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1, 3 - Dipolar cycloaddition of α- Glutaraldehyde - N - Aryl nitrone with cinnamaldehyde: An efficient synthesis of novel Isoxazolidines and evaluation of its antibacterial activity

P Sivadharani and SR Jayapradha

Abstract
There is potent and simple method of synthesis of a new class of heterocycles called isoxazolidines. The synthesis is achieved here by 1, 3 dipolar cycloaddition with α-Glutaraldehyde-N-aryl nitrone acting as a dipole and cinnamaldehyde acting as a dipolarophile. Reaction of α- Glutaraldehyde-N-aryl nitrone and different substituted cinnamaldehydes, new isoxazolidines has been precisely synthesized with yields ranging from 85 to 90 percent. The synthesized heterocyclic compounds are characterized by UV, FT-IR and NMR techniques. The isoxazolidines thus synthesized have particular antibacterial properties which shown biologically active and detained bacterial activity amongst *Bacillus Marisflavi* and *Pseudomonas aeruginosa*.

Keywords: α-Glutaraldehyde-N-aryl nitrone, cinnamaldehyde, reflux, isoxazolidine, antibacterial activity

Introduction
1, 3- Dipolar Cycloaddition reactions represent one of the maximum extensive organic chemistry synthesis techniques, considering that they're important in the modern-day synthesis of natural products and physiologically lively compounds [1]. For several 1,3 - dipoles, including nitrones [2], nitrile oxides [3], nitrile imines [4], diazoalkanes [5], and carbonyl ylides [6], extraordinarily enantioselective 1,3-dipolar cycloaddition techniques catalyzed *via* chiral Lewis acids had been mounted over the last ten years [7]. One of the most important processes for producing N-containing heterocycles is the 1, 3-dipolar cycloaddition response of nitrones and nitrile oxide [8]. Solid-state synthesis has recently received popularity as a contemporary artificial technique for physiologically energetic chemical substances. Intermolecular and intramolecular cycloaddition reactions are critical in answer and solid-section chemistry for simply manufacturing cyclic scaffolds. The [3+2]-cycloaddition reaction of nitrones to alkenes is a powerful synthetic method used to produce isoxazolidines [9-19]. According to the trend, 5-substituted isoxazolidines are synthesized from mono- and 1, 1-disubstituted alkenes [20]. More often than now, combinations of regioisomers are formed in cycloaddition strategies with 1, 2-disubstituted alkenes. Still, depending on the substitution bond, the major isomers usually have fewer electron-rich substituents in the 4-functionality. Right here the nitrones are organized with the aid of phenyl hydroxylamine and glutaraldehyde which has chosen as dipole and Cinnamaldehyde is a flavonoid that offers the spice cinnamon and its taste and smell. It takes place certainly within the bark of cinnamon wood and exclusive species of the genus Cinnamomum which consist of camphor and it has extensive biological activities. Here, distinctive cinnamaldehydes have chosen as a dipolarophile in the 1, 3 dipolar cycloaddition which reacts with α-Glutaraldehyde-N-aryl-nitrone to produce various isoxazolidine systems. The synthesized isoxazolidine heterocycles have power over two bacterial strains.

Material and Methods
All of the chemicals were of high reagent grade and were utilised without additional purification. All melting points were measured in uncorrected open capillaries. TMS was used as an internal standard for the [1] HNMR and [13] CNMR spectra, which were recorded on a Bruker 400MHz& 100MHz in CDCl3.

All chromatographic treatments were carried out on silica gel 60-120 mesh with petroleum ether-ethyl acetate as eluent. Coupling constants are reported in Hertz, and chemical shifts are indicated in parts per million (δ-scale). Other approaches, such as IR and UV- vis were captured by the Jasco spectrometer and Perkin Elmer.

