Chapter 2
An Efficient Functional Ionic Liquid Mediated One-Pot Three-Component synthesis of 2,3-Dihydroquinazolin-4(1H)-ones as anti Hyperglycemic Agents

2.1. INTRODUCTION

Ionic liquids (ILs) have captured attention of chemical community across the globe as green alternatives to classical environmentally destructive media for synthesis, catalysis, separation and other various chemical tasks. Ionic liquids encompass many unique properties, such as non-volatility, wide liquid range, high thermal stability, low toxicity, good solubility, incombustibility and reusability. These properties make ionic liquids a modern material of immense importance with wide variety of applications. Recently, there has been considerable interest in using room temperature ionic liquids as environmentally benign reaction media. There are numerous examples of all classes of organic reactions that have been successfully carried out in such media. However, in many of these reactions, the ionic liquids were just a media to facilitate the reaction. Ionic liquids are often referred to as designer solvents due to the fact that choice of combination of anion, cation and cation chain length can be used to obtain specific properties such as viscosity, solubility or melting point. The concept of “Functional ionic liquids” extends this idea by covalently tethering a functional group to the cation or anion which can interact with dissolved substrates. “Functionalised ionic liquids” have been used in an analogous way to supported (polymer, silica or other solids) reagents and catalysts.

2.2. BASIS OF WORK

2,3-dihydroquinazolin-4(1H)-one derivatives have been reported to possess diverse pharmacological activities, such as anti-tumor activity, diuretic properties, herbicidal activity, and also prescribed as
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plant growth regulators. In addition, these compounds can easily be oxidized to their quinazolin-4(3H)-one analogues, which are themselves important biologically active heterocyclic compounds. Particularly, the quinazolinone core scaffold has been extensively utilized as a drug-like template in medicinal chemistry. Due to the importance of quinazolinone derivatives in organic synthesis, the development of environmentally benign, high yielding, and clean synthesis of 2,3-dihydroquinazolin-4(1H)-ones is in demand. In view of their significance, various procedures have been developed for the construction of 2,3-dihydroquinazolin-4(1H)-one frameworks. Recently, Shi has reported the preparation of 2,3-dihydroquinazolin-4(1H)-ones with the aid of a low-valent titanium reagent, Salehi et al. reported one-pot three-component condensation of isatoic anhydride, aldehyde, and amine catalyzed by acidic reagents, such as silica sulfuric acid, montmorillonite K-10, and paratoluenesulphonic acid for the synthesis of 2,3-dihydroquinazolin-4(1H)-ones.

On the basis of above protocol here we explore our reaction on the basis of functional ionic liquids. However, Functional Ionic liquid Mediated synthesis (FILMs) in organic synthesis is unexplored. Prompted by this fact, in continuation with the green synthesis of bioactive compounds as well as functional ionic liquid mediated synthesis of quinazolinones. First of all here we concerns with the synthesis of artificial sweetener saccharin based functional ionic liquid and exploring their synthetic utility in synthesis of quinazolinones. Saccharin group was chosen as it is less toxic then other ionic liquids.
2.3. CHEMISTRY

In the first instance it was envisaged to carry out the synthesis of a greener saccharin based ionic liquid derived from bmim cation and saccharinate anion. The approach is shown in Scheme 1.

**Scheme 1.** Synthesis of [bmim] [Sac].

**Reagents and conditions:** (i) Acetonitrile, reflux, 24h (ii) Acetone, rt, 30h.

In the pursuit to carry out synthesis of [bmim][Sac], it was essential to generate [bmim]Br as outlined in the Scheme 1. A mixture of N-methyl imidazole and n-butyl bromide were subjected to reflux in anhydrous acetonitrile for 24h. Evaporating the acetonitrile and washing the reaction mixture with ethyl acetate for several time afforded [bmim] Br in good yield. In order to obtain the 5, [bmim] Br was treated with sodium salt of saccharinate which was obtained via treatment of saccharin with sodium methoxide in methanol.

