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Efficient solvent-free microwave assisted organic synthesis of 1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-aryl-propionyl]}-3-aryl-propenone and their antibacterial activity

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ABSTRACT

A solvent-free synthesis of 1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-aryl-propionyl]-3-aryl-propenones under microwave irradiation using Micheal addition of chalcones with imidazoles in the presence of glacial acetic acid as catalyst. All title compounds were screened their antibacterial activity and the compounds were elucidated on the basis of ^{1}H NMR, IR and mass spectral data.

Keywords: Chalcone, imidazolyl, Micheal addition reaction, microwave irradiation, antibacterial activity,

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INTRODUCTION

Chalcones and their derivatives have attracted increasing attention due to numerous biological and pharmacological applications such as antimalarial [1], anticancer [2], antiprotozoal [3], anti-inflammatory [4], antibacterial [5], antifilarial [6], antifungal [7], antimicrobial [8], larvicidal [9], anticonvulsant [10], antioxidant [11] activities. They have also shown inhibition of the enzymes, especially mammalian alpha-amylase [12], cyclooxygenase (COX) [13] and monoamine oxidase (MAO) [14]. However, imidazole derivatives have been reported a diverse biological activities such as antimicrobial [15], antitumor [16], antifungal [17], anticancer [18], antiviral [19] activities and they also acts as sodium hydrogen exchanger-1 potent inhibiting agents [20]. The protocol for synthesis of title compounds involving Micheal addition of chalcones with imidazole in the presence of catalytic amount of glacial acetic acid under microwave irradiation. The microwave irradiation process overcomes the hazardous effect of solvents, strong acids and monotonous reaction rates to sustain an ecosystem. Recently, microwave heating is used for a wide variety of organic reactions has found application in rapid and cleaner synthesis of organic compounds, thus increasing the yields. In continuation of our research work on the green synthesis of novel heterocyclic compounds [21], the synthesis heterocyclic compounds, sustaining the utility of microwave assisted organic synthesis (MAOS) and biological activity under the frame work of "green chemistry". Herein, we wish to report microwave assisted organic synthesis of some novel 1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-aryl-propionyl]-3-aryl-propenones **(3a-k)** with comparative studies through conventional approach and evaluated their antibacterial activity.

EXPERIMENTAL SECTION

All the chemicals were purchased from Aldrich and Fluka. Melting points were determined in open capillary tubes and are uncorrected. The purity of the compounds was checked by TLC using precoated silica gel plates

60_{254}(Merck). Microwave reactions were carried out in the milestone multi SYNTH microwave system. IR (KBr) spectra were recorded on a Shimadzu FT-IR-8400s spectrophotometer. ^{1}H NMR and ^{13}C NMR spectra were recorded on Bruker Avance II 400 MHz instrument using tetramethylsilane as an internal standard. Mass spectra were recorded on a GCMS-QP 1000 EX mass spectrometer. Elemental analysis was determined by using a Thermo Finnigan CHNS analyzer.

2.1. General procedure for the synthesis of 1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(aryl)-propionyl]-phenyl}-3-(aryl)-propenones (3a-k)

2.1.1. Conventional heating:

A mixture of **1a-j** (1.0 g, 2 mmol), imidazoles (**2a-c)** (0.28 g, 4 mmol) was dissolved in ethanol and add 2-3 drops of glacial acetic acid was refluxed for 8-12 hr at 70-80^{o}C. After the completion of reaction (as monitored by TLC), the reaction mixture was poured in ice water, filtered the residue, dried over vacuum and the resulting crude subjected to column chromatography, the eluent is hexane:ethyl acetate (8:2 v/v) gave pure yellow crystals of **3a-k.**

2.1.2. Microwave irradiation:

A mixture of **1a-j** (1.0 g, 2 mmol), imidazoles (**2a-c)** (0.28 g, 4 mmol) and 2 ml of glacial acetic acid (catalytic amount) was taken in a quartz tube and inserted into teflon vial with screw capped and then subjected to microwave irradiation in the Milestone MultiSYNTH microwave system for 4-6 min at 320 W. After the completion of reaction, reaction mixture was poured into ice cold water, filtered the residue, resulting crude dried and subjected to column chromatography. The eluent is hexane:ethyl acetate (8:2 v/v) gave yellow crystals of **3a-k**.

