



## «GREENPARK» COMBINATED BIOPLATO OF RHIZOFILTER PLANTS AND UNDERWATER MACROPHYTES FOR BIOTREATMENT OF THE MYKOLAIV CITY URBAN SYSTEM

The environmental problem of the stormwater system is associated with the possibility of pollutants entering surface water bodies. From the main territory of Mykolaiv, a significant amount of pollutants is washed into the Bug estuary with rainwater runoff (14 drains): oil products (more than 100 tons), iron (300 tons), lead (7 tons), organic compounds (5 tons) (Fig. 1).

In this regard, hydrobiotechnological systems that use biocenoses of various types of aquatic organisms - higher aquatic plants, algae - are promising. The advantages of phytoremediation (purification of contaminated waters through the use of higher aquatic vegetation, aquatic microflora and microorganisms) compared to traditional methods are: the ability to carry out remediation in situ; relatively low cost of production;



Fig. 1. Stormwater runoff into the estuary

environmental safety; the ability to monitor the purification process. Rhizofiltration is also used, i.e. the use of the absorption capacity of plant roots for pollutants (which can be removed with subsequent direct or after ashing (incineration) burial or use (after toxicometry) as a salt additive for animals. Rhizofiltration is economically viable primarily when treating large volumes of water with a low concentration of pollutants.

Laboratory studies were conducted on the accumulation capacity of heavy metals and radionuclides (Fig. 2) of common barley (*Hordéum vulgäre*), meadow timothy (*Phléum pratense* L.), meadow fescue (*Lolium pratense*), and corn sprouts. The high accumulation capacity of the floating pondweed (*Potamogeton natans*), which is widespread in the Bug Estuary, was also investigated in laboratory and field conditions.

Also, to use higher aquatic plants common in the Bug Estuary, such as reeds, reeds, and cattails, which have the ability to remove pollutants from water: biogenic elements (nitrogen, phosphorus, potassium, calcium, magnesium, manganese, sulfur), heavy metals (cadmium, copper, lead, zinc), phenols, sulfates, petroleum products, synthetic surfactants, and improve such indicators of organic pollution as biological oxygen demand (BOD) and chemical oxygen demand (COD).

It is proposed to create a «green park» of the bioplato using these terrestrial plants and aquatic plants using loose floating substrates, the strength of which will be provided by the root system of plants (Fig. 3).



Fig. 2. Laboratory studies of the accumulation capacity of plants and macrophytes

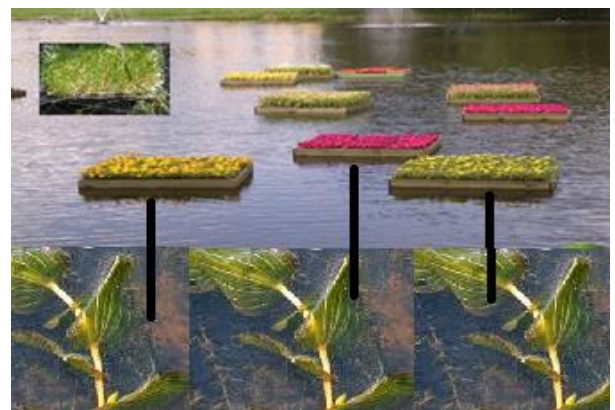


Fig.3. Scheme of formation of an organic layer from bottom silt on a technologically disturbed surface