

AN AMERICAN SCIENTIFIC JOURNAL

Texas Journal of Multidisciplinary Studies

SJIF
5.256

ISSN ONLINE
2770-0003

Problems of Air Pollution and its Monitoring

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Abstract: Sanitary protection of atmospheric air, which is the most important factor of the external environment, ensuring its quality indicators in accordance with environmental standards is one of the current global problems. While global emissions are declining at this rate, global warming and climate change are having unpredictable consequences. Currently, one of the most dangerous sources for human health is toxic gases emitted by vehicles, in particular, the exhaust gases from vehicles enter the body through the respiratory tract and combine with hemoglobin in red blood cells to form carboxyhemoglobin. In samples that did not meet hygienic requirements, sulfur dioxide was found to be in the second place after dusting. In the analysis of atmospheric air pollution with formaldehyde, it was found that all samples met the hygienic requirements.

Key words: atmospheric air, motor transport, nitric oxide, disease, work gas, pollution, dust

Introduction

High levels of pollutants are constantly detected in the air of large cities, which have a negative impact on the environment and public health. Sanitary protection of atmospheric air, which is the most important factor of the external environment, ensuring its quality indicators in accordance with environmental standards is one of the current global problems. According to the United Nations, nine out of ten people in the world breathe polluted air. 91% of the world's population lives in air-polluted areas. In 2018, 7 million people die each year as a result of excessive air pollution. In particular, the countries of Asia and Africa rank high in this indicator. Twenty-five percent of heart disease, 24 percent of paralysis, and 43 percent of lung diseases and lung cancers in humans are caused by breathing polluted air. At the same time, greenhouse gases emitted into the atmosphere are causing global warming and climate change. If global emissions go at this rate, global warming and climate change could have unpredictable consequences. In this regard, the Republic of Uzbekistan has a strong legislation, in particular, Article 1 of the Law of the Republic of Uzbekistan "On Protection of Atmospheric Air" states that atmospheric air as a component of natural resources is a national asset and protected by the state. At the same time, the main objectives of the legislation are: to preserve the natural composition of atmospheric air; to prevent and reduce harmful chemical, physical, biological and other effects on the atmosphere. One of the most dangerous sources of human health today is toxic gases from vehicles. In addition to polluting the atmosphere with various toxic gases, cars use 3-4 times more oxygen than the oxygen that the world's population needs to breathe. A car engine in a year consumes breathing oxygen of 20-30 people. Each year, 1 car removes an average of 4 tons of oxygen from the air, releasing 800 kg of carbon monoxide, 40 kg of nitrogen oxides and about 200 kg of various toxins, including hydrocarbons. Taking into account that there are now more than 500 million cars in the world one can imagine the amount of pollutants emitted into the atmospheric air which is very large. Vehicles pollute the atmosphere with 45.7% nitrogen oxides and 42% hydrocarbons. Of the almost 100 million tons of carbon dioxide emissions per year in the world, 75.5 million tons or 78% come from cars. 60% of urban air pollution is caused by vehicles. Exhaust gas from vehicles is a colorless toxic gas formed by the incomplete combustion of motor fuels. It is carbon dioxide that enters the body through the respiratory tract and combines with hemoglobin in red blood cells to form carboxyhemoglobin. This substance cannot bind oxygen, resulting in a lack of oxygen in tissues and cells, primarily nerve cells. It leads to dysfunction of all organs and all systems of tissues and cells. A

single car can emit up to a kilogram of lead into the air throughout the year. The toxic amount of lead in human blood is 0.8 parts per million, which means that if a person takes 40 mg of lead a day with food, the amount of lead in his blood will increase from one million to 0.4 parts per day. The increase in the number of vehicles, the creation and widespread use of powerful mechanisms have a negative impact on the generous nature, including atmospheric air, leading to its degradation. Cars are one of the main causes of urban air pollution today. As a result of the growing number of car fleets in the world, the share of vehicles in air pollution is increasing. The data show that in the United States and Japan, motor vehicles are among the main leading sources of air pollution. Among the gases that pollute the air of foreign countries, carbon monoxide, hydrocarbons, as well as nitrogen oxides make up 60% of all aggressive gases, while in our country they make up 14%. Cars, locomotives, airplanes, and tractors emit large amounts of O₂ into the atmosphere, releasing 260 million tons of carbon monoxide. t, volatile hydrocarbons - 40 mln. t, nitrogen oxide - 20 mln. t and releases harmful compounds of lead. The increase in the number of cars is leading to an increase in the amount of emissions into the atmosphere. The average car used for 6 years emits 9 tons of SO₂, 0.9 tons of CO₂ and 80 kg of hydrocarbons into the atmosphere. The country has more than 3.5 thousand industrial enterprises with 99.5 thousand stationary sources of pollution and more than 2.816 million mobile sources of pollution, i.e. vehicles. From 2010 to 2018, the amount of pollutants emitted into the atmosphere increased almost 1.3 times and in 2018 amounted to 2.442 mln. tons. Of this, 65% or 1 mln. 560,000 tons are motor vehicles. In particular, due to the growing number of private cars and the growing population, vehicles are the main source of air pollution in Tashkent. In Tashkent, the figure is 80%. According to the data, Tashkent's air is polluted with 395 tons of toxic gases annually. 90% of the emissions are due to vehicle emissions. There are more than 2 million registered vehicles in the country, of which 450,000 are in Tashkent.

