chemistry proceedings

MDPI

*Proceeding Paper*

# Synthesis Ethyl 2-(1H1,3-benzodiazol-2-ylsulfanyl)acetate

**J. V. Mukhtorov *, Kh. S. Toshov and Kh. Khaitbaev †**

Department of Organic synthesis and applied chemistry, National University of Uzbekistan, Tashkent 100174, Uzbekistan; e-mail@e-mail.com (K.S.T.); e-mail@e-mail.com (K.K.)

* Correspondence: javohirmuxtorov99@mail.ru

† Presented at the 26th International Electronic Conference on Synthetic Organic Chemistry, online, 15–30 November 2022; Available online: https://ecsoc-26.sciforum.net.

**Abstract.** 1H-benzo[d]imidazole-2-thiol derivatives are structural isomers of natural nucleotides, which allow easy interaction with biopolymers of living organisms. Therefore, it is urgent to synthesize new derivatives of Mercapto benzimidazole and study their chemical properties. As a result of further experiments, a new derivative of benzimidazole was synthesized and its structure was analyzed using physical and chemical research methods.

**Keywords:** 1H-benzo[d]imidazol-2-thiol; ethyl chloroacetate; IR spectroscopy

**Citation:** Mukhtorov, J.V.; Toshov, K.S.; Khaitbaev, K. Synthesis Ethyl 2-(1H1,3-benzodiazol-2-ylsulfanyl)acetate. *Chem. Proc.* **2022**, *4*, x. https://doi.org/10.3390/xxxxx

Academic Editor(s):

Published: 15 November 2022



## 1. Introduction

Currently, 1H-benzo[d]imidazol-2-thiol is a component of many bioactive heterocyclic compounds that are of great interest due to their various biological and clinical applications [1]. In recent years, researchers who have synthesized 1H- benzo[d]imidazol-2-thiol derivatives and studied their various biological activities have attracted interest. The main reasons for this are that the active functional group attached to 1H-benzo[d]imidazole-2-thiol has high activity in derivatives: for example, anticancer, hormone antagonist, antiviral, antiHIV, anthelmintic, antiprotozoal, antimycobacterial, anti-inflammatory anti-inflammatory, analgesic, anti-allergic, coagulant, anticoagulant, antioxidant, anti-diabetic and also acts as a pesticide for plant protection [2,3]. Also, 1H-benzo[d]imidazol-2-thiol derivatives are used in analytical chemistry to purify industrial wastewater from copper, mercury and lead ions, to protect metals from corrosion, and to obtain means of protecting plants from pests in agriculture [4].

## 2. Materials and Methods

*Infrared Spectroscopy (IR)*

IR spectroscopy analysis was acquired at 400–4000 $cm^{-1}$ wavenumbers with a 4 $cm^{-1}$ resolution utilizing a INVENIO S (Bruker, Germany) equipped with a diamond ATR cell. IR spectroscopy analysis: principial functional group wavelengths NH—3129–3018 $cm^{-1}$, $CH_2$—3000–2900 $cm^{-1}$, CO ($COOC_2H_5$)—1730 $cm^{-1}$.

## 3. Results and Discussion

*Synthesis Ethyl 2-(1H1,3-benzodiazol-2-ylsulfanyl)acetate*

1.5 g (0.01 mol) of 1H-benzo[d]imidazole-2-thiol, 0.84 g (0.015 mol) of KOH were placed in a flask. 15 mL of DMF (Dimethylformamide) was used as solvent and the reaction was carried out with heating for 15 min. Then 1.25 g (0.01 mol) of ethyl chloroacetate was added and the reaction was continued in a water bath for 6 hours. After a certain time, it is cooled at room temperature. Then crushed ice cubes are added, stirred for 10–15 minutes and the result is a precipitate. The precipitate is filtered and dried. It is then recrystallized in ethanol.

## 4. Conclusions

As a result of the above reaction, ethyl 2-(1H1,3-benzodiazol-2- ylsulfanyl)acetate was synthesized and its structure was studied using physicochemical research methods.

General formula: $C_{11}H_{12}O_2N_2S$, liquefaction temperature: 120–125 °C state of aggregate: white amorphous substance, $R_f$—0.6 (benzene: acetone 3:2).

**Author Contributions:**

**Funding:**

**Institutional Review Board Statement:**

**Informed Consent Statement:**

**Data Availability Statement:**

**Acknowledgments:** We would like to express our gratitude to Toshov Kh., Department of Optical Spectroscopic Analysis of "Molecular and cell biotechnology" interuniversity scientific laboratory who closely assisted in the analysis of the polysaccharides sample by means of IR spectroscopy.

**Conflicts of Interest:**

## References

1. Hamada, H.A.; Omar, M.A. Synthesis of Some New Nucleosides Derived from 2- Mercapto Benzimidazole with Expected Biological Activity. *Orient. J. Chem.* **2017**, *33*, 2303–2310.
2. Narasimhan, B.; Sharma, D.; Kumar, P. Benzimidazole: A medicinally important heterocyclic moiety. *Med. Chem. Res.* **2012**, *21*, 269.
3. Vikash, K.C.; Devender, P.; Pushpendra, K.; Vijay, Y. Synthesis, characterization and in vivo anthelmintic activity of some newer benzimidazole derivatives. *Der Pharm. Lett.* **2016**, *8*, 127–134.
4. Al-Masoudi, N.A.; Jafar, N.N.A.; Abbas, L.J.; Baqir, S.J.; Pannecouque, C. Synthesis and anti-HIV Activity of New Benzimidazole, Benzothiazole and Carbohyrazide Derivatives of the anti-Inflammatory Drug Indomethacin. *Naturforsch* **2011**, *66*, 953–960.