General procedure

Cycloaddition reaction of α-Glutaraldehyde-N-aryl nitrone with Cinnamaldehyde- Synthesis of 3-(4-oxobutyl)-2, 4-diphenyl isoxazolidine-5-carbaldehyde

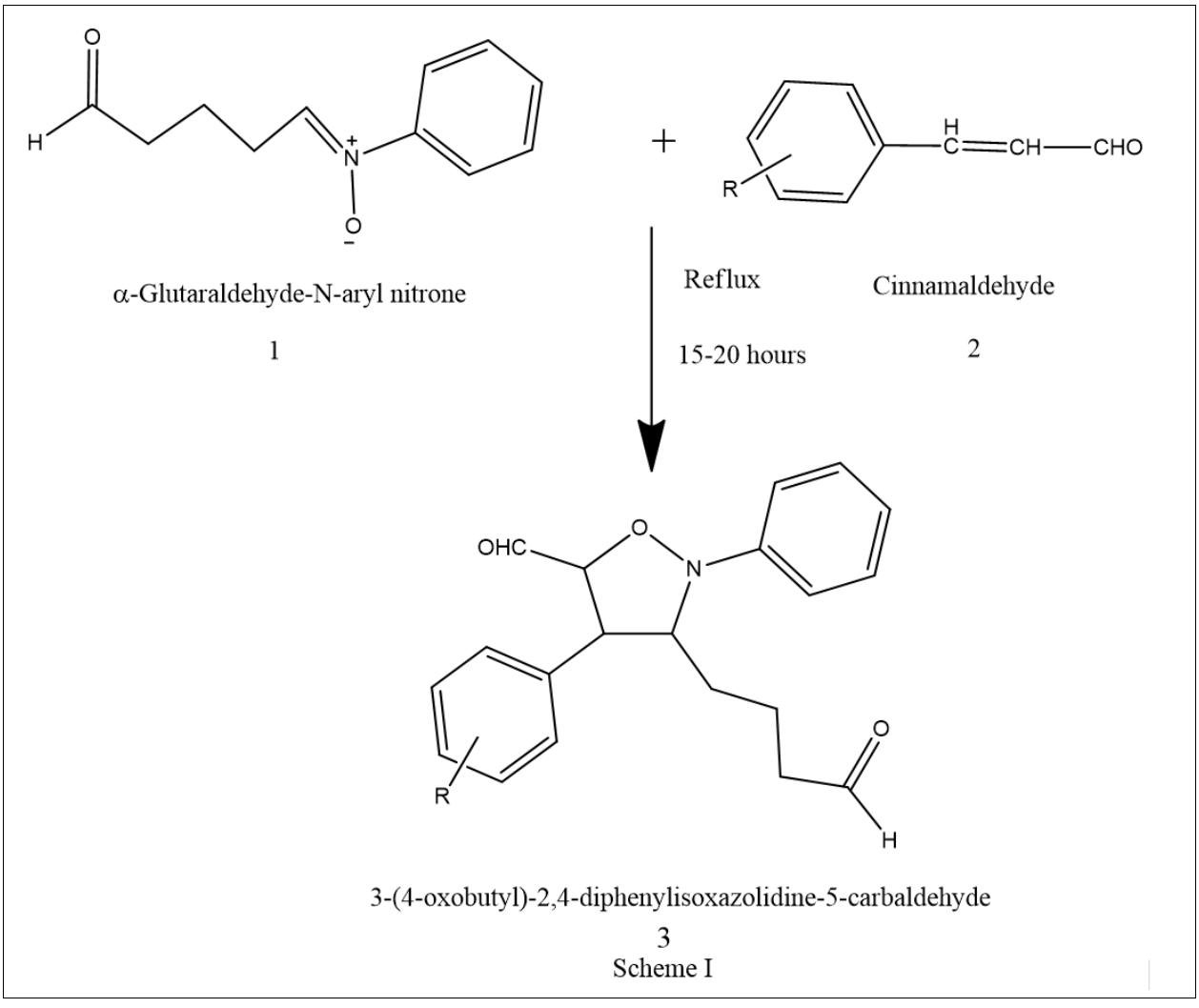
A mixture of α-Glutaraldehyde-N-aryl nitrone (1) and Cinnamaldehyde (2) is refluxed in toluene (50ml) for the time period specified in Scheme I. After completion of the reaction (as indicated by TLC), the solvent is removed under reduced pressure and the product (3) is recrystallised from petroleum ether. (Scheme I)

Results and Discussion

Recent research has focused on the synthesis of isoxazolidines through 1, 3 dipolar cycloaddition, in addition to the assessment of their spectral and structural features of the impact of substituents on the confirmation of the imperative five membered isoxazolidine ring [21, 24]. Similarly, in the present investigation we deliberate to synthesize a new heterocycles with isoxazolidine unit with different structural pattern.

