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Abstract: The tap water supplied to the inhabitants of Gdansk, Gdynia and Sopot *via* two distribution systems was analyzed for microbiological and chemical composition. One of the distribution systems involves an intake of surface water treated by coagulation, ozonation and adsorption onto active carbon; the other one uses two intakes of groundwater treated by aeration and filtration through a catalytic bed. In both the distribution systems the regrowth of heterotrophic bacteria was found to occur, which was stronger in the surface water being treated and disinfected (with chlorine, or a mixture of chlorine and chlorine dioxide) than in the groundwater being treated without disinfection. In the initial section of the surface water distribution system the average number of bacteria (regardless of the disinfectant used) increased by 1log, while in the system distributing non-disinfected groundwater an increase of only 0.5log was observed. The underlying causes of bacterial regrowth in the tap water drawn from the surface water intake can be itemized as follows: a rapid decrease in residual chlorine concentration, a high dissolved oxygen concentration and, seemingly, a higher content of assimilable organic carbon as compared to that in the tap water drawn from the groundwater intake. The largest increase in the number of bacteria, up to 2log, was observed in the end section of the system distributing treated surface water, at the distance of 15.6 km, during replacement of gaseous chlorine by chlorine dioxide. This increase was paralleled by a significant (on average more than threefold) rise in the content of TOC (probably released from the deposits on the pipe walls) and by a decrease in the concentrations of residual chlorine and chlorine dioxide to values averaging $0.03 \text{ gCl}_2/\text{m}^3$ and $0.027 \text{ gClO}_2/\text{m}^3$, respectively. Researches are underway, where use is made of direct methods to count bacterial cells (epifluorescence microscope). It is expected that such examinations will make it possible to determine the total number of bacteria (including those survived) in the tap water, as well as to assess their morphological structure.

Keywords: Tap water, surface water, groundwater, water-pipe network, microbiological quality, heterotrophic bacteria.