Employing the above procedure as mentioned, the other novel heterocyclic compounds **3b-k, 3a-g** (using imidazole **2a**), **3h-k** (using 2-alkyl imidazole **2b-c**) were prepared are shown in **table 1**., from the corresponding starting materials **1a-j**. The time taken as well as yield of compounds obtained for these conversions were discussed and comparison of time and yields of compounds **3a-k** along with their melting point values are shown in **Table 1.**

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(4-methoxyphenyl)-propionyl]-phenyl}-3-(4-methoxyphenyl)-propenone **(3a)**: IR (KBr, cm^{-1}): 1636, 1685, 3011, 3521. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.91 (dd, 1H, C-H, *J* = 16 Hz, *J* = 11.2 Hz), 3.11 (dd, 1H, C-H, *J* = 16 Hz, *J* = 6.2 Hz), 3.85 (s, 3H, OCH_3), 3.87 (s, 3H, OCH_3), 5.48 (dd, 1H, C-H, *J* = 6.2 Hz, *J* = 11.2 Hz), 6.56 (s, 1H, Ar-H), 6.92 (m, 4H, Ar-H), 7.24 (s, 1H, C=CH-C=O), 7.35 (d, 2H, Ar-H), 7.36 (d, 2H, Ar-H), 7.51 (d, 2H, Ar-H), 7.58 (m, 1H, Ar-H), 7.96 (m, 1H, HC=C-C=O), 8.60 (d, 1H, Ar-H), 13.45 (s, 2H, OH). MS: *m/z*=521 (M+ Na)$^+$. Elemental analysis: $C_{29}H_{26}N_2O_6$: Calcd: C, 69.87; H, 5.26; N, 5.62; Found: C, 69.98; H, 5.32; N, 5.74.

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-(2-chlorophenyl)-propionyl]-phenyl}-3-(2-chloro phenyl)-propenone **(3b)**: IR (KBr, cm^{-1}): 1626, 1684, 3017, 3502. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.89 (dd, 1H, C-H, *J* = 15.8 Hz, *J* = 10.4 Hz), 3.04 (dd, 1H, C-H, *J* = 15.8 Hz, *J* = 5.8 Hz), 5.94 (dd, 1H, C-H, *J* = 5.8 Hz, *J* = 10.4 Hz), 6.63 (s, 1H, Ar-H), 7.26 (s, 1H, C=CH-C=O), 7.36-7.86 (m, 11H, Ar-H), 7.64 (s, 1H, Ar-H), 8.65 (s, 1H, Ar-H), 13.45 (s, 2H, OH). MS: *m/z*=505 (M-H)$^-$. Elemental analysis: $C_{27}H_{20}Cl_2N_2O_4$: Calcd: C, 63.92; H, 3.97; N, 5.52; Found: C, 63.83; H, 3.91; N, 5.46.

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(4-chlorophenyl)-propionyl]-phenyl}-3-(4-chloro phenyl)-propenone **(3c)**: IR (KBr, cm^{-1}): 1633, 1684, 3024, 3512. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.87 (dd, 1H, C-H, *J* = 15.6 Hz, *J* = 10.8 Hz), 3.06 (dd, 1H, C-H, *J* = 15.6 Hz, *J* = 6.2 Hz), 5.53 (dd, 1H, C-H, *J* = 6.2 Hz, *J* = 10.8 Hz), 6.59 (s, 1H, Ar-H), 7.26 (s, 1H, C=CH-C=O), 7.45-7.89 (m, 11H, Ar-H), 7.68 (s, 1H, Ar-H), 8.61 (s, 1H, Ar-H), 13.45 (s, 2H, OH). MS: *m/z*=529 (M+Na)$^+$. Elemental analysis: $C_{27}H_{20}Cl_2N_2O_4$: Calcd: 63.92; H, 3.97; N, 5.52. Found: C, 63.98; H, 4.06; N, 5.56.

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(p-tolyl)-propionyl]-phenyl}-3-(p-tolyl)-propenone **(3d)**: IR (KBr, cm^{-1}): 1637, 1689, 3020, 3516. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.39 (s, 3H, CH_3), 2.42 (s, 3H, CH_3), 2.97 (dd, 1H, C-H, *J* = 16 Hz, *J* = 11.2 Hz), 3.11 (dd, 1H, C-H, *J* = 16 Hz, *J* = 6.4 Hz), 5.50 (dd, 1H,C-H, *J* = 6.4 Hz, *J* = 11.2 Hz), 6.57 (s, 1H, Ar-H), 7.23 (s, 1H, C=CH-C=O), 7.26 (s, 4H, Ar-H), 7.37 (d, 2H, Ar-H), 7.34 (d, 2H, Ar-H), 7.33 (d, 4H, Ar-H), 7.59 (m, 1H, CH=N), 7.94 (d, 1H, CH=C-C=O), 8.64 (s, 1H, Ar-H),13.64 (s, 2H, OH). MS: *m/z*=467 (M+H)$^+$. Elemental analysis: $C_{29}H_{26}N_2O_4$: Calcd: C, 74.66; H, 5.62; N, 6.00. Found: C, 74.59; H, 5.68; N, 6.11.

