MQ-8 sensor only achieved 53.50%. With heating, the accuracy of the HCHO sensor increased to 65.73%, while the MQ-8 sensor dropped drastically to 3%. Based on these results, the HCHO sensor is recommended as a more accurate alternative formaldehyde sensor in the low concentration range.

Keywords: *Arduino, Formalin, Food Safety, HCHO Sensor, MQ-8 Sensor,*