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APPLICATION OF THE «REVITAL» TECHNOLOGY OF WASTE WATER CONDITIONING FOR THE ALL-YEAR INTRA-SOIL IRRIGATION OF MISCANTHUS, GRAINED ON LOW-CARBON SOILS, WITH PRODUCTION OF BIO SUBSTRATE FOR RESTORATION OF SOIL FERTILITY AND INDUSTRIAL RAW MATERIALS

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The innovative technology “ReVital”, developed at the Ukr R&D Center “Potential-4” for conditioning urban and industrial wastewater, uses low-energy equipment, resource-saving processes, and eliminates the negative impact on the environment.

The ReVital technology allows conditioning water for reuse with a composition and properties that comply with the standards applicable to water used for irrigation, equipment cooling, transportation, preparation of reagents, equipment washing, etc.

In wastewater conditioning processes using the ReVital technology, the minimum amount of carbon dioxide (greenhouse) gas, a metabolic product of aerobic microorganisms generated in buildings during aerobic biological wastewater treatment, enters the atmosphere, since the ReVital technology uses facultative microorganisms that use bound oxygen and physicochemical processes to destroy organic compounds, bacteria and viruses with the removal of reaction products as sludge.

The final stage of wastewater conditioning is the restoration of their biological integrity on a synergistic bioplate - an engineering structure with microorganisms immobilized on an inert substrate and an intra-soil irrigation system for moisture-loving perennial plants, in particular reed, miscanthus, etc.

The root system of plants removes ions of salts and organic impurities from water, and their green mass absorbs carbon dioxide and produces oxygen during photosynthesis.

The use of a bioplate is promising for the restoration of the ecological and sanitary state of small rivers, most of which within concrete settlements flow

in concrete trays, and the arrangement of wall vertical bioplates in them allows intensifying the natural processes of self-purification of polluted surface waters and restoring them as the habitat of aquatic organisms.

Sewage sludge, green mass of plants undergoes anaerobic degradation to produce biosubstrate to restore soil fertility, and also, as raw materials in industry, as biomass at bio TPPs, production of bio concrete, bioplastics, cellulose, etc.

It is promising to obtain from the biomass of miscanthus a chemical-thermomechanical mass (CTMM) - a high-yield fibrous semi-finished product (HYFSP).

The mass yield from Miscanthus is about 85-92%.

CTMM is used as a fibrous semi-finished product in the composition of a wide range of paper and cardboard products and serves as a partial or complete replacement of cellulose in these types of products while maintaining their high quality indicators.

Due to the lower cost compared to wood pulp, the use of miscanthus pulp has global prospects in the paper and cardboard industry.

This area of use of Miscanthus has a great environmental advantage, as it helps to reduce deforestation.

The use of ReVital technology for conditioning wastewater from pulp and paper mills and growing in synergistic bioplates with an intra-soil miscanthus irrigation system makes it possible to comprehensively solve the problem of protecting water resources from pollution and depletion, to use low-fertile lands, increasing their fertility with biosubstrate obtained from sewage sludge and biomass of miscanthus leaves, with the receipt of raw materials for the production of pulp.