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(phenyl)-propionyl]-phenyl}-3-(phenyl)-propenone **(3e)**: IR (KBr, cm^{-1}): 1643, 1693, 3022, 3510. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.95 (dd, 1H, C-H, *J* = 16 Hz, *J* = 11.2 Hz), 3.12 (dd, 1H, C-H, *J* = 16 Hz, *J* =6.2 Hz), 5.51 (dd, 1H, C-H, *J* = 6.2 Hz, *J* = 11.2 Hz), 6.58 (s, 1H, Ar-H), 7.10 (s, 1H CH=N), 7.23 (s, 1H, C=CH-C=O), 7.41 (m, 1H CH=N), 7.36 (s, 5H, Ar-H), 7.42 (s, 4H, Ar-H), 7.65 (m, 2H, Ar-H), 7.96 (d, 1H, Ar-H), 8.59 (s, 1H, Ar-H), 13.52 (s, 2H OH). MS: *m/z*=437 $(M-H)^-$. Elemental analysis: $C_{27}H_{22}N_2O_4$: Calcd: C, 73.96; H, 5.06; N, 6.39. Found: C, 73.83; H, 5.12; N, 6.32.

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(2,4-dimethoxy-3-methylphenyl)-propionyl]-phenyl}-3-(2,4-dimethoxy-3-methylphenyl)-propenone **(3f)**: IR (KBr, cm^{-1}): 1651, 1694, 3019, 3502. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.18 (s, 6H, CH_3), 2.92 (dd,1H, CH, *J* = 16.2 Hz, *J* = 11 Hz), 3.11 (dd, 1H, C-H, *J* = 16.2 Hz, *J* = 5.8 Hz), 3.78 (s, 6H, OCH_3), 3.90 (s, 6H, OCH_3), 5.50 (dd, 1H, C-H, *J* = 5.8 Hz, *J* = 11 Hz), 6.49 (s, 1H, Ar-H), 6.7 (m, 2H, Ar-H), 7.25 (m, 1H, N-CH), 7.29 (m, 1H, CH=CH), 7.45 (d, 1H, C=CH-C=O), 7.49 (dd, 2H, Ar-H), 7.58 (m, 1H, CH=N), 8.35 (s, 1H, C=CH-C=O), 8.60 (s, 1H, Ar-H), 13.52 (s, 2H, C–OH). MS: m/z=587 $(M+H)^+$. Elemental analysis: $C_{33}H_{34}N_2O_8$: Calcd: C, 67.56; H, 5.84; N, 4.78. Found: C, 67.61; H, 5.79; N, 4.70.

1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(2,3-dimethoxyphenyl)-propionyl]-phenyl}-3-(2,3-dimethoxyphenyl)-propenone **(3g)**: IR (KBr, cm^{-1}): 1650, 1693, 3021, 3521. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.96 (dd, 1H, C-H, *J* = 16.2 Hz, *J* = 10.8 Hz), 3.11 (dd, 1H, C-H, *J* = 16.2 Hz, *J* = 5.8 Hz), 3.78 (s, 6H, OCH_3), 3.90 (s, 6H, OCH_3), 5.50 (dd, 1H, C-H, *J* = 5.8 Hz, *J* = 10.8 Hz), 6.49 (s, 1H, Ar-H), 6.73 (m, 2H, Ar-H), 7.25-7.58 (m, 8H, Ar-H, CH=N), 8.35 (s, 1H, C=CH-C=O), 8.60 (s, 1H, Ar-H), 13.52 (s, 2H, C–OH). MS: *m/z*=559 $(M+H)^+$. Elemental analysis: $C_{33}H_{34}N_2O_8$: Calcd: C, 66.66; H, 5.41; N, 5.02. Found: C, 66.76; H, 5.48; N, 5.08.