In continuation of our efforts in the direction of designing of organic synthesis of bioactive scaffolds from Functional ionic liquids, herein we wish to report the synthesis of 2,3-dihydroquinazolin-4(1H)-ones via multi-component reaction (MCRs) of isatoic anhydride,
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amines, and aldehydes in the presence of artificial sweetener saccharin based functional ionic liquid [bmim][Sac](Scheme 2).

Scheme 2. Synthesis of 2,3-dihydroquinazolin-4(1H)-one

Reagents and conditions: (i) [bmim][Sac], heat, 50°C, 4h.

Initially, we intended to find an efficient functional ionic liquid for the synthesis of a tandem one-pot multi-component reaction from aniline 6a, benzaldehyde 7a and isatoic anhydride 8 (Table 2.1) as a model reaction. The catalytic activity of various ionic liquids was evaluated for this model reaction results are shown in Table 2.1.

Table 2.1 Reaction of aniline, aldehyde and isatoic anhydride in presence of various ILs.

<table>
<thead>
<tr>
<th>Entry</th>
<th>ILs</th>
<th>Mol (%)</th>
<th>9a yield(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[bmim][Br]</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>[bmim][BF₄]</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>[bmim][PF₆]</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>[bmim][Tfa]</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>5</td>
<td>[bmim][Cl]</td>
<td>20</td>
<td>25</td>
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<table>
<thead>
<tr>
<th></th>
<th>Reaction conditions</th>
<th>Yield%</th>
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<tbody>
<tr>
<td>6</td>
<td>[bmim]H₂PO₄</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>TSILs</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>TSILs</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>TSILs</td>
<td>10</td>
</tr>
<tr>
<td>a</td>
<td>10 [bmim][Sac]</td>
<td>20</td>
</tr>
<tr>
<td>R</td>
<td>11 [bmim][Sac]</td>
<td>30</td>
</tr>
<tr>
<td>e</td>
<td>12 [bmim][Sac]</td>
<td>10</td>
</tr>
<tr>
<td>a</td>
<td>13 [bmim][Sac]</td>
<td>5</td>
</tr>
</tbody>
</table>

It was observed when we used 20 mol % of halogen containing ionic liquids, such as [bmim][Br], [bmim][BF₄], [bmim][PF₆], [Hmim]Tfa and [bmim][Cl], as a catalyst at 50°C, the titled compound was obtained in poor yields (Table 2.1), entries 1-5. We were pleased to find the improvement with the yield of desired product 4a when we used 20 mole% of [bmim]H₂PO₄ (Table-2.1), entry 6. It was also seen when used 20 mole% of halogen-free ionic liquid such as tetraalkylammonium sulphonic acid (TSILs) and found better yield of the desired 4a in 1.5h (Table-2.1), entry7. No improvement was observed by increasing the amount of TSILs from 20 to 30 mole%, however by decreasing the amount ionic liquid we found the reducing yield of desired product (Table-2.1), entries 8 and 9. Fortunately, we acquired pleasant result when we carried out the reaction with artificial sweetener saccharin based functional ionic liquid [bmim][Sac] and providentially found the excellent yield of desired product 4a at 20 mole% in 1h (Table-2.1), entry 10. The optimum catalyst loading for [bmim][Sac] was found to be 20 mole%. By increasing the amount of
catalyst from 20 to 30 mole % no significant change in the yield of product was observed (Table-2.1), entry 11 however decreasing the amount of catalyst from 20 mole % to 10 and 5 mole % relative to substrate, the yield of desired product 4a was reduces (Table-2.1), entries 12 and 13. Among the ionic liquids evaluated, [bmim][Sac] was superior to others containing inorganic substances and provided the best yield of the compound 2,3-dihydroquinazolin-4(1H)-one 4a.