A comprehensive analysis of the literature revealed that there is no reporting on the cycloaddition of α-Glutaraldehyde-N-aryl nitrones (1) with the functional groups and alkene moiety. Cinnamaldehyde (2), a novel dipolarophile, is intriguing due to its active double bond along with the aldehyde functional group. This can result in the synthesis of cycloadducts by the reaction of α-Glutaraldehyde-N-aryl nitrone. For the present study, α-Glutaraldehyde-N-aryl nitrone (1) is the preferred dipole. An equimolar ratio of α-Glutaraldehyde-N-aryl nitrone and Cinnamaldehyde is refluxed in toluene for 15-20 hours. After working up the reaction, it is found that only the product predominate the reaction mixture, as evidenced by TLC with crude NMR mixture, and the product is separated using column chromatography. The product isolated is identified as 3-(4-oxobutyl)-2, 4-diphenyl isoxazolidine-5-carbaldehyde (3). From the recent literature[26], a strong indication of the regio and stereoselectivities involved in the reaction has no other additional regio and stereoisomer resulting from the addition. It is clear that one additional potential activated double bond has been added to the cycloadduct produced in (3). As the synthesized isoxazolidine has three chiral centres, eight isomers are possible; among that any one of the isoxazolidine predominates in the crude reaction mixture.

Finally, we choose to examine the cycloaddition of the Glutaraldehyde-N-aryl nitrone compound (1) as our initial model which reacts with Cinnamaldehyde as a dipolarophile (2).



Scheme I

The ^{1}H NMR spectrum shows the signal at δ 3.82 (1H, dd, *J* = 8.1, 6.9 Hz), 4.13 (1H, dt, *J* = 8.1, 6.8 Hz), 5.17 (1H, dd, *J* = 6.9, 3.8 Hz) which confirms the formation of novel isoxazolidine. And its miles feasible to attain the same product by means of microwave irradiation that is a simple and price green approach to produce new heterocycles.

There is substantial evidence to support the trans arrangement of the C- and N-aryl groups in nitrones produced from aromatic aldehydes. This works on the basic assumption of comparing the UV spectra of objects with fixed cis and trans geometry. The isoxazolidine ring is confirmed by UV absorption at 289 nm. The synthesis of the isoxazolidine ring system is indicated by the disappearance of the C=C (olefine) band at 1591.95 cm^{-1} and the C=N (nitrone) band at 1490.7 cm^{-1} in the FT-IR spectrum.