1-{2,4-dihydroxy-5-[3-(2-methyl-imidazol-1-yl)-3-(4-chlorophenyl)-propionyl]-phenyl}-3-(4-chlorophenyl)-propenone **(3h)**: IR (KBr, cm^{-1}): 1636, 1687, 3022, 3502. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.21 (s, 3H, CH_3), 2.97 (dd, 1H, C-H, *J* = 15.6 Hz, *J* = 11.2 Hz), 2.86 (dd, 1H, C-H, *J* = 15.6 Hz, *J* = 5.8 Hz), 5.38 (dd, 1H, C-H, *J* = 5.8Hz, *J* = 11.2 Hz), 6.47 (s, 1H, C-H), 6.88 (d, 4H, Ar-H), 7.19 (s, 1H, CH=N), 7.30 (m, 3H, C-H, Ar-H), 7.45 (s, 1H, CH=N), 7.58 (d, 2H, Ar-H), 7.82 (d, 1H, C-H), 8.54 (s, 1H, C-H), 13.65 (s, 2H, C-OH). MS: *m/z*=543 $(M+ Na)^+$. Elemental analysis: $C_{28}H_{22}Cl_2N_2O_4$: Calcd: C, 64.50; H, 4.25; N, 5.37. Found: C, 64.43; H, 4.32; N, 5.45.

1-{2,4-dihydroxy-5-[3-(2-methyl-imidazol-1-yl)-3-(2,5-dimethoxyphenyl)-propionyl]-phenyl}-3-(2,5-dimethoxyphenyl)-propenone **(3i)**: IR (KBr, cm^{-1}): 1636, 1687, 3014, 3514. ^{1}H NMR (300 MHz, $CDCl_3$): δ 2.18 (s, 3H, CH_3), 2.96 (dd, 1H, C-H, *J* = 16.2 Hz, *J* = 10.6 Hz), 3.11 (dd, 1H, C-H, *J* = 16.2 Hz, *J* = 6.4 Hz), 3.78 (s, 6H, OCH_3), 3.90 (s, 6H, OCH_3), 5.50 (dd, 1H, C-H, *J* = 6.4 Hz, *J* = 10.6 Hz), 6.49 (s, 1H, Ar-H), 6.70 (m, 2H, Ar-H), 7.25 (m, 1H, N=CH), 7.29 (m, 2H, C=CH-C=O, Ar-H), 7.45 (d, 1H, CH=CH), 7.49 (dd, 2H, Ar-H), 7.58 (m, 1H, CH=N), 8.35 (s, 1H, C=CH-C=O), 8.60 (s, 1H, Ar-H), 13.52 (s, 2H, C–OH). MS: *m/z*=572 $(M)^+$. Elemental analysis: $C_{32}H_{32}N_2O_8$: Calcd: C, 67.12; H, 5.63; N, 4.89. Found: C, 67.19; H, 5.71; N, 4.91.

1-{2,4-dihydroxy-5-[3-(2-ethyl-imidazol-1-yl)-3-(4-chlorophenyl)-propionyl]-phenyl}-3-(4-chlorophenyl)-propenone **(3j)**: IR (KBr, cm^{-1}): 1638, 1687, 3020, 3522. ^{1}H NMR (300 MHz, $CDCl_3$): δ 1.21 (t, 3H, CH_3), 2.48 (q, 2H, CH_2), 2.97 (dd, 1H, C_4-H, *J* = 16 Hz, *J* = 10.6 Hz), 3.10 (dd, 1H, C-H, *J* = 16 Hz, *J* = 6 Hz), 5.38 (dd, 1H, C-H, *J* = 6 Hz, *J* = 10.6 Hz), 6.47 (s, 1H, C_5-H), 6.88 (m, 4H, Ar-H), 7.19 (s, 1H, CH=N), 7.30 (m, 3H, C-H, Ar-H), 7.45 (s, 1H, C=N), 7.58 (m, 2H, Ar-H), 7.82 (d, 1H, C-H), 8.54 (s, 1H, C-H), 13.65 (s, 2H, C-OH). MS: *m/z*=534 $(M)^+$. Elemental analysis: $C_{29}H_{24}Cl_2N_2O_4$: Calcd: C, 65.20; H, 4.62; N, 5.29. Found: C, 65.05; H, 4.52; N, 5.23.