Under the optimized reaction conditions in hand, we explored the amine substrate scope with isatoic anhydride and aldehydes for the synthesis of functionalized quinazolinone. All the reactions proceeded properly and afforded desired products under the optimized reaction conditions. A wide range of amines 2 were tolerated with electron-neutral and electron-donating groups could be employed as coupling partner with isatoic anhydride 1 and aldehydes 3 which smoothly converted into the desired products 4 in good to excellent yield, whereas amines bearing electron-withdrawing groups furnished slightly lower yields of the desired products 4. We were also pleased to find that sterically hinders anilines also gave moderate to good yields (Table 2.2).

Table 2.2. [bmim][Sac] catalyzed synthesis of 2,3-dihydroquinazolin-4(1H)-one.\textsuperscript{a}

<table>
<thead>
<tr>
<th>Entry</th>
<th>R\textsuperscript{1}</th>
<th>R\textsuperscript{2}</th>
<th>Product</th>
<th>Yield (%)\textsuperscript{b}</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>H</td>
<td>H</td>
<td>9a</td>
<td>81</td>
</tr>
<tr>
<td>2</td>
<td>4-F</td>
<td>H</td>
<td>9b</td>
<td>79</td>
</tr>
<tr>
<td>3</td>
<td>4-Cl</td>
<td>H</td>
<td>9c</td>
<td>75</td>
</tr>
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<th></th>
<th></th>
<th>2014</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>2-Cl</td>
<td>H</td>
<td>9d</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>OC₂H₅</td>
<td>H</td>
<td>9e</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4-F</td>
<td>4-F</td>
<td>9f</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>H</td>
<td>4-F</td>
<td>9g</td>
<td>81</td>
<td></td>
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<tr>
<td>8</td>
<td>4-OCH₃</td>
<td>H</td>
<td>9h</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>4-Br</td>
<td>H</td>
<td>9i</td>
<td>77</td>
<td></td>
</tr>
<tr>
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<td>H</td>
<td>4-OCH₃</td>
<td>9j</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>H</td>
<td>3-OCH₃</td>
<td>9k</td>
<td>80</td>
<td></td>
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<td>4-F</td>
<td>4-NO₂</td>
<td>9l</td>
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<td>9m</td>
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<td>3-OCH₃</td>
<td>OH</td>
<td>9n</td>
<td>79</td>
<td></td>
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<tr>
<td>15</td>
<td>4-Cl</td>
<td>OH</td>
<td>9o</td>
<td>75</td>
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<td>16</td>
<td>3,5-diCl</td>
<td>H</td>
<td>9p</td>
<td>77</td>
<td></td>
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<tr>
<td>17</td>
<td>H</td>
<td>4-Br</td>
<td>9q</td>
<td>80</td>
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<tr>
<td>18</td>
<td>4-OCH₃</td>
<td>4-Br</td>
<td>9r</td>
<td>81</td>
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<td>4-F</td>
<td>9s</td>
<td>79</td>
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</tr>
<tr>
<td>20</td>
<td>4-Cl</td>
<td>4-OCH₃</td>
<td>9t</td>
<td>78</td>
<td></td>
</tr>
</tbody>
</table>

*aReaction conditions: isatoic anhydride 1 (1.0 mmol), aniline 2 (1.0 mmol), 3 aldehyde (1.0 mmol), and 20 mol % IL, 50°C. *bIsolated Yield.*
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Figure 2.1. The proposed mechanism of 2,3-dihydroquinazolin-4(1H)-one.

The structures of the desired products 9 were fully characterized by spectroscopic technique like Mass spectroscopy, $^1$H, $^{13}$C NMR, and elemental analysis.

The proposed mechanism for the formation of 2,3-dihydroquinazolin-4(1H)-one catalyzed by [bmim][Sac] functionalized ionic liquid is illustrated in Scheme 3. In this reaction the ionic liquid not only behaves as solvating property but also facilitates the reaction as a catalyst.

