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Evaluation of antimicrobial activity of the compound 4-thioxo-thiazolidine-2-one against multidrug resistant clinical isolates

Ivanildo M. Silva (PQ)[1,2], Ana Carolina C. M. Medeiros (IC)[2], Rosilma O. Araújo (PG)[2], Kêsia X. F. R.de Sena (PQ)[2], Julianna F. C.de Albuquerque*(PQ)[2]

[1] Faculdade Integrada de Belo Jardim-Pernambuco, [2] Departamento de Antibióticos da UFPE.

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Introduction

Thiazolidine derivatives and their analogous structures, synthesized by substituting various positions on the heterocyclic ring, are powerful and active molecules. Owing to their pharmacological and antimicrobial properties, thiazolidine derivatives have been synthesized and evaluated in a number of studies over the last decades[1-2]. Many researchers have examined the biological properties of thiazolidinone derivatives and antimicrobial actions[3,4]. Many of these synthesized derivatives have been tested against Gram-positive and Gram-negative bacteria, including *Mycobacterium tuberculosis*, with satisfactory results[5]. With the intention of finding a drug capable of combating multidrug-resistant bacteria the compound 5-(3-methoxy-4-hydroxybenzylidene)-4-thioxo-thiazolidine-2-one (HRJ-26) (Figure 1) was synthesized and tested against multidrug-resistant clinical isolates.

Results and Discussion

The compound was synthesized from a solution of 4-thioxo-thiazolidine-2-one (0.300g, 2.25x10^{-3} mol) in glacial acetic acid (7.0 mL), sodium acetate and 3-methoxy-4-hydroxybenzaldehyde (0.184 g, 2.25 x 10^{-3} mol) added. The reaction mixture was heated under reflux for a period of 3 hours under stirring. After purification and crystallization, the following results were obtained: yield 35 %; mp 215-216 ºC; Rf 0.50 (0.94:0.06 $CHCl_3$/EtOH); recrystallization: methanol. The structures of the compound were determined by spectroscopic methods ^{1}H RMN, ^{13}C RMN, infrared, mass spectrometry and confirmed by elemental analysis. The spectrum for the hydrogen ^{1}H RMN showed a chemical shift (δ) for the exocyclical double bond to 7.99 ppm, correspondent to the methine proton, therefore showing it to be characteristic of the Z conformation. The compound (HJR-26) was effective against all microorganisms tested including those multiresistant in the three concentrations used. However, the concentration of the 300 µg/disk compound was the most satisfactory in relation to the standard drugs, ampicillin and cephalexin. At this concentration (300 µg/disk) the tested compound formed halos of Inhibition greater than or equal to 31.25% and 37.50% of clinical isolates compared to ampicillin and cephalexin drugs respectively. *The* Minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) were quite effective when compared with the standard drug cephalexin. In this comparison, the compound HRJ-26 showed MIC and MBC better or equal to the standard drug in 56.25% of the microorganisms tested with MIC, ranging from 4 to 32 µg/mL.

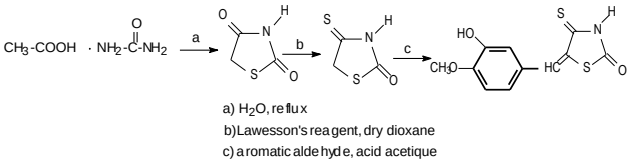

Figure 1. Synthetic routes of thiazolidinone derivative: Reagents and conditions.

Conclusions

HRJ-26 was active against all tested bacteria, with halos of inhibition ranging from 9.33 to 39.33 mm, being more active at 300 µg/disk. A percentage of 56.25% and 12.50% of the analysis performed showed MIC higher than or equal to the standard drugs, cephalexin and ampicillin, respectively.

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CNPq

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