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Contents

Parameter Estimation of Essential Amino Acids in *Arabidopsis thaliana* Using Hybrid of Bees Algorithm and Harmony Search

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Abstract. Mathematical models of metabolic processes are the cornerstone of computational systems biology. In model building, the task of parameter estimation is difficult due to the huge numbers of kinetics parameters involved. The common way of estimating the parameters is to formulate it as an optimization problem. Global optimization methods can be applied by minimizing the distance between experimental data and predicted models. This paper proposes the Hybrid of Bees Algorithm and Harmony Search (BAHS) to estimate the kinetics parameters of essential amino acid production in the aspartate metabolism for *Arabidopsis thaliana*. The performance of the BAHS is evaluated and compared with other algorithms. The results show that BAHS performed better as it improved the performance of the original BA by 60%. Meanwhile, it takes less computational time to estimate the kinetics parameters of essential amino acid production for *Arabidopsis thaliana*.

Keywords: Systems biology · Parameter estimation · Bees Algorithm
Harmony Search · Computational intelligence · *Arabidopsis thaliana*