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Determination of the Parameters of the Bergman´s Model for Diabetic Mice Treated with Ibervillea sonorae

N.R. Budar-Aleman[*1], A.A. Sotelo de [*1], M.G. Ramírez-Sotelo[*2], A.I. Cabrera-Llanos [*1]

[*1] Department of Bioprocess, Interdisciplinary Professional Unit of Biotechnology, National Polytechnic Institute, Mexico City

[*2] Department of Bioengineering, Interdisciplinary Professional Unit of Biotechnology, National Polytechnic Institute, Mexico City

Abstract: This article shows the estimation of Bergman's minimal model parameters for glucose-insulin interaction in three states: evolution of the concentration of insulin, evolution of glucose and glucose/insulin interaction. First, the dynamics of glucose measured in mice that were induced diabetes mellitus type 2 experimentally, which were treated with extracts of Ibervillea sonorae root in a range of 100-400 mg/kg, likewise, the estimate for healthy mice is shown and the different parameter values obtained are compared with each other showing how they influence the dynamics of Bergman's model. The values of the glucose/insulin interaction where obtained in vivo by blood samples of the mice every hour. Showing the evolution and variability of the estimate is shown in graphical form; also, the estimation error is quantified by performance curves, which were associated to the energy that is implied in the difference between the values of the parameters obtained and the data obtained in the kinematics of the mice. The results indicate the estimated level reached, where the upper value of the performance curve was 3.0128, while the lower was 0.1978, with standard error values between 1.55% and 10.47%.

Keywords: Parameter Estimation; Glucose-Insulin Model; Diabetic Mice; Ibervillea sonorae.

Corresponding author: A.I. Cabrera-Llanos
aicllbuda@yahoo.com