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AN EFFICIENT CLAY CATALYZED CYCLIZATION OF SUBSTITUTED PROPENAMIDE TO ISOXAZOLINE

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ABSTRACT*:* A series of newly substituted isoxazoline derivatives (3a-g) have been synthesized by conventional as well as microwave assisted technology by the reaction of acetanilide, aromatic aldehydes (1a-g) and hydroxylamine hydrochloride in two steps by using K10 Montmorillonite clay as a catalyst. It was found that some compounds show the better yield with K-10 Montmorillonite catalyst under microwave irradiation than conventional synthesis. The newly synthesized products were characterized by IR, ^{1}HNMR and ^{13}CNMR.

KEYWORDS: Isoxazoline**,** Microwave assisted technology, K10 Montmorillonite, clay catalyst

INTRODUCTION:

Compounds incorporating heterocyclic ring systems continue to attract considerable interest due to the wide range of biological activities they posses. Amongst them five member heterocyclic compounds occupy a unique place in the realm of natural and synthetic organic chemistry. Nitrogen and oxygen containing heterocyclic compounds have received considerable attention due to their wide range of pharmacological activity.

Five member heterocycles like isoxazoline have found wide application as pharmaceutical and agrochemical agents. Isoxazoline derivatives have played a crucial role in the theoretical development of heterocyclic chemistry and are also used extensively in organic synthesis.

B. Jayashankara et al [1] have synthesized a series of ether-linked bis (isoxazoline) derivatives by 1, 3-dipolar cycloaddition reactions of nitrile oxides with allyl alcohol and allyl ethers and also reported their antimicrobial activity. Amber L. Norman et al [2] have synthesized 3, 5-disubstituted isoxazolines and also reported the enantioselectivity in the synthesis of 3, 5-disubstituted isoxazolines. V.A. Kadnor et al [3] have synthesized some fluorinated isoxazoline derivatives and also reported their antibacterial activity. Rajeev Bhimwal et al [4] have synthesized some novel isoxazoline derivatives and also reported in-vitro antimicrobial activity of synthesized compounds.

P.M. Gurubasavaraja Swamy et al [5] have synthesized certain substituted chalcones and isoxazolines bearing hydroxy benzofuran and also reported their antimicrobial screening. Prabodh Chander Sharma et al [6] have synthesized some new isoxazoline derivatives as possible anti candida agents. Tejaskumar Shah et al [7] have synthesized the novel isoxazoline derivatives

and also screened the compounds for their in vitro antibacterial activity using gram-positive bacteria and gram-negative bacteria.
L. Stibranyi et al [8] have synthesized the isoxazolines fused with naphthalene ring and also studied their photochemistry. Mohamed Gaber Morei et al [9] have synthesized 5-hydroxy -2-isoxazolines and also reported their conversion into corresponding isoxazoles. M. S. Khazaal et al [10] have reported the synthesis of novel Schiff bases containing isoxazoline unit.
Satish Babulal Jadhav et al [11] have synthesized some novel isoxazoline derivative
and also reported their antimicrobial activity. Kim Goldenstein et al [12] have reported enantioselective preparation and enzymatic cleavage of spiroisoxazoline amides. Pawar Sudhir et al [13] have reported the synthesis and biological evaluation of Mannich bases of isoxazoline derivatives as novel antimicrobial agents.
Vandana Sharma et al[14] have synthesized some 3, 5-diarylisoxazoline derivatives by reaction of substituted chalcones with hydroxylamine hydrochloride and also reported their biological activity. Hae Suk Youn et al[15] have reported the synthesis and biological evaluation of isoxazoline and isoxazole derivatives as 5-HT2A and 5-HT2C receptor ligands. Kiran V. Mehta et al[16] have reported the synthesis of some isoxazoline azo compounds and their colourant performance and fastness evaluation on synthetic fabric.
Kapubalu Suneel Kumar et al[17] have synthesized some novel isoxazoles via chalcone intermediates.
Karabasanagouda T. et al[18]have synthesized some new isoxazoles carrying 4-methylthiophenyl moiety and also reported that they are potential analgesic and anti-infammatory agents.

