Academic Sciences International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 6, Issue 1, 2014

Research Article

ANTIMICROBIAL ACTIVITY OF 2, 6 DI-SUBSTITUTED PIPERIDINE 4-ONE DERIVATIVES

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Received: 27 Oct 2013, Revised and Accepted: 18 Nov 2013

ABSTRACT

Objective: To evaluate the antimicrobial activity of 2,6 disubstituted piperidine-4-one derivatives.

Method: Tube dilution assay- It is the standard method for shaping levels of resistance to an antibiotics. A serial dilutions of the antibiotic are prepared in a liquid medium which is inoculated with a identical number of microorganisms and incubated at 37 ºC. The lowest concentration of the antibiotic is measured to be the minimal inhibitory concentration (MIC).

Results: The compound 3(DAL-II) were found highly efficacy against *Staphylococcus aureus, Bacillus subtillis* (Gram-positive) and the compound 3(DALII) were found highly efficacy against *aspergillus niger.*

Conclusion: Synthesized 2,6 disubstituted piperidine 4 one derivatives exhibited antimicrobial activity against the tested organisms.

Keywords: Piperidine derivatives, Antimicrobial activity, Tube dilution assay.

INTRODUCTION

The goal of the pharmaceutical research is to synthesis the compound which is more efficacy against resistance microorganisms. The substituted piperidine derivatives were reported for antimicrobials**[1-5].** The 2,6 disubstituted piperidine-4-one derivatives were synthesized by mannich reaction (condensation method) and characterized by IR, NMR, MASS spectroscopy and evaluated for antimicrobial activity (zone of inhibition) at two concentrations by disc diffusion method**[6]** and we were reported**.** The aim of this research is to evaluate the minimum inhibitory concentration (MIC) of 2,6 disubstituted piperidine-4-one derivatives against gram positive bacteria, gram negative bacteria and fungus.

MATERIALS AND METHODS

Chemicals and solvents

Muller-Hinton broth, Muller-Hinton agar, 0.5 McFarland turbidity standard and Cultures of bacteria were received from Himedia laboratories. Dimethyl sulfoxide (DMSO) were received from spectro chem.

Instruments

Incubator were recorded from TECHNICHO ltd.

Procedure

Antimicrobial activity

Minimum Inhibitory Concentration Test (MIC)

The antimicrobial activity of the synthesized compounds were studied against *Staphylococcus aureus, Bacillus subtillis* (Gram-positive), *Escherichia coli, Proteus mirabilis* (Gram-negative) *and Aspergillus Niger* (fungus) by using tube dilution assay**[7].** At the lowest concentration of the test derivative that completely inhibits the growth of tested organism is termed as minimum inhibitory concentration. Arrange 8 sterile test tubes in a rack and dispense 1 ml of sterile Muller-Hinton broth into each tube. Prepare a stock solution of the antimicrobial agent to make the serial dilution of 5µg/ml, 10µg/ml, 25µg/ml, 50µg/ml, 100µg/ml, 200µg/ml. The 7th tube concentration is 400µg/ml and 8th tube act as a growth control. Adjust the turbidity of bacterial suspension overnight growth by 0.5 McFarland standard. Add 1 ml of this suspension to each dilution and control tube. Incubate the tubes overnight at 37 ºC. Compare with the control tube with test for visible growth and record the result. The lowest concentration with no visible growth is the minimum inhibitory concentration(MIC) for the test organism. We were evaluated three compounds for antimicrobial activity such as compound 1(DAAIL1-C9H16O3NCl), compound 2(DALIL1-C13H24O3NCl) and compound 3(DAL II-C14H26O3NCl).

RESULTS

Antibacterial activity

The synthetic compounds were evaluated for antibacterial activity against gram positive and gram negative organisms at the concentrations of 5µg/ml, 10µg/ml, 25µg/ml, 50µg/ml, 100µg/ml, 200µg/ml and 400µg/ml by using tube dilution assay. All the compounds were exhibited antibacterial activity(Table 1). The compound 1(DAAIL1) was emerged significant antibacterial activity against *Staphylococcus aureus, Bacillus subtillis*(gram positive organisms) at the concentration of 200µg/mL. The compound 3(DAL II) were found effective against *Staphylococcus aureus, Bacillus subtillis*(gram positive organisms) at the concentration of 100µg/mL. The compound 1(DAAIL1) and 3(DAL II) were found significant activity against Proteus mirabilis and *Escherichia coli* (gram negative organism).

Table 1: Antibacterial activity of 2,6 disubstituted piperidine 4 one derivatives

S. No.	Sample Code	Minimum Inhibitory Concentration (µg/mL)			
		B. Subtilis	S. Aureus	P. Mirabilis	E. Coli
01	DAAIL1	200	200	100[1]	100[1]
02	DALIL1	200	100[1]	100[1]	200
03	DAL II	100	100	100[1]	100[1]

1. 50% active

Antifungal activity

The synthetic compounds were evaluated for antifungal activity against A*spergillus niger* at the concentrations 5µg/ml, 10µg/ml, 25µg/ml, 50µg/ml, 100µg/ml, 200µg/ml and 400µg/ml by using tube dilution assay (Table no 2). The compound 1**(**DAAIL1) were not active and the compound 2(DALIL1) were emerged significant antifungal activity against the A*spergillus niger.* The compound 3(DALII) were found highly efficacy against A*spergillus niger* at the concentration of 50µg/mL.

Table 2: Antifungal activity of 2,6 disubstituted piperidine 4 one derivatives

S. No.	Sample Code	Minimum Inhibitory Concentration (µg/mL)
		Aspergillus Niger
01	DAAIL1	NA[1]
02	DALIL1	100[2]
03	DAL II	50

1-Not active, 2- 50% active

DISCUSSION

The test compound were found to be active against gram positive bacteria, gram negative bacteria and fungus, among these the compound 1(DAAIL1) were emerged significant antibacterial activity against gram positive bacteria at the concentration of 200µg/mL. The compound 3(DAL II) were found to be moderate efficacy against *Staphylococcus aureus, Bacillus subtillis* (gram positive bacteria) at the concentration of 100µg/mL and highly efficacy against A*spergillus niger* (fungus) at the concentration of 50µg/mL.

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