

Free Full Text from Publisher

Look Up Full Text

Full Text Options



Save to EndNote online

Add to Marked List

1 of 1

Synthesis, in-Vitro and in Silico Studies of Azo-Based Calix[4]arenes as Antibacterial Agent and Neuraminidase Inhibitor: A New Look Into an Old Scaffold

By: Ali, Y (Ali, Yousaf)^[1,2]; Bunnori, NM (Bunnori, Norasiinda Muhamad)^[2]; Susanti, D (Susanti, Deny)^[2]; Alhassan, AM (Alhassan, Alhassan Muhammad)^[3]; Abd Hamid, S (Abd Hamid, Shafida)^[2]

[View ResearcherID and ORCID](#)

FRONTIERS IN CHEMISTRY

Volume: 6

Article Number: 210

DOI: 10.3389/fchem.2018.00210

Published: JUN 12 2018

Document Type: Article

[View Journal Impact](#)

Abstract

Calixarene derivatives are reported as potential therapeutic agents. Azo derivatives of calixarenes have not been given much consideration to explore their biomedical applications. In the present study, some azo-based derivatives of calix[4]arene were synthesized and characterized and their antibacterial and antiviral potentials were studied. The mono azo products of sulphanilamide, sulfaguanidine and 2-methyl-4-aminobenzoic acid showed good activity against bacterial strains with minimum inhibition concentration values ranging from 0.97 to 62.5 µg/mL. For mono azo products, the diazotized salt was applied as a limiting reagent. The use of calix[4]arene and sodium acetate trihydrate in 1: 3 (molar ratio) helped in partial substitution. Molecular docking was performed to see the interaction of the designed compounds with two bacterial and one viral (neuraminidase) receptor. Some of the derivatives showed good interaction with the active site of bacterial and neuraminidase enzymes through hydrogen, hydrophobic and pi-pi interactions, and could inhibit the activity of the selected enzymes.

Keywords

Author Keywords: calix[4]arenes; azo calix[4]arenes; antibacterial activity; docking; neuraminidase inhibition

KeyWords Plus: FUNCTIONALIZED CALIXARENES; SPECTRAL CHARACTERIZATION; ANTIMICROBIAL ACTIVITY; BIOLOGICAL EVALUATION; DERIVATIVES; DYES

Author Information

Reprint Address: Abd Hamid, S (reprint author)

+ Int Islamic Univ Malaysia, Kulliyah Sci, Kuantan, Malaysia.

Addresses:

[1] Sarhad Univ Sci & Informat Technol, Dept Chem, Peshawar, Pakistan

+ [2] Int Islamic Univ Malaysia, Kulliyah Sci, Kuantan, Malaysia

+ [3] Int Islamic Univ Malaysia, Kulliyah Pharm, Kuantan, Malaysia

E-mail Addresses: shafida@iium.edu.my

Funding

Funding Agency	Grant Number
Malaysian Ministry of Science, Technology and Innovation (MOSTI) for EScience	06-01-08-SF0147
Ministry of Higher Education (MOHE) for ERGS Grant	ERGS12-017-0017

[View funding text](#)

Publisher

FRONTIERS MEDIA SA, AVENUE DU TRIBUNAL FEDERAL 34, LAUSANNE, CH-1015, SWITZERLAND

Citation Network

In Web of Science Core Collection

0

Times Cited

[Create Citation Alert](#)

42

Cited References

[View Related Records](#)

Use in Web of Science

Web of Science Usage Count

6

Last 180 Days

7

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection

- Science Citation Index Expanded

Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

Journal InformationImpact Factor: [Journal Citation Reports](#)**Categories / Classification**

Research Areas: Chemistry

Web of Science Categories: Chemistry, Multidisciplinary

[See more data fields](#)

◀ 1 of 1 ▶

Cited References: 42Showing 30 of 42 [View All in Cited References page](#)

(from Web of Science Core Collection)

- | | | |
|-----|---|-------------------------|
| 1. | Crystal structure of the anti-bacterial sulfonamide drug target dihydropteroate synthase
By: Achari, A; Somers, DO; Champness, JN; et al.
NATURE STRUCTURAL BIOLOGY Volume: 4 Issue: 6 Pages: 490-497 Published: JUN 1997 | Times Cited: 177 |
| 2. | Modulation of Drug Resistance in Staphylococcus aureus with Coumarin Derivatives
By: Aquino de Araujo, Rodrigo Santos; Barbosa-Filho, Jose Maria; Scotti, Marcus Tullius; et al.
SCIENTIFICA Article Number: UNSP 6894758 Published: 2016 | Times Cited: 3 |
| 3. | Methods for in vitro evaluating antimicrobial activity: A review
By: Balouiri, Mounyr; Sadiki, Moulay; Koraichi Ibensouda, Saad
JOURNAL OF PHARMACEUTICAL ANALYSIS Volume: 6 Issue: 2 Pages: 71-79 Article Number: 2095-1779(2016)6:2<71:MFIVEA>2.0.TX;2-H
Published: APR 2016 | Times Cited: 397 |
| 4. | Methods for determining bactericidal activity of antimicrobial agents: approved guideline
By: Barry, A. L.; Craig, W. A.; Nadler, H.; et al.
NCCLS Document M26-A 19. Published: 1999
[Show additional data] | Times Cited: 3 |
| 5. | Synthesis of cesium selective pyridyl azocalix[n]arenes
By: Chawla, HM; Singh, SP; Upreti, S
TETRAHEDRON Volume: 62 Issue: 12 Pages: 2901-2911 Published: MAR 20 2006 | Times Cited: 24 |
| 6. | Design, synthesis, and biological evaluation of crenatoside analogues as novel influenza neuraminidase inhibitors
By: Chen, Bao-Long; Wang, Ya-Jing; Guo, Hong; et al.
EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY Volume: 109 Pages: 199-205 Published: FEB 15 2016 | Times Cited: 12 |
| 7. | The synthesis of some new derivatives of calix[4]arene containing azo groups
By: Deligoz, H; Ercan, N
TETRAHEDRON Volume: 58 Issue: 14 Pages: 2881-2884 Article Number: PII S0040-4020(02)00156-4 Published: APR 1 2002 | Times Cited: 54 |
| 8. | Selected applications of calixarene derivatives
By: Deska, Malgorzata; Dondela, Barbara; Sliwa, Wanda
ARKIVOC Special Issue: SI Pages: 393-416 Part: 6 Published: 2015 | Times Cited: 5 |
| 9. | Synthesis and spectral characterization of azo dyes derived from calix[4]arene and their application in dyeing of fibers
By: Elcin, Serkan; Ilhan, Murat Muzaffer; Deligoz, Hasalettin
JOURNAL OF INCLUSION PHENOMENA AND MACROCYCLIC CHEMISTRY Volume: 77 Issue: 1-4 Pages: 259-267 Published: DEC 2013 | Times Cited: 6 |
| 10. | Synthesis and evaluation of fluorescence properties of Cu²⁺ selective azocalix[4]arenes and their application in living cell imaging
By: Elcin, Serkan; Deligoz, Hasalettin; Bhatti, Asif Ali; et al.
SENSORS AND ACTUATORS B-CHEMICAL Volume: 234 Pages: 345-352 Published: OCT 29 2016 | Times Cited: 7 |
| 11. | SYNTHESIS OF MONOALKYLATED CALIX[4]ARENES VIA DIRECT ALKYLATION | Times Cited: 104 |