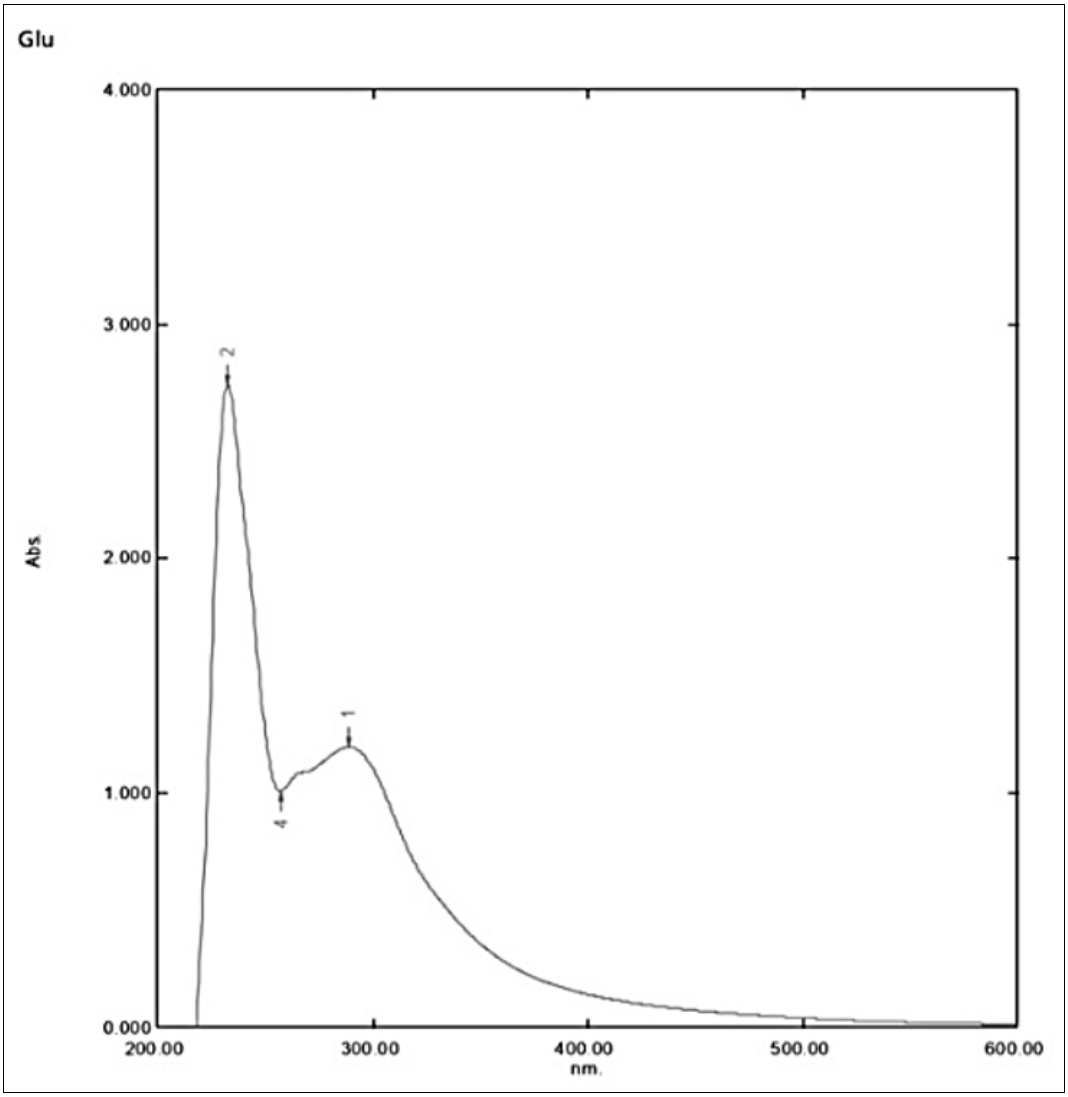


Fig 1: UV-Visible spectra of the synthesized novel isoxazolidine 3

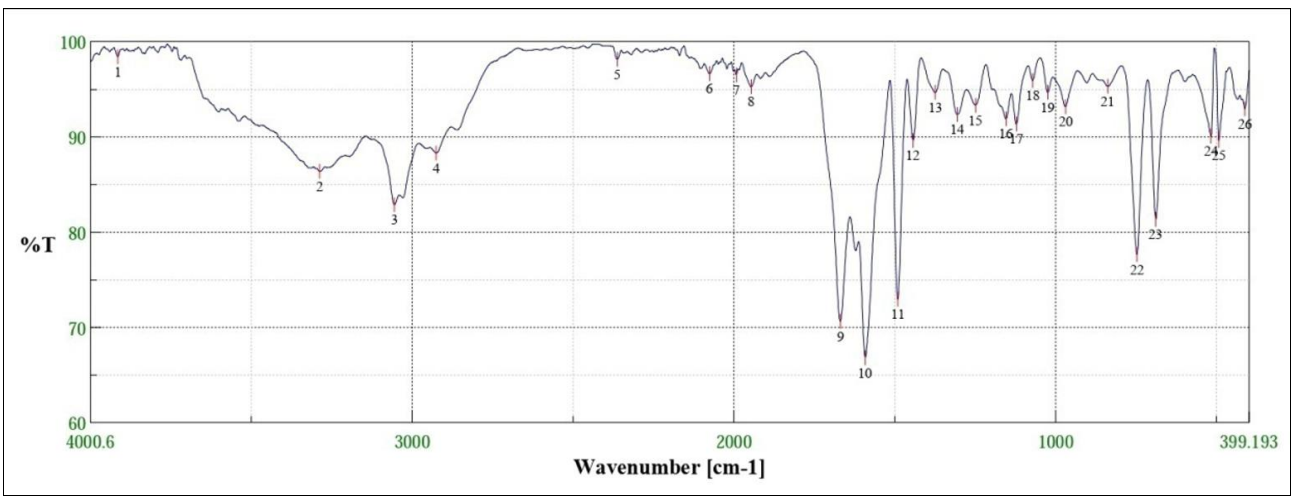


Fig 2: FT-IR spectra of the synthesized novel isoxazolidine 3

Table 1: Synthesis of novel isoxazolidines using different dipolarophiles 2

	R	Time(h)	Yield
a	H	20	90%
b	4-Cl	18	85%
c	2-NO_2	19	87%
d	2-OH	18	86%
e	α-CH_3	20	85%
f	α-OCH_3	17	86%
g	2-Br	16	85%
h	4-OH, 3-OCH_3	18	89%
i	4-NO_2	20	90%