About 50,000 cars enter the city every year from other regions and countries. About 75% of the capital's vehicles run on gasoline and diesel fuel, and 25% on gas. The number of cars per capita in Uzbekistan is growing sharply. This figure has increased by 14.5% over the past year. As of January 1, 2021, the number of vehicles owned by individuals in the Republic of Uzbekistan amounted to 2,955,295.

Material and Methods

The situation is further complicated by the fact that the number of cars in the capital has more than doubled in the last 10 years, public transport networks were built in the 80s of the last century, but not yet completely revised, resulting in serious problems in the urban public transport system. Atmospheric air pollution has always been a concern due to its harmful effects on human health. Air pollution has a negative impact on human health and is one of the leading causes of allergies and respiratory diseases. That is why the quality of the air we breathe is so important. Almost every major city has high levels of pollutants in their atmosphere, which have a negative impact on ecosystems and public health. Atmospheric air quality monitoring programs include five major pollutants: dust (solid suspended particles), sulfur dioxide, carbon monoxide (carbon monoxide), nitrogen dioxide, and nitric oxide. Other substances (ammonia, phenol, formaldehyde, ozone, chlorine, solid fluorides, hydrogen fluoride, heavy metals) are added to the program measurements depending on the composition of the industrial separations and the characteristics of nearby cities and adjacent areas. The increase in emissions of air pollutants can be attributed to the increase in the number of manufacturing enterprises and vehicles in the process of rapid economic development. Based on the above, we aimed to retrospectively analyze the ecological and hygienic condition of the atmospheric air in residential areas in the dynamics of the years. The object of inspection is atmospheric air and its content of nitrogen oxides, carbon dioxide, formaldehyde, lead, dust at gas stations, intersections and car washes located in residential areas.

Results

In carrying out the work, the legal normative document SanQ and M "REK list of pollutants in the air of residential areas of the Republic of Uzbekistan" was used. The monitored population is the largest district in the southern part of Tashkent, with a total area of 5.6 thousand hectares by 2020, and a population of 167.6 thousand people. Chirchiq and Karasu rivers, Salar and Jun canals run through the territory of the district. 50% (2800 hectares) of the district is planted with greenery. There are 174 streets in the district, the main ones are

Tashkent Ring Road, Yangi Sergeli, Choshtepa Anna Akhmatova and Kipchak Streets. There are 4 and 12 bus parks in the district, RAF car park and Tashkent International Airport.

Discussion

There are Sergeli industrial zone, 2097 organizations and enterprises, 12 large industrial enterprises, 300 industrial enterprises, 1748 micro-firms in the district, the largest of which are the air repair plant and Novatr plants.

We made a retrospective analysis of the ecological and hygienic condition of the atmospheric air of the settlements of this district in the dynamics of 2017-2020 and obtained the following results:

The total number of samples taken in 2017 - 1902 (100%), of which - 263 (13.8%), the total number of samples taken in 2018 - 1950 (100%), of which - 323 (16.5%), The total number of samples taken in 2019 - 1677 (100%), of which - 198 (11.8%), the total number of samples taken in 2020 - 973 (100%), of which - 130 (13.3%) hygienic did not meet the requirements. The analysis of the tested samples in terms of pollutants: in 2017, a total of 416 samples were taken for dust, of which 115 - 27.5%, in 2018 - a total of 404 samples for dust, of which - 141 - 34.9%, In 2019, a total of 370 samples of dust were taken, of which 83 - 22.4%, in 2020 - a total of 290 samples of dust, of which 55 (18.9%) did not meet hygienic standards. Of the 416 samples of sulfur gas in 2017 - 75 (18.0%), in 2018 - 436 samples - 89 (20.4%), in 2019 - 330 samples - 62 of them (18.7%), and in 2020 - out of 196 samples taken - 32 (16.3%) did not meet the hygienic requirements. In samples that did not meet hygienic requirements, sulfur dioxide was found to be in the second place after dusting. In the analysis of air pollution with formaldehyde, it was found that all samples taken in 2019-2020 met the hygienic requirements.

Conclusion

Based on the above, it is expedient to expand green areas along the roads and further improve the quality of fuels and increase the number of environmentally friendly vehicles, as well as to constantly monitor the level of pollution in the sanitary protection of residential areas from air pollution.

Acknowledgement

Currently, one of the most dangerous sources for human health is toxic gases emitted by vehicles, in particular, the exhaust gases from vehicles enter the body through the respiratory tract and combine with hemoglobin in red blood cells to form carboxyhemoglobin. In samples that did not meet hygienic requirements, sulfur dioxide was found to be in the second place after dusting. In the analysis of atmospheric air pollution with formaldehyde, it was found that all samples met the hygienic requirements.

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