1-{2,4-dihydroxy-5-[3-(2-ethyl-imidazol-1-yl)-3-(2,5-dimethoxyphenyl)-propionyl]-phenyl}-3-(2,5-dimethoxyphenyl)-propenone **(3k)**: IR (KBr, cm^{-1}): 1634, 1688, 3023, 3520. ^{1}H NMR (300 MHz, $CDCl_3$): δ 1.26 (t, 3H, CH_3), 2.52 (m, 2H, CH_2), 2.97 (dd, 1H, C-H, *J* = 15.6 Hz, *J* = 11.2 Hz), 2.86 (dd, 1H, C-H, *J* = 15.6 Hz, *J* = 5.6 Hz), 3.77 (s, 6H, -OCH_3), 3.82 (s, 6H, -OCH_3), 5.38 (dd, 1H, C-H, *J* = 5.6 Hz, *J* = 11.2 Hz), 6.47 (s, 1H, C-H), 6.88 (d, 4H, Ar-H), 7.19 (s, 1H, CH=N), 7.30 (m, 3H, C-H, Ar-H), 7.45 (s, 1H, C=N), 7.82 (d, 1H, C-H), 8.54 (s, 1H, C-H), 13.65 (s, 2H, C-OH). MS: m/z=586 $(M)^+$. Elemental analysis: $C_{33}H_{34}N_2O_8$: Calcd: C, 67.65; H, 5.86; N, 4.82. Found: C, 67.56; H, 5.84; N, 4.78.

2.2. Biological assay

2.2.1. Antibacterial activity

All the compounds were screened for their antibacterial activity against bacterial strains such as Bacillus subtilis (ATCC-6633), Staphylococcus aureus (ATCC-29737), Escherichia coli (ATCC-10536), and Proteus mirabilis

(ATCC-25933) using ampicillin as standard drug. The testing against bacteria has been carried out by employing the paper disc method by measuring the inhibition zone in millimeters. The samples were dissolved in DMF (AR grade) and Whatman No. 40 filter paper discs were soaked in different concentrations of the compounds obtained in the ranges from 200 µg/mL to 50 µg/mL by successive dilutions. The sterile nutrient agar was used as a culture medium, melted and taken in labeled containers, cooled to 50°C. Actively growing agar slant culture suspension of bacteria swab inoculated separately on these solidified agar plates. Sterile filter paper discs (6mm diameter) prepared from standard Whatman No. 1 filter papers were dipped in the test solution of different concentrations and after drying the discs, they were introduced on to the above inoculated agar plates containing bacterial strains. The plates with test compound discs were incubated for 24 hrs at 37 °C. The diameter of zone of inhibition (in millimeters) was measured.

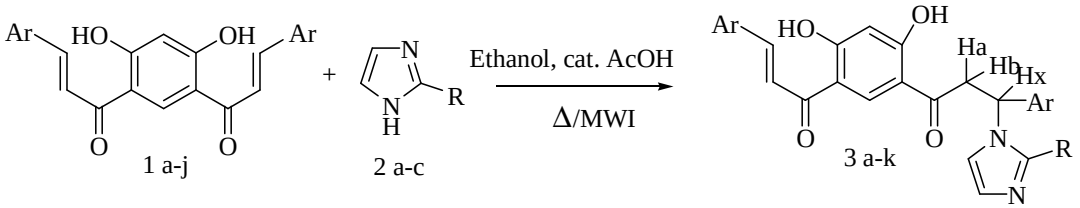
RESULTS AND DISCUSSION

3.1. Chemistry

All the structures of newly synthesized compounds were assigned on the basis of their IR, ^{1}H NMR and mass spectral data. The IR spectrum of **3a** showed two characteristic absorption bands at 1636 cm^{-1} and 1685 cm^{-1} indicate to two carbonyl groups it confirms the one of the carbonyl group is α,β-unsaturated carbonyl ketone of compound. The ^{1}H NMR spectrum of **3a** showed two double of doublets at δ 2.91 and δ 3.11 integrating for one proton each, due to multiple coupling involving both geminal and vicinal proton assigned to H_a and H_b respectively. Another double of doublet appeared at δ 5.48 integrating for one proton was assigned to H_x. The spectrum also exhibited two doublets at δ 7.24 and δ 7.96 integrating for one proton each due to $C_{2'}$ –H & $C_{3'}$ –H respectively of α,β-unsaturated carbonyl moiety, A multiplet at δ 7.58 integrating for one proton due to CH=N of imidazole heterocyclic ring. In Mass spectrum of **3a** gave the molecular ion peak at m/z=521 $[M+Na]^+$ 100%. These lead further scopes for the construction of new heterocyclic ring system on free α,β-unsaturated carbonyl moiety and can contribute towards biodynamic heterocycles and its biological activity. The improved yields under microwave assisted synthesis describes single step synthesis of the heterocycles (**3a-k**) with microwave route, besides being advantageous and compared over conventional method (**Table-1**).