Here, the synthesised α-Glutaraldehyde-N-aryl nitrone (**1**) reacts with the substituted cinnamaldehydes (2, 2a-2h) to provide several kinds of isoxazolidine systems (3, 3a-3h).

3 - (4 - oxobutyl)-2, 4 – diphenyl isoxazolidine – 5 - carbaldehyde (3a)

^{1}H NMR: δ 1.51-1.65 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.59 (td, *J* = 7.4, 6.8 Hz), 1.59 (td, *J* = 7.4, 6.8 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.82 (1H, dd, *J* = 8.1, 6.9 Hz), 4.13 (1H, dt, *J* = 8.1, 6.8 Hz), 5.17 (1H, dd, *J* = 6.9, 3.8 Hz), 6.95 (1H, tt, *J* = 8.1, 1.2 Hz), 7.02-7.41 (9H, 7.08 (dtd, *J* = 8.2, 1.2, 0.5 Hz), 7.19 (tt, *J* = 7.7, 1.6 Hz), 7.27 (tdd, *J* = 7.7, 1.9, 0.5 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz), 7.35 (dtd, *J* = 7.6, 1.5, 0.5 Hz)), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.71 (d, *J* = 3.8 Hz)).

^{13} C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 115.9 (2C, s), 127.6 (2C, s), 127.8-127.8 (2C, 127.8 (s), 127.8 (s)), 128.2 (2C, s), 128.4 (2C, s), 139.2 (1C, s), 148.0 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

4-(4-chlorophenyl)-3-(4-oxobutyl)-2-phenylisoxazolidine-5-carbaldehyde (3b)

^{1}H NMR: δ 1.51-1.65 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.59 (td, *J* = 7.4, 5.7 Hz), 1.59 (td, *J* = 7.4, 5.7 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.84 (1H, dd, *J* = 8.1, 6.9 Hz), 4.13 (1H, dt, *J* = 8.1, 5.7 Hz), 5.15 (1H, dd, *J* = 6.9, 3.8 Hz), 6.69 (2H, ddd, *J* = 8.2, 1.5, 0.5 Hz), 6.95 (1H, tt, *J* = 8.1, 1.2 Hz), 7.08 (2H, dtd, *J* = 8.2, 1.2, 0.5 Hz), 7.24-7.51 (4H, 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz), 7.45 (ddd, *J* = 8.2, 1.4, 0.5 Hz)), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.71 (d, *J* = 3.8 Hz)).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 115.9 (2C, s), 127.8 (1C, s), 128.0-128.3 (4C, 128.1 (s), 128.2 (s)), 128.7 (2C, s), 133.7 (1C, s), 139.2 (1C, s), 148.0 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

4-(2-nitrophenyl)-3-(4-oxobutyl)-2-phenylisoxazolidine-5-carbaldehyde (3c)

^{1}H NMR: δ 1.51-1.74 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.67 (td, *J* = 7.4, 5.6 Hz), 1.67 (td, *J* = 7.4, 5.6 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.89 (1H, dd, *J* = 8.1, 6.9 Hz), 4.05 (1H, dt, *J* = 8.1, 5.6 Hz), 5.11 (1H, dd, *J* = 6.9, 3.8 Hz), 6.95 (1H, tt, *J* = 8.1, 1.2 Hz), 7.02-7.44 (8H, 7.08 (dtd, *J* = 8.2, 1.2, 0.5 Hz), 7.20 (ddd, *J* = 8.2, 1.4, 0.5 Hz), 7.27 (ddd, *J* = 8.0, 1.5, 0.5 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz), 7.37 (ddd, *J* = 8.2, 7.4, 1.5 Hz), 7.37 (ddd, *J* = 8.0, 7.4, 1.4 Hz)), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.72 (d, *J* = 3.8 Hz)).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 114.8 (1C, s), 115.9 (2C, s), 124.1 (1C, s), 127.3 (1C, s), 127.8 (1C, s), 128.2 (2C, s), 128.4 (1C, s), 129.4 (1C, s), 148.0 (1C, s), 154.1 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