The synthesis of novel isoxazoline derivatives remain a main focus of medicinal research. Isoxazoline derivatives have been reported to possess antifungal, antibacterial, anticonvulsant, anti-inflammatory, antiviral, analgesic, antitumor, chemotherapy activity. Penicillin derivatives containing isoxazole ring were found to be antibacterial agent .In accordance with the significance of the application of these compounds, a mild and efficient route to the synthesis of isoxazoline derivatives in presence of clay catalyst i.e.K-10 Montmorillonite is reported herein.
In the present work, propenamides (2a-g) were synthesized by the reaction of acetanilide with substituted aldehydes (1a-e) in the presence of aqueous solution of sodium hydroxide and ethanol by using K-10 montmorillonite as a catalyst by conventional as well as microwave irradiation technique. The synthesized chalcones were treated with hydroxylamine hydrochloride in presence of sodium hydroxide with K-10 montmorillonite as a clay catalyst to obtain isoxazolines derivatives (3a-g) by conventional as well as microwave irradiation technique.

MATERIALS AND METHODS:

General procedure for the synthesis of N-phenyl-3-(substituted phenyl) propenamides:

N-phenyl-3-(substituted phenyl) propenamides (3a-e) were synthesized by reacting a mixture of acetanilide (0.05 mol), benzaldehyde (0.05 mol), aqueous NaOH (10%, 5 mL),K-10 Montmorillonite(2g) and methanol (50 mL). The reaction mixture was stirred for 10 h at room temperature using magnetic stirrer. Then, it was refluxed for further 6 h on a water bath. After completion of the reaction (monitored by TLC) an excess of solvent was removed by distillation and the resultant viscous mass was poured into ice water (100 mL) with vigorous stirring and left overnight for complete precipitation. The resultant solid product was filtered, washed with cold water, dried and recrystallized from ethanol. The catalyst K-10 montmorillonite was removed by simple filtration.

General procedure for synthesis of 3-phenylamino-5-(substituted phenyl) isoxazolines:
3-Phenylamino-5-(substituted phenyl) isoxazolines (3a-e) were synthesized by reacting a mixture of purified N-phenyl-3-(substituted phenyl) propenamides (0.01 mol) (2a-e), hydroxylamine hydrochloride (0.01 mol), K-10 Montmorillonite and a solution of NaOH (10 %) in dry ethanol (50 mL) by refluxing for 6 h on a water bath. After completion of the reaction, an excess of the solvent was removed by distillation and the resultant mass was poured into ice water (100 mL) with vigorous stirring. It was kept in cool overnight. The resultant solid product was filtered, washed with sufficient cold water, dried and purified by recrystallization from acetone. The catalyst was removed simply by filtration.

