

# Mechanisms for Capturing Particles From Vehicles From The Side of Ornamental Tree Leaves And Their Effect On The Amount Of Pigment In The Leaves.

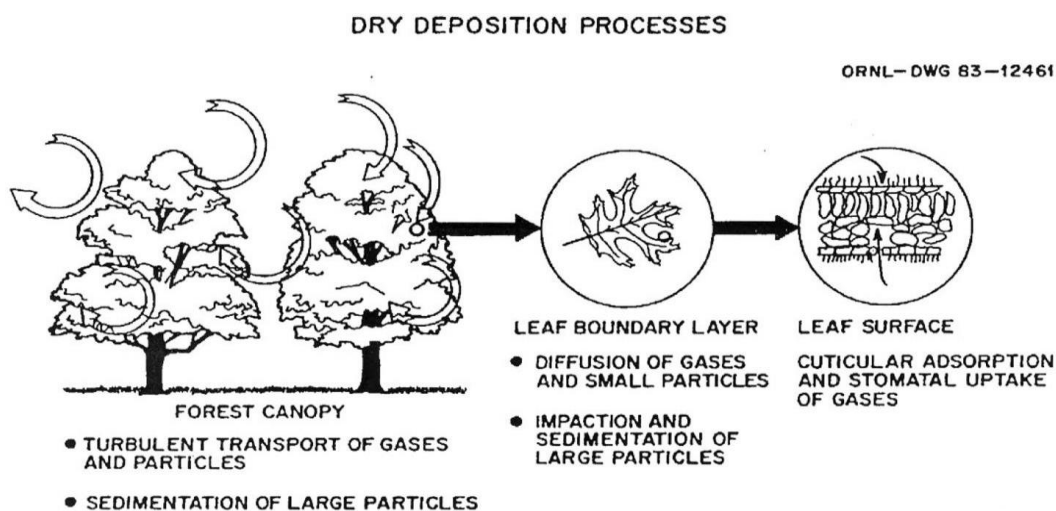
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**Annotation.** In the world, much attention is paid to protecting the environment from pollution and solving environmental problems. First of all, harmful substances emitted by transport cause great harm to plants. Tree leaves are one of the main vegetative organs of plants and perform the functions of photosynthesis, transparency and gas exchange. Harmful substances emitted by vehicles adversely affect the leaves of ornamental trees. Leaves and plant cells that absorb nitrogen oxides from the air begin to die. The amount of pigments in the leaves of a tree acts as an indicator that determines the state of a particular environment.

**Key words:** plants, environment, ornamental wood, pigment content, vehicles.

**Introduction:** In recent years, great attention has been paid to the integrated environmental monitoring of the environment in our republic. In order to correctly assess the level of pollution of the environment, it is important to monitoring the concentration of various impurities not only in water and soil, but also pollutants in plants. At the same time, biological monitoring is different from other monitoring methods with high indicators in determining environmental pollutants. One of the important elements of biological monitoring is that when pollutants are thrown into the environment under human influence, this is evident in its place as a result of its high efficiency in the green coating. [1]

In the dry deposition process, particles and gases are collected or are deposited on solid surfaces and this decreases the concentration in the air. Atmospheric particles and gases that are intercepted by vegetation can be either absorbed into plant tissues or retained on the surface of leaves, twigs, branches and the trunk (adsorbed). Pollutants absorbed by plant tissues can sometimes be turned into organic compounds stimulating the development of the plant (Sanderson, 2008; Lockwood et al., 2008).



Typically, 1 cm<sup>2</sup> of leaf area adsorbs 10-70 mg PM<sub>x</sub> per year

Broad-leaved trees are generally more effective than conifers; evergreens more than deciduous



The combination of different properties is the main factor in increasing the efficiency of PM reduction. Rough leaves with a more complex shape, higher stomatal density and leaf firmness were associated with higher PMx deposition values. (From Sgrigna et al., 2020). The characteristics of the shell should not be neglected.

**The purpose of the study:** is to determine the effect of harmful substances in the atmosphere on ornamental trees on the central streets of the city of Tashkent.

