



## A new model for the prediction of the performance of integrated solar and hydraulic jump enhanced waste stabilization pond

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### ABSTRACT

This paper presents a model which incorporates: characteristic length, dispersion coefficient, supercritical inlet velocity, initial and final bacteria density before and after irradiation, first-order rate constant for fecal coliform removal, retention time, dispersion number, solar radiation, depth of the integrated solar and hydraulic jump enhanced waste stabilization pond (ISHJEWSP), length of the horizontal section of ISHJEWSP, and angle of slope of the ISHJEWSP. A comparison of the conventional waste stabilization pond and the ISHJEWSP showed that the bacteria removal was significantly higher in the enhanced pond than the conventional pond at a significance level of 0.05. The verification of the conventional model gave good average coefficients of correlation of  $R = 0.800 \pm 0.173$  between the measured and calculated  $N_e/N_o$  and  $R = 0.924 \pm 0.034$  for the ISHJEWSP, respectively.

*Keywords:* Model; Performance; Prediction; ISHJEWSP

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