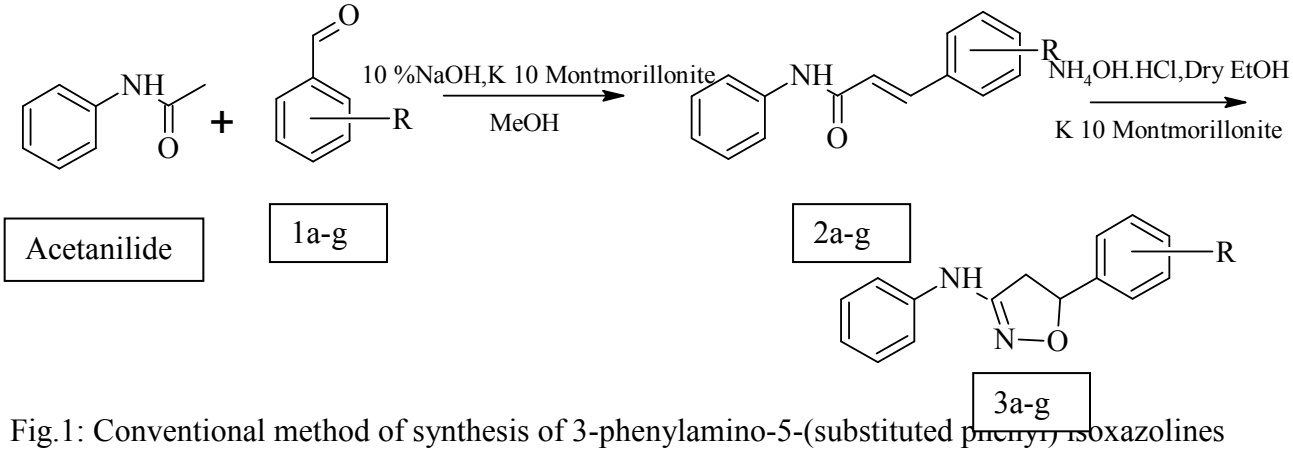


Fig.1: Conventional method of synthesis of 3-phenylamino-5-(substituted phenyl) isoxazolines

Microwave assisted synthesis of N-phenyl-3-(substituted phenyl) propenamides:
N-phenyl-3-(substituted phenyl) propenamides (3a-e) was synthesized by reacting a mixture of acetanilide (0.05 mol), aromatic aldehyde (0.05 mol), aqueous NaOH (10%, 1mL), K-10 Montmorillonite and methanol (10mL). The reaction mixture was then subjected to microwave irradiation for 56 to 170 seconds. After completion of the reaction (monitored by TLC) the resultant viscous mass was poured into ice water (10 mL) with vigorous stirring and left overnight for complete precipitation. The resultant solid product was filtered, washed with cold water, dried and recrystallized from ethanol.

Microwave assisted synthesis of 3-phenylamino-5-(substituted phenyl) isoxazolines:
3-Phenylamino-5-(substituted phenyl) isoxazolines (3a-e) were synthesized by reacting a mixture of purified N-phenyl-3-(substituted phenyl) propenamides (2a-e) (0.01 mol),hydroxylamine hydrochloride (0.01 mol), K-10 Montmorillonite and a solution of NaOH (10%) in dry ethanol (10 mL) by using microwave irradiation for a period of 70 to 240 seconds. After completion of the reaction the resultant mass was poured into ice water (10 mL) with vigorous stirring. It was kept in cool overnight. The resultant solid product was filtered, washed with sufficient cold water, dried and purified by recrystallization from acetone.

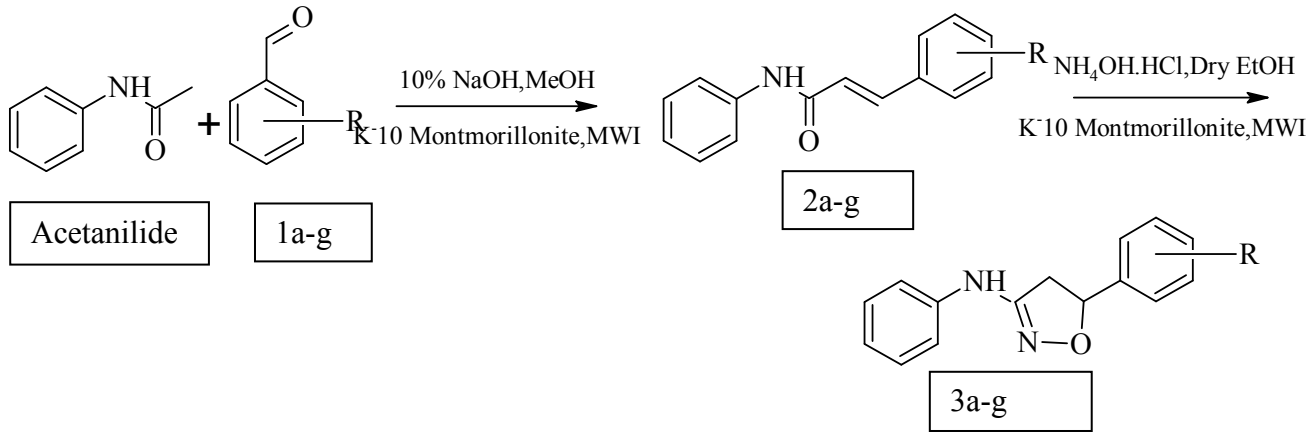


Fig.2: Microwave assisted method of synthesis of 3-phenylamino-5-(substituted phenyl) isoxazolines