### Objectives of the study:

1. To study the amount and properties of harmful substances emitted from vehicles moving through the central streets of Tashkent.
2. Determination of the amount of pigments in the leaves of ornamental trees planted in the regions of the city of Tashkent where vehicles move a lot.

**Objects and methods of research:** As an object of research, 3 streets and 1 Park were built, where the vehicles of the city of Tashkent were prolific and ornamental trees were planted. These facilities were: Sergeli district along New Sergeli Street, Uchtepa district along Farkhod Street, Shaykhontokhur district along Abdullah Qadiri Street, Yunusabad District Botanical Garden, eastern plantain, Oriental biota, common Oak, experimental work was carried out to determine the amount of pigments in the leaves of chestnut trees.

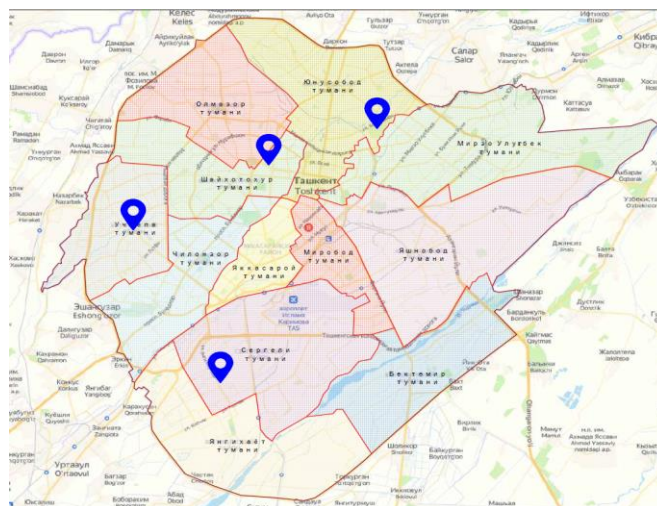


Figure 2 location of objects on the map (Tashkent City) determination of the amount of pigments in plant leaves was carried out by the spectrophotometric method (Ermakov 1987) in the spring (may 20) of the year. The essence of this method is that the density in the pigment extract was achieved by measuring the density in the spectrophotometer (SF-46) instrument at the maximum matching wavelength chlorophyll a-663 nm, chlorophyll b-645 nm, carotenoid 440 nm. [2]

Олинган натижаларнинг дисперсиявий таҳлили арча, сохта каштан ва павловния ўсимликларининг баргларидаги хлорофилл “а”, хлорофилл “б” ва каротиноид миқдорлари турли даражада бўлишидаги фарқлар ишончли эканлигини кўрсатди. (Ҳаваух, 1998) Шу кўрсаткич асосида,

манзарали дарахтларнинг баргларидаги хлорофилл “а”, хлорофилл “б” ва каротиноид микдорлари Личтенталер ва Веллбурн (1985) тенгламаси ёрдамида ҳисобланди:

$$\text{Chlorophyll "a" [mg/g]} = 11.75 * a_{662} - 2.350 * A_{645}$$

$$\text{Chlorophyll "B" [mg/g]} = 18.61 * A_{645} - 3.960 * A_{662}$$

$$\text{Carotenoid [mg/g]} = 1000 * A_{470} - 2.270 * \text{Chlorophyll "a"} - 81.4 * \text{Chlorophyll "b"} / 227$$

$$F \text{ [mg / g]} = (V * C) / P$$

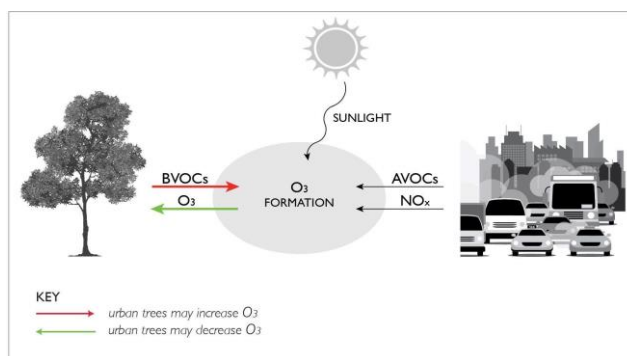
Where: F is the chlorophyll content of the plant leaf [mg/g]; V is the fluid volume [ml]; C is the chlorophyll concentration [mg / ml]; P is the Leaf weight, [g]. (Lichtenthaler and Wellburn, 1985).

