Study on the germicidal efficacy of UV FAN

Introduction

Microbiological laboratories are the places where the ambient air must be contained microbes as less as possible. The contamination of the microbes from the environment may affect the tests or provide the faulty results. More addition, the infectious agents from the clinical specimens in aerosol form are harmful to laboratories personnel.
The aim of this study is to test the germicidal efficacy of UV FAN devices currently available on the market.

Materials and Method

1. UV FAN device
2. Air Sampling device
3. Blood agar plate
4. SDA agar plate

Method

The test was carried out in a Microbiology laboratory. The room size was 3W x 4L x 3H. Two benches each 3 x 1 m were positioned on either side of the room entrance and a biohazard cabinet was placed opposite the entrance. Two devices of UV FAN model M1/25 manufactured by Light Progress were used in this study. Each was placed at height of 1.60 m and 1.20 m at the center of the room. Air sampling was carried out using a Air sampling device, AES model SAMPL' AIR MK2 (France), which placed on a table covered with sterile cloth. At the intervals time of 0 , 10, 20, 30, 45 and 60 minutes after operating the UV FAN. 100 liters of air were passed over the culture media. The blood agar plates were incubated at 37^{o}C for 24 hours. The SDA plates were incubated at room temperature for 48 hours. Subsequently all organisms growth on the media were counted.

Results

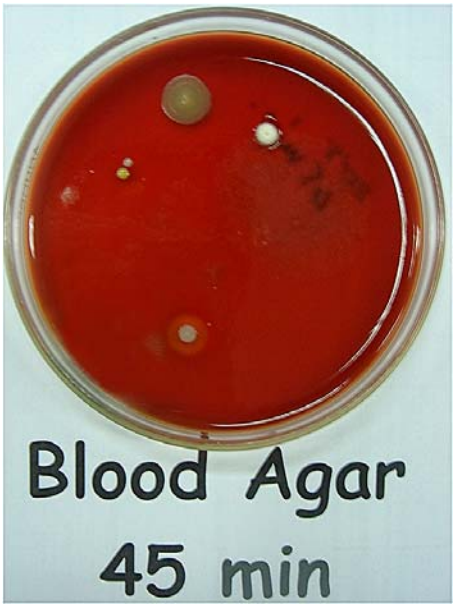
The test result for the germicidal efficacy of UV FAN is summarized in Table 1. The overall reduction for the total amount of microbes was ranged at 50% for the first 10 minute irradiation to 93.55% for 60 minute irradiation whereas the overall reduction for the total amount of molds was ranged at 13.04 % for the first 20 minute irradiation to 91.30% for 60 minute irradiation as shown in the pictures below.

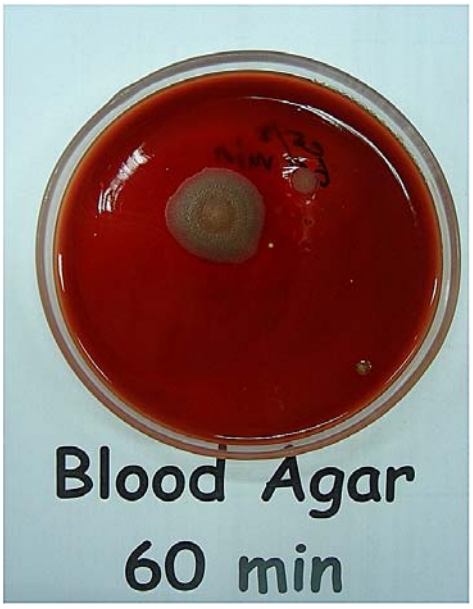

Blood Agar
0 min


Blood Agar
10 min


Blood Agar
20 min


Blood Agar
30 min


Blood Agar
45 min


Blood Agar
60 min


SDA Agar
0 min


SDA Agar
20 min


SDA Agar
45 min


SDA Agar
60 min

Table 1 Show the reduction of microbes in environment of Microbiology laboratory after operating the UV FAN.

Intervals time	Colony count on Blood agar plate (CFU/100 liter Air sample)	Percentage of reduction	Colony count on SDA plate (CFU/100 liter Air sample)	Percentage of reduction
0 minute	62	0	23	0
10 minute	31	50.00	19	17.39
20 minute	21	66.13	20	13.04
30 minute	16	74.19	6	73.91
45 minute	9	85.48	2	91.30
60 minute	4	93.55	2	91.30