RESULTS AND DISCUSSIONS:

The purity of the synthesized compounds was ascertain by thin layer chromatography on silica gel G by using petroleum ether and ethyl acetate as a developing solvent and molecular iodine as a locating agent.All the melting points were recorded using melting point apparatus .IR spectra were recorded on bruker alpha IR Spectrometer expressed in cm^{-1} . ^{1}H NMR and ^{13}CNMR spectra of the representative compound were recorded in $CDCl_3$ on NMR instrument (Bruker DRX 300) at CDRI Lucknow at 300.13 MHz using TMS as internal standard.

Characterization of compounds synthesized by conventional method:

***N*-phenyl-3-(pyridin-4-yl)prop-2-enamide(2a)**:

Yield:39.01%;M.Pt.153^{0}C;IR (cm^{-1}):3291(N-H Stretch);1662(C=O stretch);1595(C=C stretch of aromatic ring);1497-1434(v; =C-H and ring C=C stretching vibration);1365-1256(s-m; C-N stretching vibrations, C_{Ar}-N); 1101(m; C-H sym. deformation vibration);960(w; C-H deformation vibration); ^{1}HNMR(300.13 MHz,$CDCl_3$,δ/ ppm):0.34 (s,2H);7.96(s,1H,NH); 0.91(d,1H);16.50(d,1H);17.15(t,2H);8.18(d,1H);0.97(d,1H);1.00(s,1H);^{13}CNMR(300.13MHz,C DCl_3,δ/ppm):169.35(C=O);164.65(C=N);138(Ph-C);131(Ph-C); 129.26(Ph-C);128(2C,Ph-C);125(2C,Ph-C);120(CH);119(CH);77-76(2CH Ar);24.04(C-N)

3-(2-chloro-6-fluorophenyl)-*N*-phenylprop-2-enamide(2b):

Yield:56.90%;M.Pt:126^0 C;IR(cm^{-1}):3286(N-H stretch);1660(C=O stretch);1589(C=N stretch);1535(aromatic C=C stretch);1434(aromatic C-H def);1364-1317(-m; C-N stretching vibrations, C_{Ar}-N);1177-1009 (m; C-H sym. deformation vibration);960(aromatic C-H def.); 748(s-m; N-C=O bending vibration);786(C-F stretch);698(C-Cl stretch)

3-(2-hydroxyphenyl)-*N*-phenylprop-2-enamide(2c):

Yield:35.00%;M.Pt.129^{0}C; IR(cm^{-1}):2800-3300(m ,w N-H and O-H stretching Vibration); 1661(C=O);1593(Ar-CH stretching vibration); 1534(-C=C stretch);1480-1430(v; =C-H and ring C=C stretching vibration);1360-1315 (s-m; C-N stretching vibrations, C_{Ar}-N);746-689(m; broad, out-of-plane N-H deformation vibration); 604 (s-m; N-C=O bending vibration)

3-(4-chlorophenyl)-*N*-phenylprop-2-enamide(2d):

Yield:53.49%;M.Pt.98^{0}C;IR(cm^{-1}):3100-3450(N-H stretching vibration);1663(-C=O stretch of amide);1593(C=CPstretch of aromatic ring);1535(m; N-H bending vibrations);1431(v; =C-H and ring C=C stretching vibration);1236(m; C-N stretching vibrations, C_R-N);1010 -906 (aromatic C-H def.);748-689 (C-Cl stretch)