It was observed that the C-2 hydrogen of [bmim] cation because of its H-B donar ability activate the carbonyl group of isatoic anhydride 8 via H-B (electrophilic activation). This is followed by the nucleophilic
attack of 6a with elimination of carbon dioxide leading to intermediate A aminoacetanilide. Further C-2 hydrogen of bmim cation activate the carbonyl group of 7a via H-B formation followed by nucleophilic attack of amino group of intermediate A resulted another intermediate B which gave intermediate C through H-Bonding between C-2 hydrogen of bmim cation and hydroxyl group of intermediate B followed by the elimination of water and afforded 9a. The ionic liquid [bmin][Sac] was easily recycled after the reaction and reused three times without any loss in activity, even after three times the product 9a was obtained in almost same yield.

2.3.1. SYNTHESIS OF AMINO ALKYL CHAIN DERIVATIVES OF 2,3-DIPHENYL-2,3-DIHYDROQUINAZOLIN-4(1H)-ONE

The compound 9 was obtained in pure and quantitative yield, in the next stage. These compounds were generated with the introduction of amino side chain by o-alkylation at OH of the aldehyde core. In order to generate a meaningful SAR in medicinal chemistry, most of the quinazolinones compounds prepared by different procedure which were selected as a target scaffold for significant medicinal as well as biological properties but unfortunately most of the compounds belonging to this set did not display good solubility. As a part of the program aimed at discovery of new chemo types for biological activity, in the next stage of the study efforts were directed towards the addition of basic amine functional group to. The reaction of 2-(4-hydroxyphenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one with different basic alkyl amino hydrochloride side chains in the presence of
K₂CO₃ and dry acetone afforded to the formation of compounds (11a-t) in good yields.

Scheme 4. Synthesis of O-alkylated 2-(4-hydroxyphenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one.

Reagents and condition: (i) Refluxed in dry acetone, K₂CO₃, 1.5hr, reflux.

Table 2.3. Synthesis of O-alkylated 2-(4-hydroxyphenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one.

<table>
<thead>
<tr>
<th>Entry</th>
<th>R¹</th>
<th>Amine (NR₂)</th>
<th>Product</th>
<th>Yield (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4-Cl</td>
<td>CH₂CH₂N</td>
<td>11a</td>
<td>85</td>
</tr>
<tr>
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<td>CH₂CH₂N</td>
<td>11b</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>4-F</td>
<td>H₃CH₂CH₂N</td>
<td>11c</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>4-OCH₃</td>
<td>H₃CH₂CH₂N</td>
<td>11d</td>
<td>81</td>
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<tr>
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<td>4-OCH₃</td>
<td>CH₂CH₂N</td>
<td>11e</td>
<td>74</td>
</tr>
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<td>4-OCH₃</td>
<td>CH₂CH₂N</td>
<td>11f</td>
<td>88</td>
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<td>90</td>
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<td>CH₃CH₂N</td>
<td>11k</td>
<td>80</td>
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<td>4-OCH₃</td>
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<td>20</td>
<td>4-F</td>
<td>CH₂CH₂N</td>
<td>11t</td>
<td>79</td>
</tr>
</tbody>
</table>

Structure of all the analogues was elucidated by H, C, Mass and IR spectra.

2.4. BIOLOGICAL EVALUATION

2.4.1. MATERIAL AND METHOD, DRUG AND CHEMICALS

2.4.1.1. ANIMALS

Male albino rats of Sprague Dawley strain (8 to 10 weeks of age: body weight range 160 ± 20 g) were procured from National Laboratory Animal Centre (NLAC) of the Institute. Research on animals was conducted in accordance with the guidelines of the committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) formed by the Government of India in 1964. Rats were housed in groups of five in polypropylene cages under controlled standard environmental conditions of temperature, humidity, light, air changes and 12 hr light-dark cycles. Prior to commencement
of the experiment all the rats were acclimatized to the new environmental condition at least one week.

