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A Review on Air Sterilizer for Purification of Air Using UV Light and Filters

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Abstract **- In this review paper, we mainly focus on the working of air conditioner and the required development needed for the sake of human comfort. Day by day the requirement of air conditioner is increasing because the temperature is increasing rapidly. Along with the air conditioner the quality of the air must be improved in order to sort out health related issues.Impurity of air is increasing due uneven human activities. In order to purify the air, the air conditioner must be developed in such a way that different type of filters such as Manganese Dioxide filter, HEPA Filter, Electrostatic Filter must be attached to trap various types of pollution causing elements. In order to kill germs, the UV radiations must be introduced to kill the disease causing germs and pathogens for the sake of purification of air. Along with the purified air the energy must also be used efficiently, for that, IoT must be implemented to ease the work and to save energy.**
Keywords: **Filters, UV Light, COVID, Pollution**

I. INTRODUCTION

Nowadays, the world is affected by the bio fever of COVID-19 caused by Severe Acute Respiratory Syndrome (*SARS*) virus. The study is mainly focused on the airborne transmission of coronavirus through medium of air due to which earth is suffering from drastic effects of air pollution. There are assumptions or predictions done based on contagious virus transmission through polluted airborne in formed digestive enzymes. The cure and origin of spread are detailed along with the better possible green control techniques to minimizefurtherspread. The virus affects severely to our planet by means of root causes and unwanted outcomes. It's the time to deal with the future harmful air polluted diseases and to produce desirable preventive measures. The life span of the virus is for few hours, due to it causes severe threat after lockdown phase. Economical condition is not good to provide vaccination for large population of countrieslike India, China. Rapid requirement for vaccines is increasing and the biomedical facilities are less for the sake of larger population. A good atmosphere makes the earth a better place to survive.

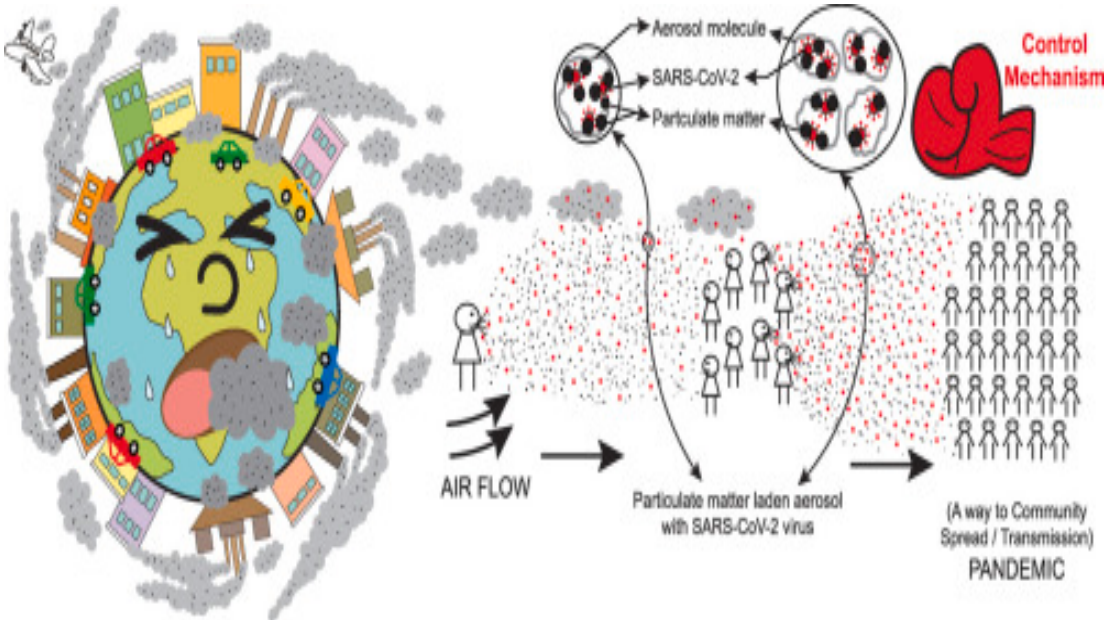

Fig. 1 Environmental Pollution [1]