3-(4-methoxyphenyl)-*N*-phenylprop-2-enamide(2e):
Yield:34.37%;M.Pt 87^0C ;IR(cm^{-1}):3100-3200(m ,w N-H stretching Vibration);1664(C=O stretch);1594(Ar-CH stretch);1536(C=C stretch);1426(v; =C-H and ring C=C stretching vibration);1332-1313(s-m; C-N stretching vibrations); 1266-1158(C-O stretch);830-746(m; broad, out-of-plane N-H deformation vibration); 788-603(s-m; N-C=O bending vibration)
3-(furan-2-yl)-*N*-phenylprop-2-enamide(2f):
Yield:55.28%;M.pt.145^0C;IR(cm^{-1}):2800-3287(m ,w N-H stretching Vibration); 1660 (C=O);1593(Ar-CH); 1536(C=C);1486-1430 (v; =C-H and ring C=C str.vib.);1362-1316(s-m; C-N stretching vibrations, C_{Ar}-N);1257(m; broad, out-of-plane N-H deformation vibration); 748 -690(s-m; N-C=O bending vibration)
2, 4-*N*, 5-diphenylpenta-2, 4-dienamide (2g):
Yield:69.25%;M.Pt:137^0C;IR(cm^{-1}):2800-3287(m ,w N-H stretching Vibration); 1663 (C=O);1595(Ar-CH); 1538(C=C);1496-1437 (v; =C-H and ring C=C str.vib.);1362-1316(s-m; C-N stretching vibrations, C_{Ar}-N);1215(m; broad, out-of-plane N-H deformation vibration); 748 -690(s-m; N-C=O bending vibration)
***N*-methylaniline-4-(4, 5-dihydro-1, 2-oxazol-5-yl) pyridine (3a)**:
Yield: 40.17% ;M.Pt.140^0C;IR(Cm^{-1}):3612(N-H);1595(aromatic C=C stretch);1492(aromatic C-H def);1300(-C-O-N stretch);1032(m; broad, out-of-plane N-H deformation vibration) ;^{1}HNMR(300.13MHz,$CDCl_3$,δ/ppm):0.33(s,1H);0.66 (d,2H); 0.77(d,2H); 0.36(d,2H); 1.00(s,2H)
***N*-methylaniline-5-(2-chloro-6-fluorophenyl)-4,5-dihydro-1,2oxazole(3b):**
Yield:58.75%;M.Pt.137^0C ;IR(cm^{-1}):3290(-N-H);2839(C-H stretch);1595(aromatic C=C stretching vibration);1493(C-O-N stretch in ring);1032(aromatic C-H def);872-819 (s; general range for C-F deformation vibration); 693(s; C-Cl stretching vibration (general range);617(m; broad, out-of-plane N-H deformation vibration)
2-(4,5-dihydro-1,2-oxazol-5-yl)phenol - *N*-methylaniline (3c):
Yield:45%; M.Pt. 139^0 C ;IR(cm^{-1}): 3300(-N-H and–O-H merged);1593(aromatic -C=C stretch);1430-1310(-C-O-N stretch); 691 (s; O-H out-of-plane bending,)
***N*-methylaniline - 5-[2-(4-chlorophenyl)ethenyl]-4,5-dihydro-1,2-oxazole(3d):**
Yield:48.09%;M.Pt.102^0C **;**IR(cm^{-1}):3100-3450(-N-H stretch);1580 (C=N stretching vibration in ring); 1511(aromatic C=C stretching vibration); 1228 (C-O-N stretch in ring); 1019 (aromatic C-H def.);799 (C- Cl stretching vibration)
***N*-methylaniline - 5-(4-methoxyphenyl)-4,5-dihydro-1,2-oxazole (3e):**
Yield: 86.26%;M.Pt.96^0 C ;IR(cm^{-1}) :3291(-N-H stretch);1666 (C=N str. in ring); 1593-1511 (aromatic C=C str.);1427 (aromatic C-H def); 1336-1313(C-O-N str. in ring); 1250 (C- Cl str.);1157(s; C-O stretching vibration);1022-959(s; sym. C-O stretching vibration); 690-597(m; C-H out-of-plane deformation vibration)
***N*-methylaniline5-(furan-2-yl)-4,5-dihydro-1,2-oxazole(3f):**
Yield:77.32%;M.Pt.137^0C ;IR(cm^{-1}):3200-3400(N-H stretch);1661(C=N str. in ring); 1596-1556(s-m; C=C stretching vibration in furan ring);1433(aromatic C=C str.);1354-1319(C-O-N str. in ring);1210 (aromatic C-H def.);750-693 (m; C-H out-of-plane deformation vibration)
***N*-methylaniline - 5-[(*E*)-2-phenylethenyl]-4,5-dihydro-1,2-oxazole (3g):**
Yield:48.35%;M.Pt:140^0C ; IR(cm^{-1}):3200-3400(N-H stretch);1664(C=N str. in ring); 1596-1537(s-m; C=C stretching vibration in furan ring);1497-1427(aromatic C=C str.);1315 (C-O-N str. in ring);1258 (aromatic C-H def.);750-693 (m; C-H out-of-plane deformation vibration)

