

Well locations as a factor of contaminant removal during riverbank filtration (Mosina-Krajkowo well field, Poland)

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ABSTRACT

Due to poor water quality, abstraction of surface water for water supply purposes usually requires the use of complicated and expensive methods of water treatment. One of the natural methods used for surface water treatment is riverbank filtration (RBF). The treatment efficiency of surface water after RBF depends of many factors which include water residence time in the aquifer, which in turn depends on distance of the wells from the river channel and hydraulic properties of the aquifer, as well as on its geochemical conditions.

This work presents the variability of river water treatment efficiency in the case of macro and micro components as well as organic micropollutants and bacteria, based on a two-year investigation performed at the RBF site located in Krajkowo, which supplies the city of Poznan (central Poland). The research shows that in wells located within 70–80 m of the river channel, the influence of contamination from river water is considerable (especially in case of bacteria, plankton as well as micropollutants and nitrates). Water quality from a well located 250 m from the river is much better and is similar to typical groundwater. In wells located 480-1100 m from the river, the contaminants that are observed in river water (e.g. nitrates and micropollutants) do not exist, however the aquifer is enriched in organic matter (relatively high COD, occurrence of sulphides and organic plankton remains). The research presented shows that the most favorable distance of the well from the river channel (from a water quality point of view) is 150-250 m (which corresponds to residence times of at least 6 months).

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