

# Accepted Manuscript

Research paper

First principles prediction of aqueous acidities of some benzodiazepine drugs

Bahram Ghalami-Choobar, Ali Ghiami-Shomami, Soheila Asadzadeh-Khanghah

PII: S0009-2614(18)30524-4

DOI: <https://doi.org/10.1016/j.cplett.2018.06.044>

Reference: CPLETT 35743

To appear in: *Chemical Physics Letters*

Received Date: 11 March 2018

Accepted Date: 20 June 2018

Please cite this article as: B. Ghalami-Choobar, A. Ghiami-Shomami, S. Asadzadeh-Khanghah, First principles prediction of aqueous acidities of some benzodiazepine drugs, *Chemical Physics Letters* (2018), doi: <https://doi.org/10.1016/j.cplett.2018.06.044>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## First principles prediction of aqueous acidities of some benzodiazepine drugs

Bahram Ghalami-Choobar\*, Ali Ghiami-Shomami, and Soheila Asadzadeh-Khanghah

*Department of Chemistry, Faculty of Science, University of Guilan, P.O. Box: 19141, Rasht, Iran*

*\*Corresponding author: E-mail: [B-Ghalami@guilan.ac.ir](mailto:B-Ghalami@guilan.ac.ir) , Phone: [+0981333367262](tel:+981333367262)*

### Abstract

In this study, aqueous acidities of several benzodiazepine (BZD) drugs including Oxazepam, Clonazepam, Nitrazepam, Flunitrazepam, Diazepam, Alprazolam, Estazolam, Temazepam, Medazepam and Bromazepam were successfully computed using two common thermodynamic cycles. To that, calculated gas phase Gibbs free energies at PBE1PBE/6-311+G(d,p) level of theory and computed solvation Gibbs free energies at (CPCM/IEF-PCM: UAKS, UAHF and UA0)/HF/6-31+G(d) levels of theory were combined. The most accurate  $pK_a$  values were obtained with thermodynamic cycle involving water and using CPCM-UA0 solvation model with MAD = 0.4. Moreover, for the first time, aqueous  $pK_a$  value of Halazepam was predicted using the best method equal to 3.1.

**Keywords:** Benzodiazepine;  $pK_a$ ; Thermodynamic cycle; Solvation model; Cavity model.

Download English Version:

<https://daneshyari.com/en/article/7837698>

Download Persian Version:

<https://daneshyari.com/article/7837698>

[Daneshyari.com](https://daneshyari.com)