### The results obtained and their discussion.

One of the main environmental problems of the city of Tashkent is the negative impact on the environment of various harmful gas substances coming out of the vehicles. More than 70% of air pollution in the city of Tashkent corresponds to the contribution of various gases from vehicles. As a result of the population growth in Tashkent and the expansion of the urban area, the number of motor vehicles in the city is also increasing. As of January 1, 2022, the total number of vehicles belonging to individuals in our Republic is 3.6 million units, which is 10.6% more than last year's indicators. Of these, more than 450,000 vehicles belonging to the residents of the city of Tashkent and more than 23,000 vehicles from the average regions enter the city and move through the streets of the city. Of the vehicles in the capital, 60% operate on gasoline and diesel fuel, and 40% on gas. [3]

### Classification of motor vehicles moving in Tashkent by fuel types (2022) (Table 1).

Total auto-bills	Petrol	Diesel	Compressed gas	Liquefied gas
3,6 МЛН. ДОНА	911,0 МИНГ ДОНА	135,3 МИНГ ДОНА	2,3 МЛН. ДОНА	294,2 МИНГ ДОНА



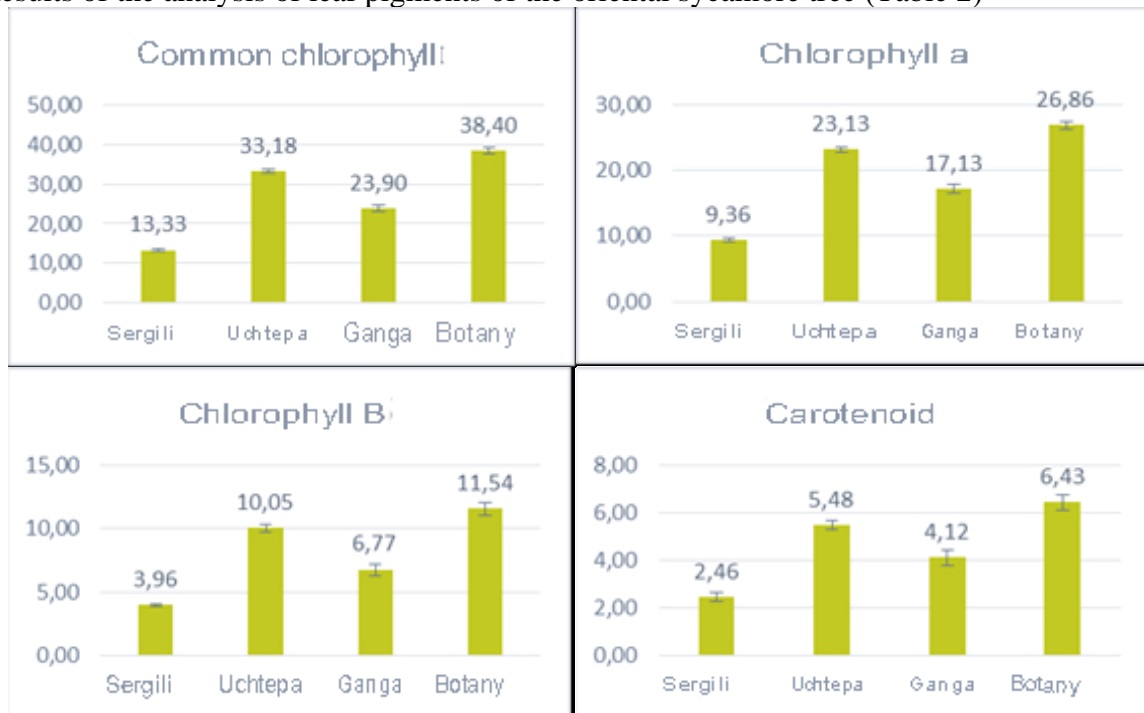
The survey objectified olingan each bir tree leaf 50 milligramdan test tube guldi. Each bir sheet sample 5 mldan 95% ethyl alcohol homogenization cylinder. Homogenate 5000 tezlikda 12 min ailantriada centrifuge. Production of chlorophyll “A“ extract, chlorophyll ”B“ and carotenoids quantitative determination of cutsatkichi cutsatkichi 664, 649 and 470 nm light (Agilent Cary 60 UV-Vis Markal Spectrophotometer) ekanligi accurately. [4]

