INTRODUCTION

Nitrogen-heterocycles play a predominant role in medicinal chemistry due to their pharmacological activities. The quinoline derivatives play various biological activates such as anticancer [1], anti-HIV [2], antimicrobial [3], antituberculosis [4], antiviral [5], antimalarial [6], antioxidant [7], anti-inflammatory [8], antiprotozoal [9] and some of the quinoline derivatives found in marked drugs including as chloroquine, piperaquine, pyronaridine, ciprofloxacin, lenvatinib and tipifarnib. In addition, morpholine core moiety is also important in pharmacological industry due to its antimicrobial [10] and anti-inflammatory [11] activities. Furthermore, chalcone derivatives are pharmacologically active with wide variety of activates as antimicrobial [12], anticancer [13], anti-inflammatory [14], antidiabetic [15] etc. Therefore, we wish to synthesize (E)-1-aryl-3-(2-morpholinoquinolin-3-yl)prop-2-en-1-ones by using 1-butyl-3-methylimidazolium tetrafluoroborate (Bmim)BF₄. The method has proved to be an easy, efficient high yields with short routine and being more environmentally-friendly.

EXPERIMENTAL

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). The IR spectra were recorded on a Perkin-Elmer FT-IR-8400s, using samples in KBr disks. The purity of the compounds was checked by TLC using precoated silica gel plates 60254 (Merck). 1H NMR and 13C NMR spectra were recorded on Bruker Avance II 400 MHz spectrometer using tetramethylsilane as an internal standard. Mass spectra were recorded on a GC-MS-QP 1000 EX mass spectrometer. Elemental analysis was performed on a Perkin Elmer CHN-2400 analyzer.

Synthetic procedure for (E)-1-aryl-3-(2-morpholinoquinolin-3-yl)prop-2-en-1-ones (Va-k): A mixture of 2-morpholinoquinoline-3-carbaldehyde (I) (1 mmol), aryl methyl ketones (IVa-c) (1 mmol) and (Bmim)BF₄ was stirred at 80 °C for 40-50 min. Progress of the reaction was monitored by TLC, after
completion of the reaction. The reaction mixture poured into ice cold water, slowly the solid separates out, it filtered, washed with water, dried and purified by using column chromatography using n-hexane:ethyl acetate (9:1) to afford pure (E)-1-aryl-3-(2-morpholinoquinolin-3-yl)prop-2-en-1-ones (Va-k) (Scheme-I).

(E)-3-(2-Morpholinoquinolin-3-yl)-1-phenylprop-2-en-1-one (Va): Colour: yellow; yield: 90 %; m.p.: 127-130 °C. IR (KBr, νmax, cm–1): 1652 (C=O); 1586 (C=C); 1370 (C=N); MS: m/z = 345 (M+H)+; Anal. Calcd. for C22H20N2O2: C, 77.07; H, 6.19; N, 7.82. Found: C, 76.78; H, 5.78; N, 8.10.

(E)-3-(2-Morpholinoquinolin-3-yl)-1-(p-tolyl)prop-2-en-1-one (Vb): Colour: yellow; yield: 92 %; m.p.: 130-133 °C. IR (KBr, νmax, cm–1): 1651 (C=O); 1590 (C=C); 1370 (C=N); MS: m/z = 359 (M+H)+; Anal. Calcd. for C22H19N2O2Cl: C, 69.75; H, 5.05; N, 7.39. Found: C, 69.70; H, 5.01; N, 7.33.

(E)-1-(4-Chlorophenyl)-3-(2-morpholinoquinolin-3-yl)prop-2-en-1-one (Vd): Colour: Pale yellow; Yellow: 89 %, m.p.: 125-128 °C. IR (KBr, νmax, cm–1): 1647 (C=O); 1592 (C=C); 1370 (C=N); MS: m/z = 423 (M+H)+; Anal. Calcd. for C22H19N2O2Br: C, 62.47; H, 4.56; N, 6.60.

Scheme-I: Synthesis of (E)-1-aryl-3-(2-morpholinoquinolin-3-yl)prop-2-en-1-ones
The chalcones have successfully synthesized from 2-morpholinoquinoline-3-carboxaldehyde and aryl methyl ketones, the intermediate aldehyde was prepared by starting from acetic anilide with the reaction of DMF and POCl₃ reagent followed by substitution of morpholine. The Claisen-Schmidt condensation was carried out by using 1-butyl-3-methylimidazolium tetrafluoroborate (Bmim)BF₄ in the place of hazardous strong bases and acids. The newly synthesized chalcone were characterized by ¹H NMR, ¹³C NMR and Mass spectral data analysis. In the ¹H NMR spectrum the compounds (Va-k) showed characteristic newly generated two doublet in the range of 6.74 and 7.98 ppm integrating for each one proton was assigned for α,β-unsaturated carbonyl group protons. In the ¹³C NMR spectrum, the compounds (Va-k) showed required number of carbon peaks. The LCMS spectra exhibited the (M+H)⁺ peaks their m/z values.

**Antibacterial activity:** The synthesized compounds (Va-k) were evaluated for in vitro antibacterial activity against four
bacterial strains Gram-positive (Staphylococcus aureus and Bacillus subtilis) and two Gram-negative (Pseudomonas aeruginosa and Escherichia coli) by paper disc method and norfloxacin used as the standard drug by measuring the zone of inhibition in mm. The compounds were screened at the concentrations of 100 µg/mL in DMSO. The compounds Ve, Vf, Vg and Vi were showed good antibacterial activity against all the bacterial strains and remaining compounds showed moderated to low activity (Table-1).

**Antifungal and antibacterial activities:** The synthesized compounds (Va-k) were evaluated for *in vitro* antifungal activity against two fungal strains (Sclerotiumrolfsii and Aspergillus niger) at a concentration of 500 mg/mL by disc diffusion method, zone of inhibition measured in mm and ketoconazole used as the standard. Careful observation of the results shows that compounds Va, Ve, Vf and Vi showed better antifungal activity and the remaining compounds were showed moderate activity against both the organisms (Table-1). The synthesized compounds were screened their *in vitro* antimicrobial activity, the result suggeted that the compounds Ve, Vf and Vi showed good antimicrobial activity.

**Conclusion**

The use of ionic liquid ([Bmim]BF₄) synthetic protocal for the synthesis of chalcone deivatives offer many advantages simple reaction procedure, short rection times, high yields, exclusion of toxic solvents and easy work up.

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**CONFLICT OF INTEREST**

The authors declare that there is no conflict of interests regarding the publication of this article.

**REFERENCES**