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Indoor air sampling and detection of SARS-CoV-2 virus

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Currently, the spread of the SARS-CoV-2 virus through the air has become a discussion topic among scientists [1,2]. Many research institutes have begun to develop different methods of monitoring biological agents in the air, but still there is no standard method. However, since sampling was done in the patient's room in many studies, this caused problems in differentiating between airborne and respiratory transmission [3]. Based on research conducted by scientists, we have tried to refine the sampling method and equipment for detecting the virus of SARS-CoV-2, which causes coronavirus disease, in the indoor air of a hospital specializing in the treatment of COVID-19.

During the study, air samples were taken using the “Gil Air Plus Personal air sampler pump” equipment which recommended by Sensidyne. Pump calibration was performed twice, before and after analysis, using a “Gilibrator 2 Wet Cell Calibrator”. During the sampling process, an impinger was used with DMEM (Dublicco's Modified Eagle's Medium), which keeps COVID-19 viruses indoor environment of the hospital. Air samples were taken at a distance of at least 1.5 meters from the patient’s bed, at a height of 1.5 meters above ground level, for one hour at a flow rate of 4 l/min-1, i.e. a total of 240 liters air was collected. All samples were transported for PCR analysis (BioRad Cfx96 Touch Real Time PCR) using a -4°C condition.

According to the results, one sample from the intensive care unit and two samples from the wards defined positive. The rest samples of the doctors and the receptionist did not give a positive result.

Typically, indoor air sampling for COVID-19 is affected by various factors such as distance, height from the floor, equipment flow rate, and total volume of air sampled. A positive result was defined in 3 out of a total of 100 samples. The choice of sampling method is a complex process, the condition of patients in the hospital during the sampling period, the periodic use of disinfectants, ventilation and other factors directly affect the viability of viruses in the air of the ward and the environment, which makes the choice of equipment and sampling method especially important and requires more deep analysis.

[1] Faridi.S., Niazi.S., Sadeghi.K, A field indoors air measurement of SARS-CoV-2 in the patient rooms of the largest hospital in Iran, 2020, 725, https://doi.org/10.1016%2Fj.scitotenv.2020.138401.
[2] A. Kenarkoohi., Z.Noorimotlagh, Hospital indoor air quality monitoring for the detection of SARS-CoV-2 (COVID-19) virus, 2020, 748, doi: 10.1016/j.scitotenv.2020.141324
[3] João Tito Borges, Liane Yuri Kondo Nakada, SARS-CoV-2: A systematic review of indoor air sampling for virus detection, 2021, doi: 10.1007/s11356-021-13001