The air purification method that utilizes UV Light of desired wavelength to kill the bacteria and viruses and to purify the air. The method of UV Light filtration is used in several applications like air conditioners, water purification and other cooling techniques. UV rays may be harmfulwhen comes in contact with human skin for longer period of time (100 Years). The 1903 Nobel Prize in Medicine was awarded to NilsVinson for his work of UV rays against Tuberculosis (TB). It uses the shortrange wavelength of UV radiationsthat kills bacteria. It is so useful in demolishing nucleic acids in the DNA of organisms [2]. HEPA filters are used to trap the dust particulates. They are usually produced by folding microfiber glass or other fibrous medium made with several layers of randomly arranged fibres, with radius ranging from 1 to 250 nm. The air flows between the filter and the fibres, airborne particulates will be trapped by the ways: impaction, interception, and diffusion (Figure 2). The occurrence of adhesion takes place due to filter fibres because of intermolecular forces, capillary action and electrostatic attraction. For particle sizes greater than 1 µm, impaction and interception are the most remarkable techniques of filtration, whereas diffusion is the presiding technique for trapping particles less than 0.1 µm.

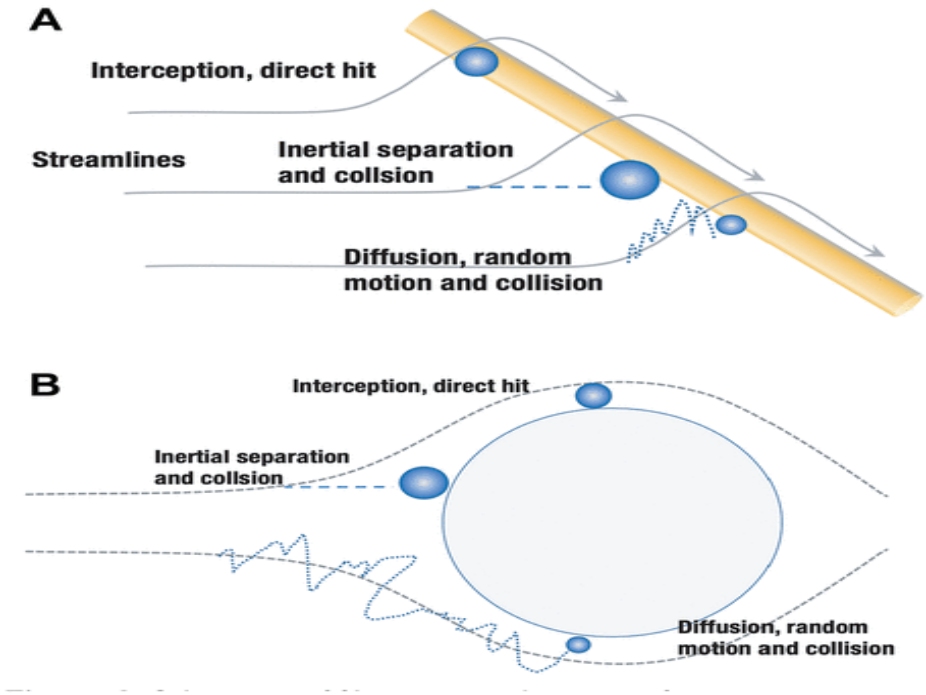

Fig. 2 HEPA Filter [3]

II. LITERATURE REVIEW

M. Nalina Sangaviya *et al.,* (2021) [4] - Researchers mainly focuses on Covid-19 concern, almost all over the world covid-19 virus is spread, despite of social distancing, the spread of virus as a passive mechanism, a pragmatic look at the method content of the virus by disinfecting and deactivating it's necessary. For that, the proposed temperature and humidity based disinfection sterilization system its necessary. The system maintaining 37 C and 85 % of relative humidity at disinfecting and sterilization area. Generally water mist generated by ultrasonic based mist maker and heater is attached to the system that transfers in to the room so it can be disinfecting up to desired humidity and until concentration is increased. After the disinfection, its concentration must be decrease up to level required for the public safety.

