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Effect of temperature on onset of nitrification in chloraminated distribution system

Dipok Chandra Sarker, Arumugam Sathasivan*

Department of Civil and Construction Engineering, Curtin University, GPO Box U1987, Perth, WA 6845, Australia
Tel. +61 (8) 9266-258, +61 (8) 9266-7296; email: d.sarker@postgrad.curtin.edu.au, S.Sathasivan@curtin.edu.au

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ABSTRACT

Controlling nitrification is a challenge as the causes of onset of severe nitrification in chloraminated distribution systems are not yet well identified. Biostability concept is recently introduced to define the conditions at which nitrification would onset. At biostable residual, growth rate is balanced by disinfection rate. Growth rate is a function of free ammonia present, maximum growth rate, and coefficients defining the balance are assumed constant. Although maximum growth rate and disinfection rate coefficients are known to vary with temperature, it is yet to be taken into account. Water temperature in distribution systems varies between 6 and 35°C. Optimum temperature for ammonia oxidising bacteria (AOB) is between 25 and 30°C, which makes the variation of growth rate non-exponential beyond 20°C. In this paper, how biostability curve would alter within the full practical range of practical temperature is shown, by analysing the data obtained for a bacterium that behaves similar to AOB found in distribution systems.

Keywords: Chloramine; Free ammonia; Nitrification; Biostability curve; Biostability; Temperature

* Corresponding author.