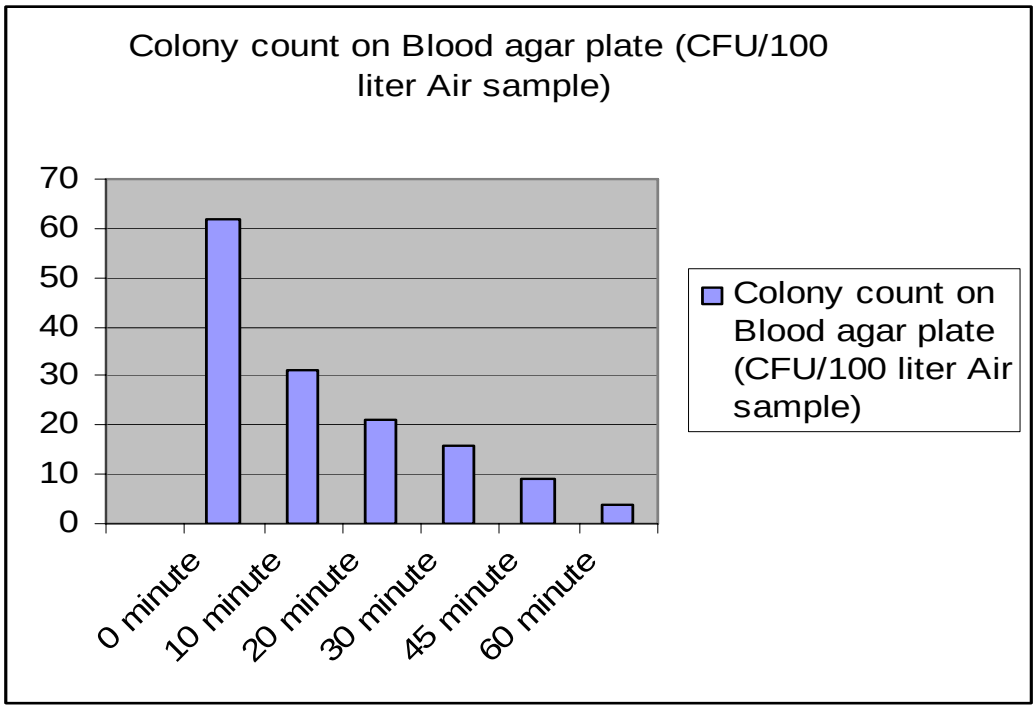


Figure 1: Show the number of cfu/100 liters found in the air on Blood agar plate at 0, 10, 20, 30, 45 and 60 minutes after operation of UVFAN devices.

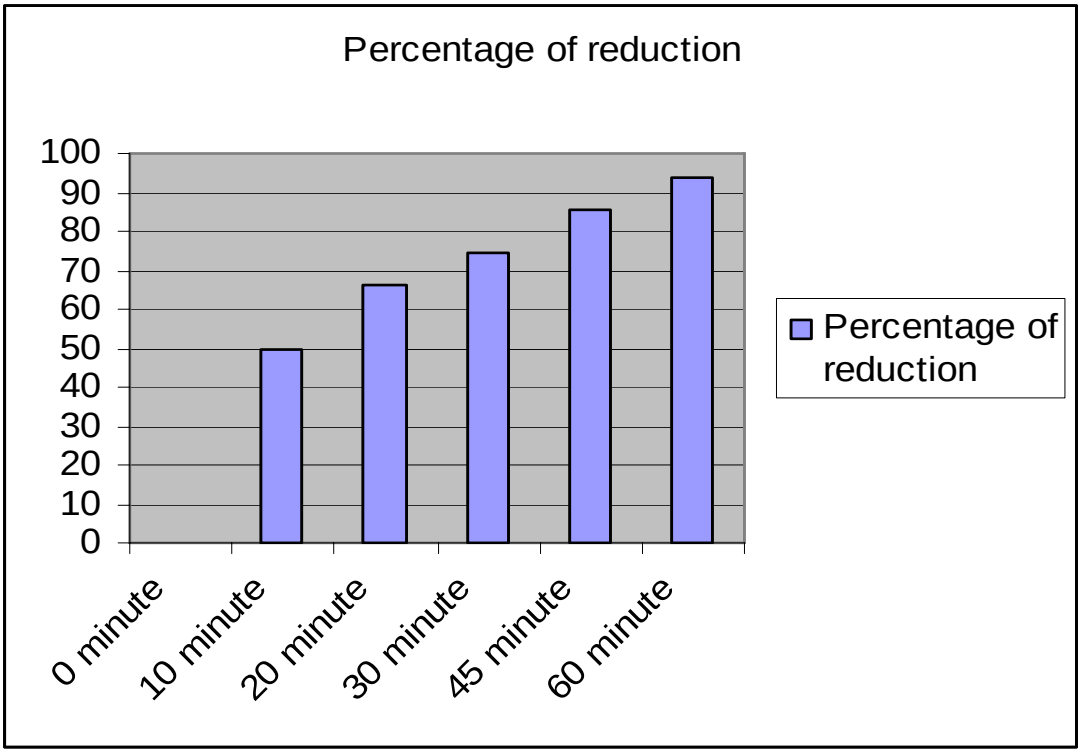


Figure 2: Show the percentage of microbe reduction on Blood agar plate at 0, 10, 20, 30, 45 and 60 minutes after operation of UVFAN devices.