4-(2-hydroxyphenyl)-3-(4-oxobutyl)-2-phenylisoxazolidine-5-carbaldehyde (3d)

^{1}H NMR: δ 1.51-1.70 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.63 (td, *J* = 7.4, 5.7 Hz), 1.63 (td, *J* = 7.4, 5.7 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.80-4.07 (2H, 3.87 (dd, *J* = 8.1, 6.9 Hz), 4.00 (dt, *J* = 8.1, 5.7 Hz)), 5.13 (1H, dd, *J* = 6.9, 3.8 Hz), 6.59 (1H, ddd, *J* = 8.3, 1.2, 0.5 Hz), 6.84-7.01 (2H, 6.91 (ddd, *J* = 8.0, 7.5, 1.2 Hz), 6.95 (tt, *J* = 8.1, 1.2 Hz)), 7.02-7.39 (6H, 7.08 (dtd, *J* = 8.2, 1.2, 0.5 Hz), 7.16 (ddd, *J* = 8.0, 1.3, 0.5 Hz), 7.24 (ddd, *J* = 8.3, 7.5, 1.3 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz)), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.71 (d, *J* = 3.8 Hz)).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 115.9 (2C, s), 116.8 (1C, s), 124.1 (1C, s), 127.3 (1C, s), 127.8 (1C, s), 128.2 (2C, s), 128.4 (1C, s), 129.4 (1C, s), 148.0 (1C, s), 155.9 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

5-methyl-3-(4-oxobutyl)-2, 4-diphenyl isoxazolidine-5-carbaldehyde (3e)

^{1}H NMR: δ 1.46-1.75 (7H, 1.51 (s), 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.68 (td, *J* = 7.4, 5.6 Hz), 1.68 (td, *J* = 7.4, 5.6 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.78-3.94 (2H, 3.84 (d, *J* = 7.1 Hz), 3.88 (dt, *J* = 7.1, 5.6 Hz)), 6.99-7.14 (3H, 7.05 (tt, *J* = 8.1, 1.2 Hz), 7.08 (dtd, *J* = 8.2, 1.2, 0.5 Hz)), 7.15-7.42 (7H, 7.21 (tt, *J* = 7.7, 1.6 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz), 7.35 (dtd, *J* = 7.6, 1.5, 0.5 Hz), 7.36 (tdd, *J* = 7.7, 1.9, 0.5 Hz)), 9.60-9.76 (2H, 9.66 (t, *J* = 6.9 Hz), 9.71 (s)).

^{13}C NMR: δ 26.2 (1C, s), 27.6 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 79.7 (1C, s), 115.9 (2C, s), 127.6 (2C, s), 127.8-127.8 (2C, 127.8 (s), 127.8 (s)), 128.2 (2C, s), 128.4 (2C, s), 139.2 (1C, s), 148.0 (1C, s), 201.6 (1C, s), 202.2 (1C, s).

4-(2-methoxyphenyl)-3-(4-oxobutyl)-2-phenylisoxazolidine-5-carbaldehyde (3f)

^{1}H NMR: δ 1.51-1.71 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.64 (td, *J* = 7.4, 5.6 Hz), 1.64 (td, *J* = 7.4, 5.6 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.75-4.10 (5H, 3.80 (s), 3.90 (dd, *J* = 8.1, 6.9 Hz), 4.03 (dt, *J* = 8.1, 5.6 Hz)), 5.11 (1H, dd, *J* = 6.9, 3.8 Hz), 6.84-7.14 (5H, 6.91 (ddd, *J* = 8.0, 7.5, 1.2 Hz), 6.95 (tt, *J* = 8.1, 1.2 Hz), 7.02 (ddd, *J* = 8.3, 1.2, 0.5 Hz), 7.08 (dtd, *J* = 8.2, 1.2, 0.5 Hz)), 7.14-7.39 (4H, 7.21 (ddd, *J* = 8.0, 1.3, 0.5 Hz), 7.23 (ddd, *J* = 8.3, 7.5, 1.3 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz)), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.72 (d, *J* = 3.8 Hz)).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 56.0 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 115.8 (1C, s), 115.9 (2C, s), 124.1 (1C, s), 127.3 (1C, s), 127.8 (1C, s), 128.2 (2C, s), 128.4 (1C, s), 129.4 (1C, s), 148.0 (1C, s), 157.0 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