Shalom Akhai *et al.,* (2021) [5] - In today's time we need fresh air in our day today life or environment so accordingly we need air filtration from air conditioners so the work in this paper is focuses on using air filtration in air conditioner, we reduced virus from the environment. As we know in this pandemic of corona virus we all are stuck in summer season in our home so we need air conditioner, from this point of view in this paper one device is included, which is High Efficiency Particulate Air (HEPA) filters from this device we stave-off from germs with the help of this air filter. In the end the filter in the air conditioner system have the ability to filter out the viruses and other infectious particles. The air-conditioners which combine High Efficiency Particulate Air (HEPA) filters with anti-bacterial technology.

Chetan Bandekar *et al.,* (2021) [6] - The paper explains about the design and fabrication of setup of determining the pathogen and trapping/killing using the air filter. Researchers have clarified that the common air filter cannot kill the highly infectious airborne viruses as well as SARS CoV-2 virus. In this research Nickel foam-based air filter is used which have additional advantages due to its high porosity nature, which will be effective to trap viruses

which normal filters cannot do. Finally, paper concludes that air can be purified and also eliminate harmful viruses in cost effective manner.

Qingqing Zhang *et al.,* (2021) [7] - In this paper researcher discussed about the central air conditioning Using UV light to purify the air. Now a days the air is polluted then it was before because of rapid increase in the growth of industries, automobile or natural disaster like forest fire etc. first the air is passed through the two filter were some of the particle get absorb and remaining are passed through the ultraviolet rays which penetrate the cell membrane and change the DNA pattern. Finally we get the fresh air with no pollutant in it.

Yang Lei *et al.,* (2021) [8] - The paper describes, now a day's modern industry is growing day by day with the development of industry, the release of pollutants into the environment has been accelerating annually. The unclean water and harmful air have become several risk and global environment issue that were threating the sustainable development of the ecological environment and human health. Here, it demonstrate a novel strategy for the exploitation of conjugated micro porous polymer bearing amino pyridine moiety (A-CMPs) as an advanced filter for bacteria Sterilization and efficient PM capture. The capture Efficiency of A-CMPs aerogels for PM2.5 and PM10 were respectively up to PM2.5≥99.57±0.19% and PM10≥ 99.98±0.01% in a long-term durability test and easy to be regenerated. A-CMPs additional is sterilization performers and thus is the great technology significant with remarkable potential as a new kind of advanced filter multifunctional filtration in both air and water.

Yilian Cheng *et al.,* (2020) [9] - Research is based on, presently it is most necessary to disinfect from different kinds of bacteria and viruses so, in this paper the operation is regarding to the Air Disinfection of Computed Tomography Rooms which is dedicated to COVID-19 Cases. In this paper the materials are includes the Ultraviolet disinfection lamps, Plasma circulation air sterilizer, Microbial air sampler and CO2 constant temperature incubator and also the methods in this paper included the segments of Tested objects, instrument equipment, Methods for disinfection and many others. The conclusion is that, the unbounded bacteria in the air instantly after disinfection was lower than before disinfection.

III. CONCLUSION

From the above research we can conclude that, the quality of air will be improved and there are less or no chances of unpurified air. And the energy is also utilized in efficient manner as there is IoT implemented and comfort of human is also updated. The air is purified as well as the pathogens are killed and purified and chilled air is delivered in energy efficient manner. The human comfort is also increased as the system is automated.As mentioned above, pollution in the air is minimized and air free from dust particulates, carbon related contents and bacteria is delivered. As UV system is used the bacteria and viruses such as COVID are destroyed and healthy environment is created.

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