Characterization of compounds synthesized by Microwave assisted method:

N-phenyl-3-(pyridin-4-yl)prop-2-enamide(2a) :

Yield:41.09%;M.Pt.153^{0}C;IR(cm^{-1}):2800-3300(m ,w N-H stretching Vibration); 1661 (C=O stretch);1593 (Ar-CH stretching vibration), 1534(C=C);1480-1430(v; =C-H and ring C=C str.vib);1360-1315(s-m; C-N stretching vibrations, C_{Ar}-N);746-689(m; broad, out-of-plane N-H deformation vibration); 604 (s-m; N-C=O bending vibration)

3-(2-chloro-6-fluorophenyl)-*N*-phenylprop-2-enamide(2b);

Yield:60.79%;M.Pt.138^{0}C ; IR(cm^{-1}):2800-3287(m ,w N-H); 1660 (C=O);1593(Ar-CH); 1536(C=C);1486-1430 (v; =C-H and ring C=C str.vib.);1362-1316(s-m; C-N stretching vibrations, C_{Ar}-N); 1257(m; broad, out-of-plane N-H deformation vibration); 748 -690(s-m; N-C=O bending vibration)

3-(2-hydroxyphenyl)-N-phenylprop-2-enamide(2c):

Yield: 50.5% ;M.Pt. 129^{0}C ; IR(cm^{-1}):3289 (m ,w N-H and O-H stretching Vibration);1661 (C=O);1593(Ar-CH);1534 (C=C);1480-1430(v; =C-H and ring C=C str.vib);1360-1315(s-m; C-N stretching vibrations, C_{Ar}-N);746-689(m; broad, out-of-plane N-H deformation vibration); 604(s-m; N-C=O bending vibration)

3-(4-chlorophenyl)-N-phenylprop-2-enamide(2d):

Yield:56.23%;M.Pt.98^{0}C; IR(cm^{-1}):3291(m ,w N-H stretching Vibration); 3057(C-H stretch); 1700(C=O stretch);1593 (Ar-CH); 1534 (C=C stretch);1480-1430 (v; =C-H and ring C=C stretching vibration);1360-1315 (s-m; C-N stretching vibrations, C_{Ar}-N);746-689(m; broad, out-of-plane N-H deformation vibration); 604 (s-m; N-C=O bending vibration)

3-(4-methoxyphenyl)-N-phenylprop-2-enamide(2e):

Yield:58.17%;M.Pt.87^{0}C;IR(cm^{-1}):3289(m ,w N-H stretching Vibration); 1662 (C=O) ;1595 (Ar-CH); 1534(C=C);1482-1428(v; C-H and ring C=C str.vib);1363-1315(s-m; C-N stretching vibrations, C_{Ar}-N); 1159-1110(s-m; C-O stretching vibration); 746-689(m; broad, out-of-plane N-H deformation vibration); 604 (s-m; N-C=O bending vibration)**;**1190(C-O stretching vibration)

3-(furan-2-yl)-N-phenylprop-2-enamide(2f):

Yield:49.02%;M.Pt.145^{0}C;IR(cm^{-1}):2800-3300(m ,w N-H stretching Vibration); 1661(C=O) ;1593(Ar-CH); 1534(C=C);1480-1430(v; =C-H and ring C=C str.vib);1360-1315(s-m; C-N stretching vibrations, C_{Ar}-N);746-689(m; broad, out-of-plane N-H deformation vibration); 604 (s-m; N-C=O bending vibration)