2.4.1.2. INDUCTION OF DIABETES

A solution of STZ (60 mg/kg) in 100 mM citrate buffer, pH 4.5 was prepared and calculated amount of the fresh solution was immediately injected intraperitoneally to overnight fasted rats. After 48 hours, the animals were checked for their diabetic status. Animals showing blood glucose levels above 300 mg/dl were termed as diabetic. Blood glucose level measurements were always done by glucostrips (Roche).

2.4.2. In vivo ANTI-HYPERGLYCEMIC ACTIVITY

The test compounds and standard antidiabetic drug Metformin were prepared in 1.0 % freshly prepared Gum acacia.

2.4.2.1. ASSESSMENT OF ANTIHYPETHYPERGLYCEMIC ACTIVITY ON NORMOGLYCAMIC RATS

The baseline glucose level of each animal was measured by glucometer using glucostrips after an overnight starvation. Animals showing blood glucose level between 60 to 80 mg/dl were finally selected, divided into groups each consisted of five animals. Rats of experimental group were administered the suspension of the test sample orally at preselected dose levels i.e. 100 mg/kg body weight in the case synthetic compounds. The standard antidiabetic drug i.e. Metformin was administered at 100 mg/kg dose levels. Animals of control group were given an equal amount of 1.0 % gum acacia and termed as sham treated control. The rats (all groups) were primed with sucrose (10.0
gm/kg orally) 30 minute after test sample/vehicle administration and blood glucose was again measured from the tail vein at 0, 30, 60, 90 and 120 min post sucrose load. Food but not water was withheld from the cages during the course of experimentation. Comparing the AUC of experimental and control group determined the percent anti-hyperglycemic activity.

All the synthesized compounds were tested for their in vivo anti-hyperglycemic activity in sucrose loaded model (SLM). The compounds which showed significant blood glucose lowering activity in SLM model were further screened in sucrose challenged streptozotacin induced diabetic rat model (STZ) model for their blood glucose lowering activity. The results of anti-hyperglycemic activity evaluation in SLM and STZ are given in Table 4.

2.4.2.2. SUCROSE LOADED RAT MODEL (SLM)

Overnight fasted male Sprague Dawley rats were used for the sucrose-loaded experiment. Blood was collected at ‘0’ min from the tail vein of the animals. After the ‘0’ min blood collection, samples/drugs were given to the test group consisting of 5 rats by oral gavages at a dose of 100 mg/kg. Half an hour post test sample treatment, a sucrose-load of 10.0 gm/kg body weight was given to each rat. The blood was collected at 30, 60, 90 & 120 min post sucrose load. Food but not water was removed from the cages during the course of experimentation. Quantitative glucose tolerance of each animal was calculated by area under curve (AUC) method. Comparing the AUC of experimental and control groups calculated the percentage anti-hyperglycemic effect. Statistical comparison between groups was made by Student’s ‘t’ test.
2.4.2.3. SUcroSE- CHALLENGED STREPTOZOCTOCIN-
INDUCED DIABETIC RAT MODEL (STZ-S)

Male albino rats of Sprague Dawley strain of body weight 160 ± 20g were selected for this study. Streptozotocin (Sigma, USA) was dissolved in 100 mM citrate buffer pH 4.5 and calculated amount of the fresh solution was injected to overnight fasted rats (45 mg/kg) intraperitoneally. Blood glucose level was checked 48h later by glucostrips and animals showing blood glucose values between 144 to 270 mg/dl (8 to 15 mM) were included in the experiment and termed diabetic. The diabetic animals were divided into groups consisting of five animals in each group. Animals of experimental groups were administered suspension of the desired test samples orally (made in 1.0% gum acacia) at a dose of 100 mg/kg body weight. Animals of control group were given an equal amount of 1.0% gum acacia. A sucrose load of 2.5 g/kg body weight was given after 30 minutes of compound administration. After 30 minutes of post sucrose load blood glucose level was again checked by glucostrips at 30, 60, 90, 120, 180, 240, 300 min and at 24 h, respectively. Food but not water was withheld from the cages during the experimentation. Comparing the AUC of experimental and control groups determined the percent anti-hyperglycemic activity. Statistical comparison between groups was made by Student’s ‘t’ test.
Table 2.4. In vivo anti-hyperglycemic activity profile of compounds.