### Chlorophyll a, B, and carotinoids in a spectrophotometric method detection processes



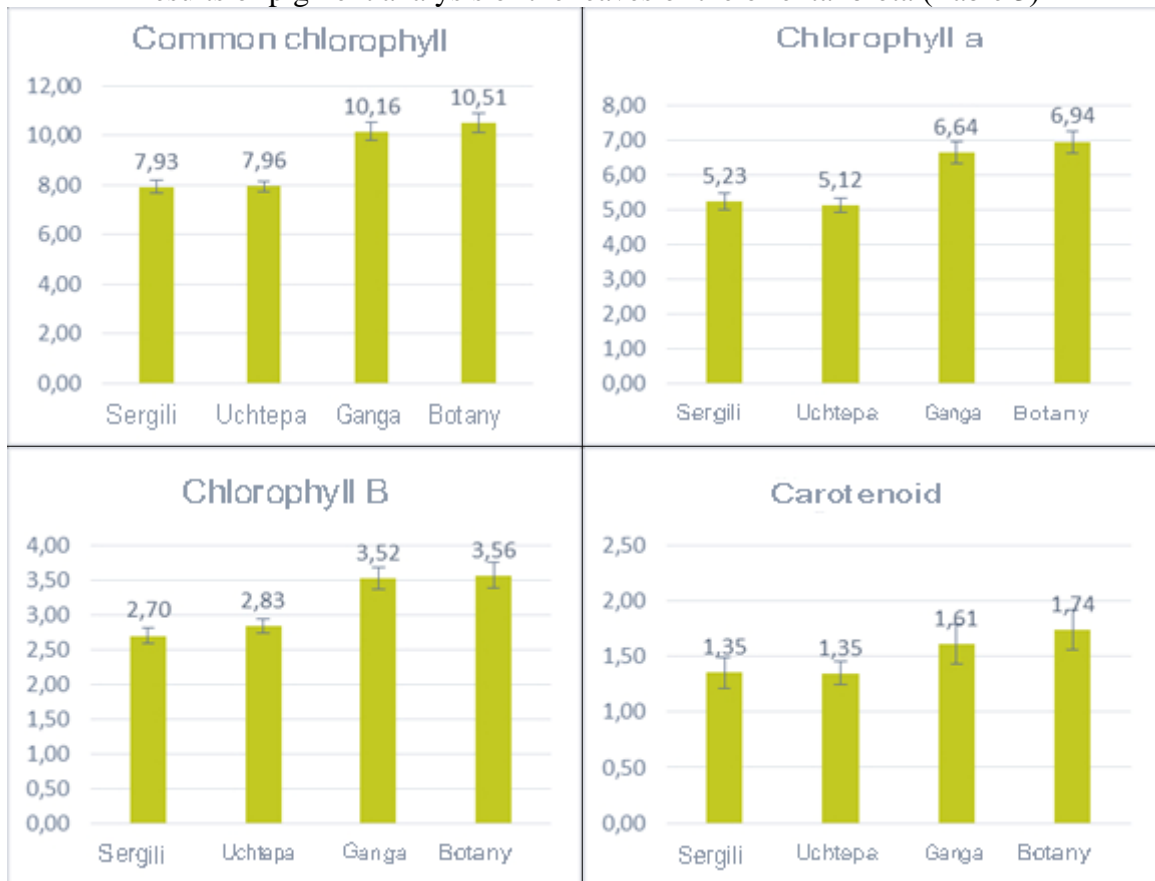
3-landscape painting of deciduous trees olingan sample laboratory experimental conditions

Results of the analysis of leaf pigments of the oriental sycamore tree (Table 2)