Scheme-1

Synthesis of 1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-(aryl)-propionyl]-3-(aryl)-propenones (3a-k)



R = H, -CH_3, -C_2H_5, Ar = 4-methoxyphenyl, 2-chlorophenyl, 4-chlorophenyl, 4-methylphenyl, phenyl, 2,4-dimethoxy-3-methylphenyl, 2,3-dimethoxyphenyl, 2,5-dimethoxyphenyl

Table-1: Physical data of 1-{2,4-dihydroxy-5-[3-(1H-1,2,4-triazol-1-yl/1H-imidazol-1-yl-3-(aryl)-propanoyl]-phenyl}-3-(aryl)-propenones (3a-k)

Compounds	Ar	R	M.P.(°C)	Comparative study			
				Conventional		Microwave	
				Time (hr)	Yield (%)	Time (min)	Yield (%)
3 a	4-methoxyphenyl	H	190	12	60	5	80
3 b	2-chlorophenyl	H	168	10	60	4	75
3 c	4-chlorophenyl	H	176	12	65	6	80
3 d	4-methylphenyl	H	230	8	70	4	85
3 e	phenyl	H	155	10	65	5	85
3 f	2,4-dimethoxy-3-methylphenyl	H	110	8	70	6	80
3 g	2,3-dimethoxy phenyl	H	181	10	65	6	75
3 h	4-chlorophenyl	CH_3	185	9	60	5	72
3 i	2,5-dimethoxy phenyl	CH_3	215	10	62	6	76
3 j	4-chlorophenyl	C_2H_5	202	10	65	5	70
3 k	2,5-dimethoxy phenyl	C_2H_5	220	9	60	6	74

3.2. Biology:

All the newly synthesized compounds screened their antibacterial activity at three concentrations such as 200, 100 and 50 μg/ml, the optimum conc. is 200 μg/ml. Among, the compounds **3a**, **3g** & **3k** were exhibited maximum, **3d, 3e** & **3i** showed moderate and **3b, 3c, 3f, 3h** & **3j** did not exhibit significant activity against *E. coli*. In case of *P. mirabilis* compound **3c** showed maximum, **3b** & **3g** exhibited moderate and **3a**, **3e, 3i** & **3k** did not exhibit significant activity. Where, as **3c, 3f, 3h,** & **3j** were found to be inactive. In case of *B. subtilis* compounds **3b, 3e** & **3g** were showed maximum, **3d** & **3k** exhibited moderate, where as **3a, 3c, 3f, 3h, 3i** & **3j** were found to be inactive. In case of *S. aureus* compounds **3a & 3d** showed maximum **3c** exhibited moderate and **3b, 3e 3f**, **3g, 3h**, **3i, 3j** & **3k** were found to be inactive of their activity, as shown in **Table-2.**

Table-2: Zone of inhibition of antibacterial activity against 1-{2,4-dihydroxy-5-[3-(1H-1,2,4-triazol-1-yl/1H-imidazol-1-yl-3-aryl-propanoyl]-phenyl}-3-aryl-propenones (3a-k).

Compound	*E. coli*			*P.mirabilis*			*B. subtilis*			*S. aureus*		
	200	**100**	**50**	**200**	**100**	**50**	**200**	**100**	**50**	**200**	**100**	**50**
3a	12	07	-	09	-	-	-	-	-	12	06	-
3b	-	-	-	11	05	-	12	07	-	-	-	-
3c	-	-	-	12	07	-	-	-	-	11	07	-
3d	11	06	-	-	-	-	10	06	-	12	-	-
3e	09	-	-	09	05	-	11	06	-	-	07	-
3f	-	-	-	-	-	-	-	-	-	-	-	-
3g	12	06	-	11	06	-	12	05	-	-	-	-
3h	-	-	-	-	-	-	-	-	-	-	-	-
3i	09	05	-	09	-	-	05	-	-	-	-	-
3j	-	-	-	-	-	-	-	-	-	-	-	-
3k	12	07	-	09	05	-	09	05	-	-	-	-
Control	11	10	10	11	11	10	11	10	10	11	11	10

CONCLUSION

In conclusion, a simple and convenient microwave irradiation method was developed for the synthesis of 1-{2,4-dihydroxy-5-[3-imidazol-1-yl-3-aryl-propionyl]-3-aryl-propenones by using as glacial acetic acid as catalyst. All the newly synthesized compounds were screened their antibacterial activity. Compounds **3a** and **3g** showed significant antibacterial activities compared with standard ampicillin.

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