



Original Research Article

Synthesis of 4-nitro-Benzoates for evaluation antimicrobial and disinfectant activity: Part-I

Prachit Gopiwad^{1*}¹Dept. of Pharmacy, CAYMET's Siddhant College of Pharmacy, Pune, Maharashtra, India

ARTICLE INFO

Article history:

Received 20-03-2024

Accepted 01-05-2024

Available online 11-05-2024

Keywords:

Benzoate

P-cresol

Resorcinol

Antimicrobial and Disinfectant

ABSTRACT

4-nitro-benzoates derivatives have been synthesized by known literature methods and found that they are easy to synthesize. The compound PG1 and PG2 were synthesized by known methods. Resorcinol and p-cresol was dissolved in ethanolic 1 N NaOH separately and to it 4-nitro-benzoyl chloride was added. The products PG1 and PG2 were collected respectively.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

Benzoates are the soft drugs and mostly release the parent moiety. Several of the benzoates have shown potent antimicrobial¹⁻⁴ and antiseptic⁵ properties. In this paper the synthesis such 4-Nitro Benzoates is being reported., which shall be evaluated for antimicrobial and disinfectant activities in later series of paper.

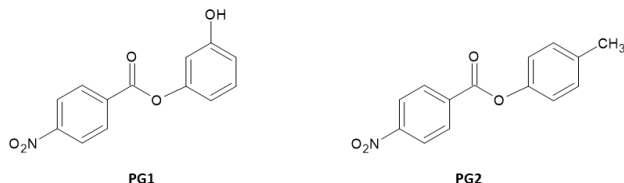


Figure 1: Compounds PG1 and PG2

2. Materials and Methods

TLC was performed on 524nm Merk TLC plates. All chemicals were of synthetic grade and 98% puris grade. TLC was eluted with 3 different solvents to check the purity of the compounds and visualized in Iodine chamber and further in UV chamber. The ¹H-NMR was performed on Bruker 400 MHz NMR before which FT-IR was performed on Perkin Elmer spectrophotometer. The synthetic scheme for the claimed compounds has been shown in Figure 2.

3-hydroxyphenyl-4-nitrobenzoate (PG1): An equimolar solution of ethylene diamine was dissolved in 10 ml of ethanolic 1 N NaOH in round bottom flask and to it 4-nitro-benzoyl chloride was added dropwise from dropping funnel with continuous stirring for 3 hrs at room temperature. The stirring was conducted on magnetic stirrer with magnetic bead in the cresol solution. The compound that separated out after 3 hrs was dried. The compound was washed with ethanol and further dried again washed with NaOH and water and air dried.

¹HNMR (δ shift in ppm): 6.86-7.04 (2H, 6.93 (ddd, J = 8.2, 2.7, 1.8 Hz), 6.99 (ddd, J = 2.7, 1.7, 0.5 Hz)), 7.14 (1H, ddd, J = 8.1, 1.8, 1.7 Hz), 7.29 (1H, ddd, J = 8.2, 8.1, 0.5 Hz), 7.97 (2H, ddd, J = 8.6, 1.4, 0.5 Hz), 8.16 (2H, ddd, J =

* Corresponding author.

E-mail address: pgopidwad@gmail.com (P. Gopiwad).

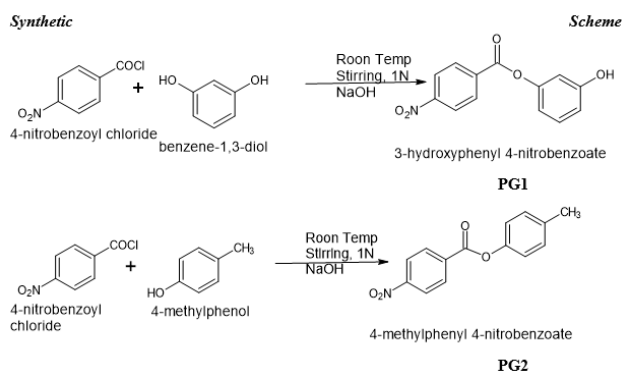


Figure 2: Synthetic scheme for PG1 and PG2

8.6, 1.7, 0.5 Hz).

4-methylphenyl-4-nitrobenzoate (PG2): The procedure for the VG1 was repeated and in place of resorcinol, p-cresol was used. Rest of the procedure remains same.

¹HNMR (δ shift in ppm): 2.23 (3H, s), 6.96-7.18 (4H, 7.02 (ddd, J = 8.3, 1.4, 0.5 Hz), 7.12 (ddd, J = 8.3, 1.5, 0.5 Hz)), 7.97 (2H, ddd, J = 8.6, 1.4, 0.5 Hz), 8.16 (2H, ddd, J = 8.6, 1.7, 0.5 Hz).

3. Results and Discussion

The compounds complied with all spectral data and complied with IR and NMR and confirmed to be synthesised.

4. Conclusion

The Benzoates of 4-Nitro benzoyl chlorides were synthesized with p-cresol and resorcinol respectively.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Chipley JR. Sodium Benzoate and Benzoic Acid. 4th ed. and others, editor. CRC Press; 2020. p. 41–8.
2. Stanojevic D, Comic LJ, Stefanovic O, Sukdolak SS. Antimicrobial effects of sodium benzoate, sodium nitrite and potassium sorbate and their synergistic action in vitro. *Bulgarian J Agricul Sci.* 2009;15(4):307–18.
3. Matin MM, Bhuiyan MH, Hossain MM, Roshid MH. Comparative antibacterial activities of some monosaccharide and disaccharide benzoates. *Orbital: Electronic J Chem.* 2015;p. 160–7.
4. Krátký M, Vinšová J, Novotná E, Mandíková J, Trejtnar F, Stolaříková J. Antibacterial activity of salicylanilide 4-(trifluoromethyl) benzoates. *Molecules.* 2013;18(4):3674–88.
5. Hadi S, Suhartati T, Noviany N, Pandiangan KD, Yandri Y, Simanjuntak W, et al. Disinfecting activity of some diphenyltin (IV) benzoate derivative compounds. *Pure Appl Chem.* 2022;94(7):799–807.

Author biography

Prachit Gopiwad, Student

Cite this article: Gopiwad P. Synthesis of 4-nitro-Benzoates for evaluation antimicrobial and disinfectant activity: Part-I. *Curr Trends Pharm Pharm Chem* 2024;6(2):41-42.