

ABSTRACT

Exceeded level of gas and particulates concentrations in the air have an impact on air pollution, one of the gases is bioaerosol that it contribute up to 30% of pollution in urban environments. In general, humans can be exposed through non-biological pollutants, such as particulate matter less than 2.5 micrometers in size (PM_{2.5}) and carbon dioxide (CO₂), or microorganisms (such as bacteria). Humans are exposed to adverse health effects such as acute toxicity, including fever, malaise, and decreased lung function caused by bacterial infections. This study aims to identify the relationship between bioaerosol and non-biological parameters (T, RH, PM_{2.5}, CO₂, wind speed, wind direction) and to determine the potential exposure to bioaerosol (bacteria) personally. Measurements were carried out at the Open Garbage Disposal Site (TPST) around the campus on August 13, 2020. This aims to see the extreme conditions for bacterial growth and the spread of aerosols to the surrounding area. The mechanism for measuring biological samples is carried out in parallel with non-biological measuring instruments in the morning (before burning) and in the evening (after burning) for two minutes with two repetitions. In this study, an active microorganism sampling tool was used by using the Andersen Singler Stage Impactor to trap bacteria into PCA media. The media samples were then identified to the genus level using culture methods. Meanwhile, the Low-Cost Sensor is used to measure the non-biological parameters used to determine air quality and meteorological factors. As a result, the identified bacteria cannot be counted quantitatively. This is due to the high contamination of organic and inorganic waste at the TPST, as well as excessive sampling time. This has an impact on the high growth of bacteria resulting in a buildup on the PCA media. However, several bacteria were identified from the genus Bacillus Sp and Micrococcus in the morning and evening measurements with mean CO₂ and PM_{2.5} concentrations of 584-816 ppm and 86-124 µg/m³ respectively at a relative humidity of 97-100%. and a temperature of 26 °C. The PM_{2.5} produced is considered to have exceeded the threshold due to continuous burning of waste. This local emission source has an impact on the surrounding environment (pollutants are scattered to the west and southwest at a speed of 2 m/s) so that it affects indoor air quality around it.

Keywords: Andersen sampler, bioaerosol, CO₂, PM_{2.5}