<table>
<thead>
<tr>
<th>Entry</th>
<th>Compounds</th>
<th>SLM</th>
<th>% Blood glucose lowering activity&lt;sup&gt;b&lt;/sup&gt;</th>
<th>STZ-S</th>
</tr>
</thead>
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<td></td>
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<td>ND</td>
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All the synthesized compounds were evaluated for their anti-hyperglycemic activity in sucrose-loaded model (SLM) and streptozotocin (STZ-S) induced β-cell damaged diabetic model of Sprague-Dawley strain male albino rats. Compounds 11c (25.8%), 11d (31.2%), 11e (44.2%), 11k (51.1%) and 11l (34.7%) have shown promising blood glucose lowering activity in SLM model. Compounds showing blood glucose lowering activity were further tested for antidiabetic activity in sucrose-challenged streptozotocin (STZ-S) induced diabetic rat model. The compounds 11e (24.6% and 28.5%) exhibited similar anti-hyperglycemic activities to standard drugs, metformin (29.2%), and glybenclamide (28.4%) in STZ.

2.5. CONCLUSION

In conclusion the ionic liquid [bmim][sac] proved to be a useful catalyst for one-pot three-component synthesis of 2-substituted-2,3-
dihydroquinazolinones. The cooperative effects of cation-anion in imidazolium-based ionic liquids revealed that catalytic activity follow the anion-dependent hydrogen bond acceptor ability and found that saccharinate is the best anion. The developed protocol offers an efficient, mild, and eco-friendly route for the synthesis of dihydroquinazolinone derivatives. All the synthesized 2-substituted-2,3-dihydroquinazolinones were examined for anti-hyperglycemic activity and some of the compounds show good activity.

2.6. EXPERIMENTAL DETAILS WITH SPECTRAL AND ANALYSIS DATA

1. All reactions were monitored by TLC over silica gel plate. The spots on TLC plates were visualized under UV lamp or by iodine vapors.

2. Temperature mentioned ranges between 90-100°C (throughout the year).

3. EtOAc, CHCl₃, MeOH, Et₂O, DMF and hexane were used as procured. Anhydrous CH₂Cl₂ and acetone were prepared as per general procedure mentioned in “Textbook of Practical Organic Chemistry” by Vogel, A. I., Revised by Furniss, B. S., Hannaford, A. J., Smith, P. W. G., and Tatchell, A. R.; ELBS with Longmann, V Edition.

4. IR spectra were recorded using Perkin-Elmer’s Spectrum RX I FTIR spectrophotometer as KBr disc.

5. ¹H-NMR, and ¹³C-NMR spectra were recorded on Bruker Avance DPX-300 MHz or Avance DPX-200 MHz FT Bruker spectrometers, using deuteriated solvents and TMS as an internal standard. Data expresses the chemical shift values in δ ppm from downfield to
upfield in both $^1$H-NMR and $^{13}$C-NMR spectra. For all compounds, $^1$H-NMR data is reported in the following order: Chemical shift (multiplicity, $J$ value, number of protons).

6. ES mass spectra were recorded in Merck M-8000 LCMS system or Micromass Quadro LCMS system and HR/EI mass were done on JEOL-600H at 70eV.

7. Elemental analyses were carried out on Carlo-Erba-1108 instrument or Elementar’s Vario EL III micro-analysers.

2.6.1. GENERAL PREPARATION OF [bmim][Sac]

2.6.1.1. REPRESENTATIVE EXPERIMENTAL PROCEDURE FOR THE SODIUM SACCHARINATE (4)

A mixture of saccharin 7.32 g (0.04 mole) and anhydrous sodium methoxide 2.16 g (0.04 mole) in 50 mL anhydrous methanol was stirred and heated to reflux for about 10-20 minutes under nitrogen. Most of the solids went into solution. Methanol was removed under reduced pressure. white solid of sodium saccharinate was obtained in good yield (90%).

