ABSTRACT

Maintaining the quality and freshness of beef is very important in the food industry, especially for large suppliers, premium restaurants, and starred hotels. So far, meat freshness assessment still relies on conventional methods such as visual observation and smell, which are subjective and prone to error. In fact, errors in detecting meat quality not only endanger consumer health but can also damage business reputation. Therefore, an objective and accurate detection system is needed. This study designs a meat freshness monitoring system based on a Telegram bot that uses three main sensors: a TCS3200 color sensor to detect changes in meat color, an MQ-135 gas sensor to detect spoilage gases such as ammonia, and a pH sensor to measure acidity levels. All sensors are connected to an Arduino Uno and programmed via the Arduino IDE, with the ESP8266 module as an internet connection to send data to the Telegram bot. The test results show that the three sensors are able to detect changes in beef freshness effectively. The color sensor detects RGB values 56–78 in fresh meat and 23–25 in rotten meat, reflecting a color change from bright red to brownish. The MQ-135 gas sensor recorded an increase in ammonia levels from 0.23–1.06 ppm to 3.12–7.91 ppm, then decreased after the meat was completely decomposed. The pH sensor showed an initial value of 5.5–6.4 (acidic) in fresh meat and increased above 6.4 (alkaline) in unfit meat. All three sensors provided consistent and accurate results in detecting meat freshness.

Keywords : *Telegram Bot, Meat Freshness Detection, Meat Freshness, Real-time Notification.*