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Experimental Design Application for Pesticide Removal in Conventional Drinking Water Treatment Processes

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Abstract: *The use of high quantities of chemicals has recently increased due to factors such as the rapidly developing population and industrialization. Today, it is possible to find many synthetic organic chemical compounds in drinking water sources. Due to the potential toxicity, carcinogenic and mutagenicity effects of many synthetic organic pollutants; monitoring and removal from water sources is very important. Among them, micropollutants such as pesticides are a particularly important and priority pollutant class that poses an ecotoxicological threat, not only for the aquatic system, but also by occupying the food chain through bioaccumulation and biomagnification processes to higher-trophic organisms, including humans. It is known that many conventional drinking water treatment processes are not effective in removing pesticides from surface waters, ground waters and wastewaters. Therefore, to increasing the removal efficiency of these pollutants in existing treatment systems, the improvement of treatment plant operating conditions or modification of plant flow chart with additional processes becomes even more important. To examine the effect of operating conditions in the treatment plant on removal of different types of pesticides requires a large number of experiments. In this case, there are different experimental design programs in order to reduce the high cost, time spent for experiments and laboratory wastes to be generated in the experiments. In this study, it was aimed to determine optimum operating conditions of conventional drinking water treatment plant processes (coagulation-flocculation, filtration and chlorination) for pesticide removal using experimental design approaches such as Box Behnken, Taguchi and Minitab. It is also aimed to compare the programs that apply different approaches and to determine the most suitable for the different drinking water processes under changing initial conditions.*

Anahtar Kelimeler: *Drinking water treatment plants, pesticide removal, experimental design.*
