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COMPARISON OF SIMULATION TOOLS FOR BACTERIA REGROWTH MODELING IN WATER DISTRIBUTION SYSTEMS

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Bacteria regrowth in water distribution networks is an issue that has been addressed by many authors. Significant efforts were made to develop a comprehensive model for simulating growth of bacteria in drinking water distribution networks. Although bacteria development is affected by many factors and it is virtually impossible to take them all into account, there were attempts to dermine the most significant factors influencing bacteria growth. As a result, there are several models available that in one hand include significant factors and in other hand are not too bulky enabling quick calculations without high requirements of computing power. However additional efforts are needed to compare models and simulation tools and check reproducibility of results obtained with different models and various packages of simulation software. The goal of this research is to compare results obtained with the help of Fortran IMSL library and Epanet-MSX software. A mathematical model describing growth of bacteria in water distribution pipes is proposed in [1]. In the present paper the model is incorporated into Epanet MSX and Fortran code that includes IMSL library. Solutions have been obtained for a straight pipe and a simple network for various conditions and parameters. Epanet MSX does not take dispersion into account, so the dispersion term is excluded there. The results obtained with Fortran routine agree well with the results of Epanet-MSX software for a certain range of parameters. However, in some cases, significant difference between the results is observed. A conclusion can be drawn that the dispersion term may be insignificant in some cases, however, in some range of parameters it is to be taken into account.

REFERENCES

[1] W. Zhang, C. T. Miller and F. A. DiGiano. Bacterial Regrowth Model for Water Distribution Systems Incorporating Alternating Split-Operator Solution Technique. *J. Environmental Eng.*, **130** (9), 2004, 932 – 941.