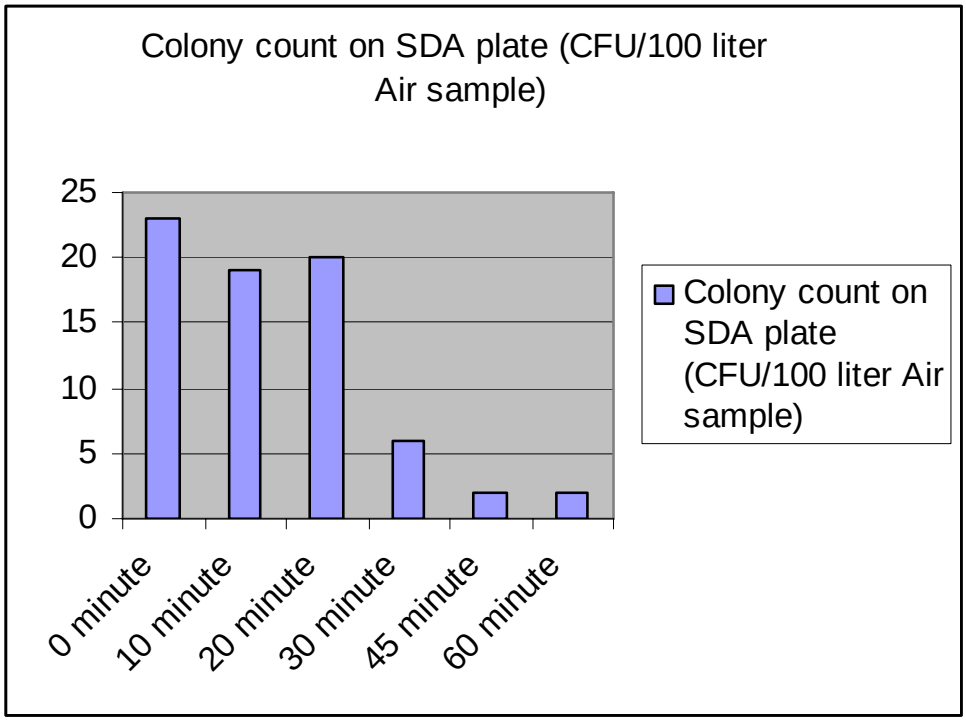


Figure 1: Show the number of cfu/100 liters found in the air on SDA plate at 0, 10, 20, 30, 45 and 60 minutes after operation of UVFAN devices.

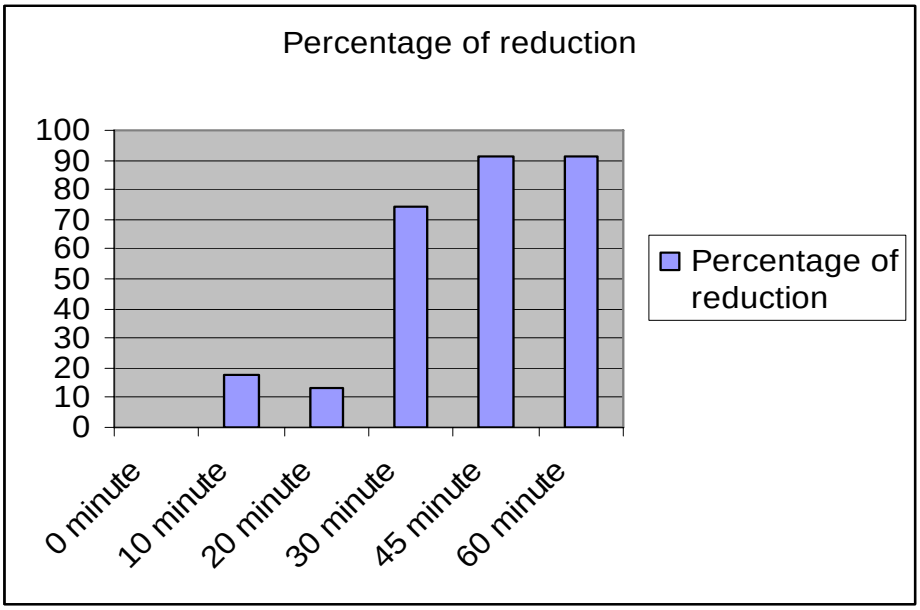


Figure 2: Show the percentage of microbe reduction on SDA at 0, 10, 20, 30, 45 and 60 minutes after operation of UVFAN devices.

Conclusion

The study on the germicidal efficacy of UV FAN was carried out in a Microbiology laboratory. The environment of the room, having around 36 m^3, contains many kinds of microorganism in the large amount. By using 2 devices of UV FAN, 50% reduction for the total amount of microbes can be achieved within 10 minutes after operating the devices. But the reduction of molds in environment is more slowly in the first 10-20 minutes. The reduction is 13.04% in the first 20 minutes. However, after operating the UV FAN for 60 minutes, the amount of both bacteria and molds can be reduced to more than 90% reduction. Therefore, the results show that the continuous use of this type of device is one of protective measurements to protect laboratory technician from infectious agents that may be occurred during working in the laboratory room such as aerosol from the centrifugation process or spilt out of the clinical specimens. And one more additional benefit of using this device is the safety when compare to the fumigation the room with formalin vapor for an example.