2,4-*N*,5-diphenylpenta-2,4-dienamide(2g):

Yield:72%;M.Pt:137^{0}C;IR(cm^{-1}):3000-3287(m ,w N-H stretching Vibration); 1663 (C=O);1595(Ar-CH); 1538(C=C);1496-1437 (v; =C-H and ring C=C str.vib.);1362-1316(s-m; C-N stretching vibrations, C_{Ar}-N); 1215(m; broad, out-of-plane N-H deformation vibration); 748 -690(s-m; N-C=O bending vibration)

N-methylaniline - 4-(4,5-dihydro-1,2-oxazol-5-yl)pyridine (3a);

Yield: 45.37%; M.Pt.1340C; IR (Cm^{-1}):3612(N-H); 1595(aromatic C=C stretch); 1492(aromatic C-H def); 1300(-C-O-N stretch); 1032(m; broad, out-of-plane N-H deformation vibration); 617(m; broad, out-of-plane N-H deformation vibration);

***N*-methylaniline - 5-(2-chloro-6-fluorophenyl)-4,5-dihydro-1,2-oxazole(3b);**

Yield:76.00%;M.Pt.134^{0}C; IR(cm^{-1}):3612(-N-H);1595(aromatic C=C str);1493(C-O-N str. in ring);1032(aromatic C-H def);872-819 (s; general range for C-F deformation vibration): 693(s; C-Cl stretching vibration (general range);617(m; broad, out-of-plane N-H deformation vibration)

2-(4,5-dihydro-1,2-oxazol-5-yl)phenol - N-methylaniline (3c);
Yield: 37.15%:M.pt.139^{0}C; IR (cm^{-1}):3290(-N-H stretching Vibration); 2839(C-H stretch); 1595(aromatic C=C stretch); 1493(C-O-N str. in ring); 1032(aromatic C-H def); 617(m; broad, out-of-plane N-H deformation vibration)

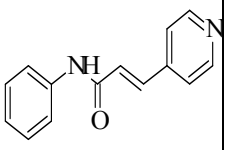
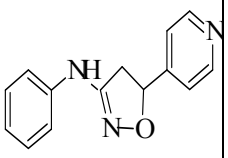
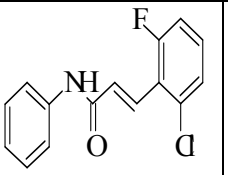
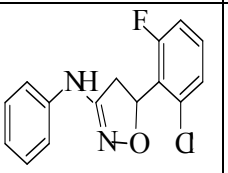
N-methylaniline - 5-[2-(4-chlorophenyl)ethenyl]-4,5-dihydro-1,2-oxazole (3d)
Yield:50.79%:M.Pt.102^{0}C; IR(cm^{-1}); 3250(N-H);1593(aromatic C=N stretch);1430 (aromatic C=C str.);1316(-C-O-N stretch); 691 (s; O-H out-of-plane bending, often broad)

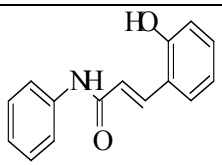
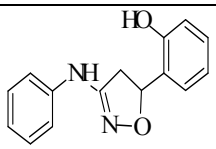
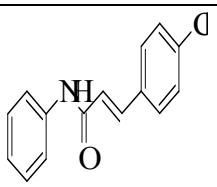
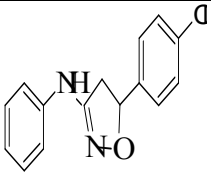
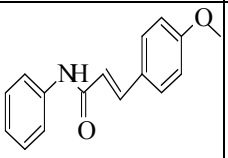
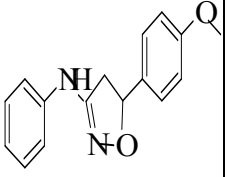
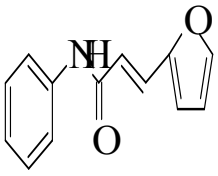
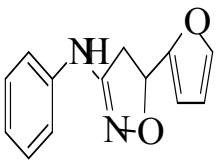
N-methylaniline - 5-(4-methoxyphenyl)-4,5-dihydro-1,2-oxazole (3e);
Yield:78.01%:M.Pt.96^{0}C ;IR(cm^{-1}):3200(N-H stretch);1593 (C=N str. in ring);1430 (aromatic C=C str.),1313(C-O-N str. in ring); 1019(aromatic C-H def.)