2.6.1.2. TYPICAL EXPERIMENTAL PROCEDURE FOR THE [bmim][Sac] (5)

The sodium saccharinate 27.0 g (0.112 mol) was added into a solution of 1-\textit{n}-butyl-3-methylimidazolium bromide [bmim][Br], 24.6 g (0.112mol) in 100 mL acetone at rt. After stirring for 30h, the reaction mixture was filtered through a plug of celite. The volatiles were removed under reduced pressure overnight and 31.0 g (86%) of viscous oil was obtained.
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IR (neat): 766, 951, 1148, 1166, 1260, 1332, 1458, 1580, 1633, 2873, 2961, 3097, 3147 cm\(^{-1}\);
\(^1\)H NMR (DMSO-\(d_6\), 300 MHz) \(\delta = 9.17\) (s, 1H, ArH), 7.89 (d, \(J = 5.4\)Hz, 1H, ArH), 7.78 (d, \(J = 2.0\)Hz, 4H, ArH), 7.71(s, 1H, ArH), 4.18 (t, \(J = 7.2\)Hz, NCH\(_2\), 2H), 3.85 (s, 3H, CH\(_3\)), 1.80 (m, 2H, CH\(_2\)), 1.28 (m, 2H, CH\(_2\)), 0.90 (t, 3H, \(J = 7.3\) Hz, CH\(_3\)); \(^1^3\)C NMR (DMSO\(d_6\), 50 MHz) \(\delta = 164.7, 142.5, 136.5, 133.0, 131.5, 123.5, 122.2, 120.0, 48.4, 35.7, 31.3, 18.7, 13.2.

2.6.1.3 REUSABILITY OF THE [bmim] [Sac]

After completion of reaction (15 min), reaction mixture was diluted with diethyl ether (20 mL), stirred for few minutes and then decanted. The diethyl ether layer was separated and concentrated under vacuo to obtain crude product which was recrystallized (EtOAc-Hexane) to afford pure product. After decanting the diethyl ether, IL phase was dried under vacuum and the dried IL was found to be identical (spectral data) with an authentic sample of [bmim][Sac] (unused ionic liquid) then the organic reaction mixture was added to the IL to start next run. It is interesting to note that recovered IL was reused for 4-5 successive batches of reactions at rt to afford pure product after usual work-up and crystallisation.

2.6.2 GENERAL PROCEDURE FOR THE PREPARATION OF 2,3-DIHYDROQUINAZOLIN-4(1H)-ONE (9)

A mixture of isatoic anhydride (1.0 mmol) benzaldehyde (1.0 mmol), aniline (1.0 mmol) [bmim][Sac] (20 mol % ) was added. The mixture solution was stirred at 75 \(^\circ\)C for 35 min. The progress of the reaction was monitored by TLC. After completion of the reaction, the
reaction was cooled to room temperature and the crude product was extracted with ethyl acetate. The extracted solution was dried over anhydrous magnesium sulphate and concentrated in vacuo and got the final product.

2.6.3. CHARACTERISATION DATA FOR THE SYNTHESIZED COMPOUNDS (9)

2,3-Diphenyl-2,3-dihydroquinazolin-4(1H)-one (9a)

![Chemical Structure of 2,3-Diphenyl-2,3-dihydroquinazolin-4(1H)-one](image)

Solid, ESI MS (m/z) = 300 (M+H). $^1$H NMR (300 MHz; DMSO-$d_6$) $\delta_H$: 6.11 (s, 1H), 6.63 (s, 1H), 6.72-6.80 (m, 2H), 7.20-7.30 (m, 2H), 7.43-7.50 (m, 3H), 7.51-7.71 (m, 7H). $^{13}$C NMR (75 MHz; DMSO-$d_6$) $\delta_C$: 69.5, 115.5, 115.6, 116.1, 121.2, 121.4, 124.8, 127.4, 127.5, 128.1, 128.3, 128.6, 129.1, 133.1, 139.6, 140.3, 146.5, 163.4 Analysis calculated for: C$_{20}$H$_{16}$N$_2$O: C 79.98, H 5.37, N 9.33 Found: C 80.04, H 5.31, N 9.38.

