ARTEMISININ DERIVATIVES WITH ANTIMALARIAL ACTIVITY AGAISNT *PLASMODIUM falciparum DESIGNED WITH AID OF QUANTUM CHEMICAL AND PARTIAL LEAST SQUARES METHODS*

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Malaria has been known since the earliest times. Hippocratic in his writings had already mentioned different manifestations of that disease and called the attention for one of its characteristic symptoms, the enlargement of the spleen[1].

There are four members of the ***Plasmodium*** gender that infect humans and all are transmitted through the female bite of the Anofeles mosquito. However, most of the deaths is attributed to the parasite species ***falciparum***. The severity of the disease caused by this species results primarily from its ability to modify the surface of infected red blood cells by inserting parasite proteins[2].

Among the classes of drugs that are effective in the clinical treatment of the ***falciparum*** malaria, we have the Artemisinin or Quinghosu and a variety of derivatives. This compound is a sesquiterpene containing the 1, 2, 4-trioxane ring and was originally extracted of the herb Artemisia annua L. or Qing hao used for the treatment of 52 kinds of diseases in People's Republica of China[3, 4].

In this work, Quantum Chemical and Partial Least Squares (PLS) methods are employed in the design of Artemisinin derivatives with antimalarial activity against ***Plasmodium falciparum*** resistant to Mefloquine. Initially compounds of literature are studied using the Hartree-Fock/6-31G* method. The PLS method is then used to build a multivariate model and prediction of the unknown antimalarial activity of new Artemisinin derivatives.

The PLS analysis using three latent variables explained 96.29% of X variance and the most important descriptors for the design of the model were one level above the lowest unoccupied molecular orbital (LUMO+1), atomic charge on atoms, and WHIM-3D index, related to the molecular symmetry: axis 1, weight: electronegativity (G1e).

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