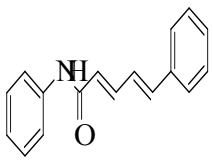
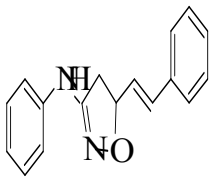
N-methylaniline - 5-(furan-2-yl)-4,5-dihydro-1,2-oxazole(3f);
Yield: 67.09%:M.pt.136^{0}C; IR (cm^{-1}): 3300(N-H stretching Vibration); 1594(C=N str. in ring); 1553 (aromatic C=C str.); 1319 (C-O-N str. in ring); 1012 (aromatic C-H def.)

***N*-methylaniline - 5-[2-phenylethenyl]-4, 5-dihydro-1, 2-oxazole (3g):**
Yield:60%;M.pt:139^{0}C ; IR(cm^{-1}):3200-3400(N-H stretch);1664(C=N str. in ring); 1596-1537(s-m; C=C stretching vibration in ring);1497-1427(aromatic C=C str.);1315- (C-O-N str. in ring);1258 (aromatic C-H def.);750-693 (m; C-H out-of-plane deformation vibration)

Table 1:Physical Characterisation of synthesized compounds

Sr. No.	Compound	Molecular formula	Structure	Molecular weight	%Yield		Time		Rf
					Conventional	Microwave	Conventional	Microwave	
1.	2a	$C_{14}H_{12}N_2O$		224.257	39.01%	41.09%	4.5hrs	95 sec	0.49
2.	3a	$C_{15}H_{17}N_3O$		255.314	40.17%	45.37%	3.5hrs	95sec	0.53
3.	2b	$C_{15}H_{11}NOFCl$		275.705	56.90%	65.00%	3.5hrs	170sec	0.79
4.	3b	$C_{15}H_{11}N_2OClF$		306.762	48.75%	76.90%	3.5 hrs	240sec	0.76

5.	2c	$C_{15}H_{13}NO_2$		239.26922	35.00%	50.50%	6 hrs	90sec	0.56
6.	3c	$C_{15}H_{14}N_2O_2$		270.32832	45.00%	37.50%	4.5 hrs	80sec	0.76
7.	2d	$C_{15}H_{12}ClNO$		257.714	53.49%	56.23%	3.5hrs	75sec	0.34
8.	3d	$C_{15}H_{13}ClN_2O$		314.809	48.09%	50.35%	3.45hrs	70sec	0.53
9.	2e	$C_{15}H_{16}NO_2$		253.3958	34.37%	58.14%	6hrs	85sec	0.63
10.	3e	$C_{17}H_{20}N_2O_2$		284.3529	86.26%	78.01%	2.5hrs	90sec	0.56
11.	2f	$C_{13}H_{11}NO_2$		213.231	55.28%	49.02%	3.45hrs	56 sec	0.37
12	3f	$C_{14}H_{16}N_2O_2$		244.289	77.32%	67.09%	3.5hrs	80sec	0.52

13	2g	$C_{17}H_{15}NO$		249.307	69.25%	72.00%	3.5hrs	170 sec	0.76
14.	3g	$C_{17}H_{15}N_2O$		280.64	48.35%	60.00%	4 hrs	180 sec	0.75

CONCLUSION:

We have efficiently synthesized a biologically interesting new series of substituted propenamides (2a-e) and their corresponding isoxazolines (3a-e) starting from readily available acetanilide and hydroxylamine. It was found that the compounds 2a,2b,3b,2c,2e,3e,2g,3g shows the better yield with K-10 Montmorillonite catalyst under microwave irradiation rather than conventional synthesis. These newly synthesized propenamides and isoxazolines may trigger a new area of research to unravel their biological properties and lead to the discovery of better antimicrobial agents.

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