Секция «Охрана окружающей среды»

Ecological evaluaion of the wastewater treatment effectiveness (on the example of Kurianovskie sewage treatment plant)

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The importance of quality of the proper wastewater treatment on Kurianovskie sewage treatment plant located in Moscow, Russia (will be called KOS onwards) is huge, because the discussed plant is treating up to 60% of the entire Moscow city wastewater volume and their discharges are making huge difference on the sustainable ecological state of the Moscow river's basin.

All the data for this study was collected from the 2019 KOS Work Report which is officially published both every quarter the year and annually usually with no official analysis from ecological government services or with the positive feedback.

Up to 80 different values of the water sample's quality parameters in the discharged treated wastewater from KOS, in the river Moscow (both 500 meters upstream and downstream) were studied with further comparison of those parameters with Russian State water quality standards to assess the state of aquatic ecosystem of the Moscow river.

To measure quality of the discharged treated wastewater from KOS, 27 water quality parameters (such as water temperature, pH level, BOD_5, concentration values of nitrogen, phosphates and other metals and chemicals) were compared with Threshold Limit Values of fishery water bodies (TLVfw). To closely measure the impact of this discharged treated wastewater on the ecosystem of the river Moscow, same quality parameters were compared with TLV of communal and household use (TLVch).

10 values of discharged treated wastewater from KOS quality parameters were above their TLVfw standards (some of them are BOD_5, water temperature, concentrations of Nitrogen, Phosphates and Aluminium) and 1 of the values (concentraion of Copper) was just matching its TLVfw standard. Other studied values has fulfilled their TLVfw requirements.

6 values of the Moscow river water sample's (500 meters downstream) quality parameters were above their TLVch standards (some of them are Chemical oxygen demand, Generalised coliform bacteria and Coliphages) and 3 of the values (Iron, Aluminium and EDTA-Na_2) were just matching its TLVch standard. All other studied values fulfilled their TLVch requirements.

Main concerns of KOS can be that their original plant was built back in 1950 but 2 blocks were reconstructed (NKOS-1 in 2014 and NKOS-2 in 2017) and there are obvious differences in quality of wastewater treatment between an old block that was meant to deal with just organic contaminants and suspended solids so it has a considerable impact on the overall quality of the wastewater treatment at the plant. Also the lack of high quality coagulant and usage of flocculant may be one of the reasons why KOS can not deal with the current level of load on the wastewater treatment scheme. A comparison of coagulants/flocculants with different chemical composition should be conducted to choose more matching one to get better results in wastewater treatment and having water pollution values in discharged treated wastewater lower than the TLVs.