5-bromo-3-(4-oxobutyl)-2, 4-diphenyl isoxazolidine-5-carbaldehyde (3g)

^{1}H NMR: δ 1.52-1.67 (4H, 1.58 (quint, *J* = 7.5 Hz), 1.58 (quint, *J* = 7.5 Hz), 1.60 (td, *J* = 7.4, 5.5 Hz), 1.60 (td, *J* = 7.4, 5.5 Hz)), 2.47-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.87-4.11 (2H, 3.93 (dt, *J* = 7.1, 5.5 Hz), 4.05 (d, *J* = 7.1 Hz)), 6.99-7.14 (3H, 7.05 (tt, *J* = 8.1, 1.2 Hz), 7.08 (dtd, *J* = 8.2, 1.2, 0.5 Hz)), 7.18-7.45 (7H, 7.24 (tt, *J* = 7.7, 1.8 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz), 7.32 (tdd, *J* = 7.7, 1.9, 0.5 Hz), 7.38 (dddd, *J* = 7.6, 1.8, 1.6, 0.5 Hz)), 9.66 (1H, t, *J* = 6.9 Hz), 9.97 (1H, s).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 89.2 (1C, s), 115.9 (2C, s), 127.6 (2C, s), 127.8-127.8 (2C, 127.8 (s), 127.8 (s)), 128.2 (2C, s), 128.4 (2C, s), 139.2 (1C, s), 148.0 (1C, s), 190.9 (1C, s), 201.6 (1C, s).

4-(4-hydroxy-3-(methylperoxy) phenyl)-3-(4-oxobutyl)-2-phenylisoxazolidine-5-carbaldehyde (3h)

^{1}H NMR: δ 1.51-1.65 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.59 (td, *J* = 7.4, 5.7 Hz), 1.59 (td, *J* = 7.4, 5.7 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.68-3.96 (5H, 3.73 (s), 3.77 (dd, *J* = 8.1, 6.9 Hz), 3.90 (dt, *J* = 8.1, 5.7 Hz)), 5.10 (1H, dd, *J* = 6.9, 3.8 Hz), 6.70-7.02 (4H, 6.76 (dd, *J* = 8.4, 0.5 Hz), 6.88 (dd, *J* = 8.4, 2.7 Hz), 6.95 (tt, *J* = 8.1, 1.2 Hz), 6.96 (dd, *J* = 2.7, 0.5 Hz)), 7.08 (2H, dtd, *J* = 8.2, 1.2, 0.5 Hz), 7.32 (2H, dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.71 (d, *J* = 3.8 Hz)).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 55.7 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 110.6 (1C, s), 115.8 (1C, s), 115.9 (2C, s), 127.8 (1C, s), 128.2 (2C, s), 128.7 (1C, s), 139.2 (1C, s), 146.1 (1C, s), 148.0 (1C, s), 153.2 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

4-(4-nitrophenyl)-3-(4-oxobutyl)-2-phenylisoxazolidine-5-carbaldehyde (3i)

^{1}H NMR: δ 1.51-1.65 (4H, 1.57 (quint, *J* = 7.5 Hz), 1.57 (quint, *J* = 7.5 Hz), 1.59 (td, *J* = 7.4, 5.7 Hz), 1.59 (td, *J* = 7.4, 5.7 Hz)), 2.46-2.60 (2H, 2.53 (td, *J* = 7.5, 6.9 Hz), 2.53 (td, *J* = 7.5, 6.9 Hz)), 3.75 (1H, dd, *J* = 8.1, 6.9 Hz), 3.95 (1H, dt, *J* = 8.1, 5.7 Hz), 5.11 (1H, dd, *J* = 6.9, 3.8 Hz), 6.95 (1H, tt, *J* = 8.1, 1.2 Hz), 7.08 (2H, dtd, *J* = 8.2, 1.2, 0.5 Hz), 7.14-7.39 (6H, 7.21 (ddd, *J* = 8.2, 1.3, 0.5 Hz), 7.26 (ddd, *J* = 8.2, 1.3, 0.5 Hz), 7.32 (dddd, *J* = 8.2, 8.1, 1.4, 0.5 Hz)), 9.60-9.77 (2H, 9.66 (t, *J* = 6.9 Hz), 9.71 (d, *J* = 3.8 Hz)).