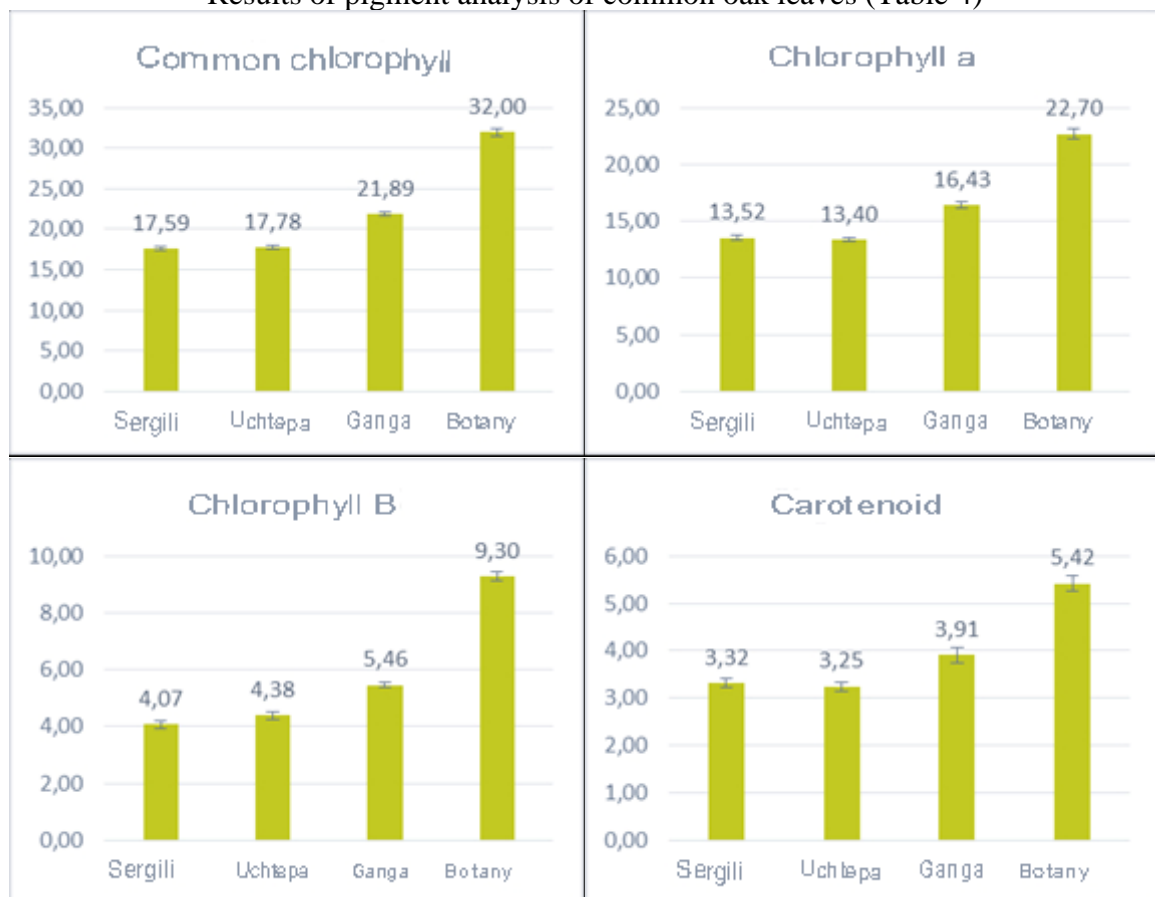




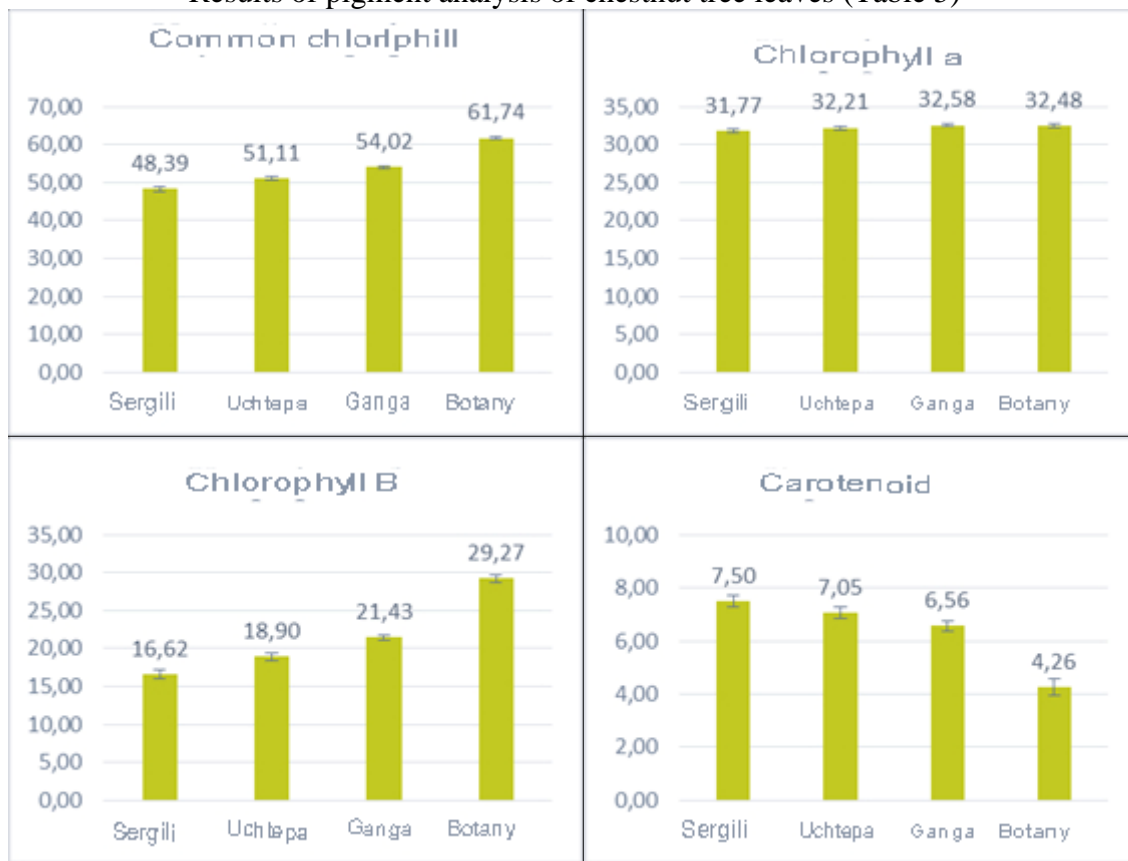
Results of pigment analysis of the leaves of the oriental biota (Table 3)



Results of pigment analysis of common oak leaves (Table 4)



Results of pigment analysis of chestnut tree leaves (Table 5)



The overall results showed that all arboreal pigments are diverse and that varieties of ornamental trees depend on the environments of the growing areas. The amount of pigments is also higher in tree leaves in areas with lower vehicle traffic levels. For example, the Sergeli district has a lower amount of pigments in the leaves of ornamental trees growing along New Sergeli Street, since the level of traffic in the area is high, that is, it is lush. These indicators indicate that harmful substances emanating from vehicles negatively affect the leaves of an ornamental tree. On the contrary, the amount of pigments in the leaves of ornamental trees growing in the Yunusabad District Botanical Garden is slightly higher. This is due to the fact that trees are growing in natural conditions and there is practically no effect of substances coming out of vehicles, and the abundance of other types of ornamental tree varieties shows its positive effect [5-6]. Currently, satellite imagery monitoring of tree stands is also being conducted to study emissions and reduce damage. We can see that the effectiveness of the results obtained increases to the Yana if experimental work is carried out and comparative studies are carried out even with the help of GIS technologies [9-10].

**Conclusion:** Ornamental tree species growing on city streets and then planted have been found to have different amounts of pigments in their leaves and to vary in quantity depending on the season.

The results of a phenological survey of ornamental trees growing on the streets chosen for the study showed that the new Sergeli, Farkhod, appeared and cut various spots on the leaves of the trees on the streets, and from the end of the summer the leaves were falling out early. It was observed that the condition was the opposite in the leaves of trees growing in the Ganges Street and Botanical Garden, and these changes are explained by the fact that they are correctly proportional to the amount of harmful substances in the streets.

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