The Eighth Experiment

Measuring the average amount of particles deposited and accumulating on horizontal surfaces

The Objective of the experiment:

Air quality test by measuring the average amount of particles that are deposited and deposited on the horizontal surfaces of different locations.

The Theoretical Part:

Particular matter is produced as a result of human urban and industrial activities, combustion processes, friction of car tires, and movement of vehicles, especially diesel-powered vehicles. These materials do not soon return to the earth after being released by the action of Earth's gravity, and usually their diameters exceed 10 µm. The air of urban cities contains large numbers of these particles that cause damage to health when they enter the human lung sacs directly during the breathing process. Particulate matter also poses other significant risks, particularly to plant growth and fruit production, as well as significant damage to buildings, transportation, and many economic properties.

As a result of the multiplicity of sources of particulate matter, it is a mixture of different components with multiple chemical content and physical characteristics varying in terms of size, shape, diameter and mass [22].

The sedimentation method is one of the simplest and oldest methods for measuring the amount of particles in the surrounding air that are deposited to the ground. The sedimentary material particles have a distinct sedimentation velocity compared to the velocity of vertical turbulent winds in the air [23].

In this experiment, calm and dry days should be chosen (not rainy, because rain leads to washing these particles and dropping them to the surface of the earth). The best places to implement this experience are commercial areas, crowded streets and marketing centers.

TheMaterials and Tools used

1. Similar plastic containers, of one use, of equal capacity, 3 count.
2. String
3. permanent black pen

4. piercing machine.
5. Electron microscope.
6. Vaseline or glycerin.
7. A sensitive electronic scale with four ranks after the sorter.
8. digital camera.
9. plastic blade.

The Method of Work

1. Put a little bit of Vaseline on each container and then distribute it with the blade over its entire area as evenly as possible.
2. . Weigh the plastic containers individually using the sensitive scale and write down your results in the table below.
3. Number the plastic containers in black pen with 1, 2, and 3 on the back of the pots.
4. Punch the pots and insert pieces of string through them for the purpose of fixing the pots.
5. Choosing 3 different locations in the open air far from sources of pollution and secure places, then fixing them with string on horizontal surfaces elevated from the ground surface at a height of 2 m.
6. Leave the utensils in the air for at least two days, recording the date and time.
7. After the time has elapsed, bring the utensils to the laboratory. Weigh the contaminated utensils.
8. . Subtract the weight of the container before exposure from the weight of the container after exposure to produce the weight of particulate matter contamination
9. The weight of the container before exposure - the weight of the container after exposure = the weight of the pollutants
10. Record your results in the following table:

Date: The Time:	The Weight of the Sediment Particulate Matter	Weight after Exposure	Weighed before Exposure	Name of the place	Sample Number
					1
					2
					3
					Average

11. Examine the container under the microscope to identify the sedimentary particles using different magnification powers of the microscope lenses to identify the characteristics of suspended particles through shape, color and sizes.
12. Measure the diameters of some of these particles.
13. Calculate the areas of some of these particles.
14. To calculate the amounts of particulate matter deposited and accumulated on the surface of your city during one month, divide the average net weight of polluting materials by the area of the polluted surface, and then calculate the area of your city, so you will find the particles accumulated during a month.
15. Take a photo of the samples collected with the mobile and put it in your report.

Discussion

Q1/ Which sites have the most particulate matter? And why? Is it expected?
Q2/ Describe the components of the aggregated particulate matter of the three sites?
Q3/ Compare the falling amounts of particulate matter on your city with the global limit of 150 Ton/year?