^{13}C NMR: δ 26.2 (1C, s), 29.3 (1C, s), 40.7 (1C, s), 43.4 (1C, s), 58.2 (1C, s), 73.9 (1C, s), 114.8 (2C, s), 115.9 (2C, s), 127.8 (1C, s), 128.2 (2C, s), 128.7 (2C, s), 139.2 (1C, s), 148.0 (1C, s), 164.6 (1C, s), 201.5-201.7 (2C, 201.6 (s), 201.6 (s)).

Antibacterial activity

In this study, antibacterial activity is examined using the disc diffusion technique. The method involves covering a yard of bacteria grown on the outer layer of an agar medium with circles of paper soaked in an antimicrobial solution. The plate is then temporarily hatched, and the presence or absence of an inhibitory zone around the circles is noted. Isoxazolidines have been shown to have antibacterial activity [27, 28]. This led to the performance of an antibacterial susceptibility test using *Bacillus Marisflavi*, *Pseudomonas aeruginosa*, and *Exiguobacterium indicum* using synthesized isoxazolidine 3 in the inhibitory zone diameter at a concentration of 20 mg/ml of DMSO. Two different microbes cannot grow when compound 3 is present. It destroys *Bacillus Marisflavi* and *Pseudomonas aeruginosa*. (Table 2, Figure 3).

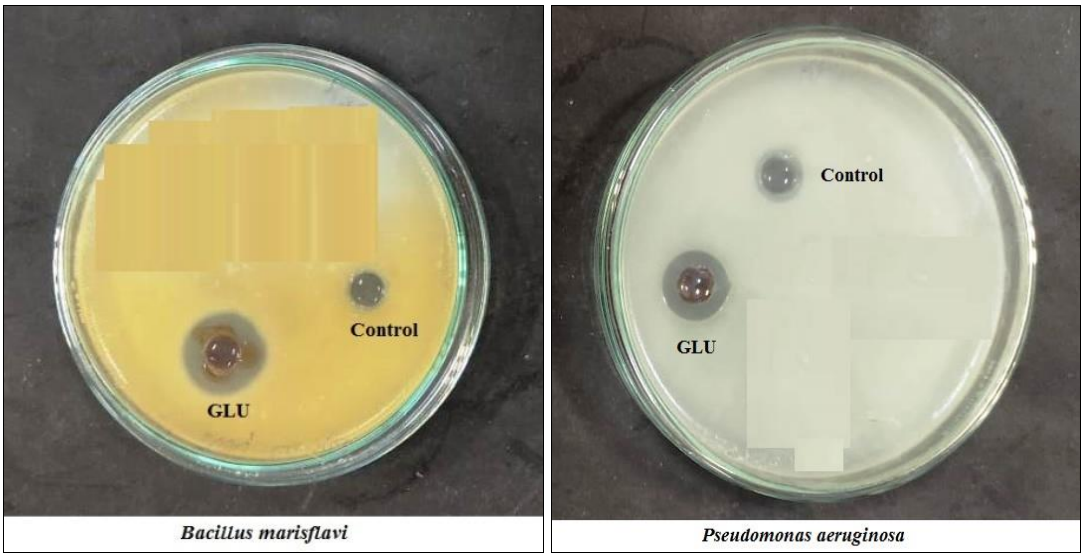


Fig 3: Depicts the antibacterial activity against *Bacillus Marisflavi* and *Pseudomonas aeruginosa*

Table 2: Concentration 20mg/ml of DMSO

Organisms	Compound 3
Bacillus Marisflavi	13 mm
Pseudomonas aeruginosa	14 mm
Exiguobacterium indicum	-

Conclusion

Using α-Glutaraldehyde-N-aryl-nitrone and various substituted Cinnamaldehyde as dipolarophiles are refluxed in conventional and with microwave irradiation methods. The new isoxazolidines are synthesized with good yield. And it has been characterized with the help of UV, FT-IR, [1] H and [13] C NMR techniques. All of the above-mentioned heterocyclic compounds have, therefore, been effectively and efficiently synthesized.

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