

ABSTRACT

Indoor Air Quality (IAQ) is an indicator of whether or not indoor air quality has an impact on human health and increases occupant comfort. According to WHO, the death rate due to health problems due to poor indoor air quality is much higher than outdoors. One of the parameters that causes a decrease in indoor air quality is the presence of microorganisms in the air. Bioaerosol generally comes from vegetation, soil and water sources, and its presence in the room is the influence of relative humidity (RH) and air temperature (T). This research was conducted to measure air quality (RH, T, PM_{2.5}, CO₂) using low-cost sensors and biological samples in the air, namely the concentration of bacteria, using the impaction method. Measurements were carried out in the Administration Room, Deli Building, Telkom University with air conditioning on 11 and 12 August 2020. Factors that affect the measurement results, namely the environment, occupant activities, and placement of measuring instruments. The average measurements of RH, T, PM_{2.5}, CO₂ and bioaerosol concentration on the first day were 97%, 27°C, 93 µg / m³, 804 ppm, and 362 CFU / m³, respectively. With the same air condition, the air quality obtained on the second day was relatively cleaner, namely 51 µg / m³, 648 ppm, and 155 CFU / m³. Measurement results show that number and activity of residents affect identification results of bacteria, where on the first day before the working hours start (the AC is off) results of bacterial concentrations were 389 and 159 CFU/m³, while results of the samples taken during working hours (AC is on) shows 71 and 830 CFU/m³. On second day, results of bacterial concentration samples before working hours were 53 and 318 CFU/m³, while during working hours were 106 and 141 CFU/m³. This shows bacteria concentration decrease of before and during working hours compared to previous day. There was no significant correlation between measured non-biological and biological parameters, presumably as the impacts of using air conditioning ventilation system. Other factors that support existence of indoor biological pollutants are come from the occupants of the room itself. Other case that causes an imbalance of indoor air systems are pollutant infiltration from outdoor to indoor.

Keywords: Bacteria, bioaerosol, impactor, indoor air quality, low-cost sensor.