



## Flocculation model applied to adjust operating conditions as flow changes

Rodrigo Braga Moruzzi<sup>a,\*</sup>, Livia Savioli Manetta<sup>b</sup>, Samuel Conceição Oliveira<sup>c</sup>

<sup>a</sup>*Instituto de Geociências e Ciências Exatas, UNESP – Univ Estadual Paulista, Departamento de Planejamento Territorial e Geoprocessamento, Avenida 24-A, 1515, CEP: 13506-900, Rio Claro – SP, Brazil, Tel. +55 19 3526 9339; email: rmoruzzi@rc.unesp.br*

<sup>b</sup>*Faculdade de Engenharia de Bauru, Programa de Pós-Graduação em Engenharia Civil e Ambiental, UNESP – Univ Estadual Paulista, Av. Eng. Luiz Edmundo C. Coube 14-01, 17033-360, Bauru – SP, Brazil, email: livia.savioli@yahoo.com.br*

<sup>c</sup>*Faculdade de Ciências Farmacêuticas, UNESP – Univ Estadual Paulista, Departamento de Bioprocessos e Biotecnologia, Rodovia Araraquara-Jaú km 1, 14800-903, Araraquara-SP, Brazil, email: samueloliveira@fcfar.unesp.br*

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### ABSTRACT

Higher flows in the flocculation stage of water and wastewater treatment systems can be dealt with by adapting the operating conditions. This study investigates the changes required to maintain the flocculation efficiency. The present study developed a mathematical model that assimilates particle ratio and shear rate with particle aggregation/breakage kinetics. The model allows determining how higher flow rates may respond under new flocculation conditions. The kinetic coefficients of the model were derived from literature sources. The mathematical model enables selecting the most appropriate combinations of operating variables in order to produce specified efficiency ranges. Due to the number of operating variables, the number of possible solutions to the mathematical model may be very large. Therefore, an important result is that the model can select 0.1%–1.9% of the possible combinations in operating variables, thus minimizing the experimental effort required to verify the response in terms of operation changes.

*Keywords:* Mathematical model; Water treatment; Flocculation process

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\* Corresponding author.