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Parameter estimation of activated sludge process based on an improved cuckoo search algorithm

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# 1 **Parameter estimation of activated sludge process based on an** 2 **improved cuckoo search algorithm**

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13 **Abstract:** It is essential to use appropriate values for kinetic parameters in activated sludge  
14 model when the model is applied for wastewater treatment processes under different environments.  
15 An improved cuckoo search (ICS) algorithm was proposed in this paper for the estimation of  
16 kinetic parameters used in Activated Sludge Model No.1 (ASM1). ICS is tested for its speed and  
17 accuracy in reaching solution by searching global minima of six standard functions. Cyclical  
18 adjustment strategy was employed into the detected probability to increase searching ability.  
19 Meanwhile, the searching step was adaptively adjusted based on the optimal nest of the last  
20 generation and the current iteration numbers. Subsequently, ICS is used to estimate 7 sensitive  
21 parameters in ASM1 for practical applications. Field data are used to validate prediction accuracy  
22 of ASM1 with estimated parameters. Predicted results of the model are closer to the actual data  
23 with adjusted parameters.

24 **Keywords:** Activated Sludge Process; ASM1; Cuckoo Search Algorithm; Parameter Estimation;  
25 Wastewater Treatment

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