3-(4-Fluorophenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9b)

![Chemical Structure of 3-(4-Fluorophenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one](image)

Solid, ESI MS (m/z) = 318 (M+H). $^1$H NMR (300 MHz; DMSO-$d_6$) $\delta_H$: 6.23 (s, 1H), 6.62 (s, 1H), 6.75-6.89 (m, 2H), 6.99-7.03 (m, 2H), 7.20 (t, $J = 5.3$ Hz, 1H), 7.49-7.55 (m, 1H), 7.59 (s, 4H), 7.66-7.76 (m, 1H), 7.78 (d, $J = 7.1$ Hz, 1H). $^{13}$C NMR (75 MHz; DMSO-$d_6$) $\delta_C$: 39.7, 69.8, 115.2, 116.1, 116.1, 116.2, 121.2, 123.7, 127.4, 127.5, 128.1, 128.3, 128.6, 133.1, 135.3, 139.6, 146.5, 159.8, 162.4, 164.1, Analysis calculated for: C$_{20}$H$_{15}$NF$_2$O: C 75.46, H 4.75, N 8.80 Found: C 75.51, H 4.70, N 8.85.
3-(4-Chlorophenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9c)

Solid, ESI MS (m/z) = 334 (M+H). $^1$H NMR (300 MHz; DMSO-$d_6$) $\delta_H$: 6.33 (s, 1H), 6.65 (s, 1H), 6.71-6.79 (m, 2H), 7.18 (t, $J = 5.7$ Hz, 3H), 7.47 (d, $J = 6.4$ Hz, 3H), 7.59 (s, 3H), 7.66 (d, $J = 5.8$ Hz, 1H), $^{13}$C NMR (75 MHz; DMSO-$d_6$) $\delta_C$: 38.9, 70.4, 115.2, 116.1, 121.2, 123.5, 127.4, 127.5, 128.1, 128.3, 129.7, 131.4, 133.1, 139.2, 139.6, 146.5, 163.4. Analysis calculated for: C$_{20}$H$_{15}$ClN$_2$O: C 71.75, H 4.52, N 8.37 Found: C 75.80, H 4.46, N 8.31.

3-(2-Chlorophenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9d)

Solid, ESI MS (m/z) = 334 (M+H). $^1$H NMR (300 MHz; DMSO-$d_6$) $\delta_H$: 6.33 (s, 1H), 6.65 (s, 1H), 6.71-6.79 (m, 2H), 7.18 (t, $J = 5.7$ Hz, 3H), 7.47 (d, $J = 6.4$ Hz, 3H), 7.59 (s, 3H), 7.66 (d, $J = 5.8$ Hz, 1H), $^{13}$C NMR (75 MHz; DMSO-$d_6$) $\delta_C$: 38.9, 70.4, 115.2, 116.1, 121.2, 123.5, 127.4, 127.5, 128.1, 128.3, 129.7, 131.4, 133.1, 139.2, 139.6, 146.5, 163.4. Analysis calculated for: C$_{20}$H$_{15}$ClN$_2$O: C 71.75, H 4.52, N 8.37 Found: C 75.80, H 4.46, N 8.31.

3-(4-Ethoxyphenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9e)

Solid, ESI MS (m/z) = 344 (M+H). $^1$H NMR (300 MHz; DMSO-$d_6$) $\delta_H$: 1.35 (t, $J = 7.1$ Hz, 3H), 3.94 (q, $J = 5.9$ Hz, 2H), 6.69-6.80 (m, 3H), 7.20 (t, $J = 5.1$ Hz, 1H), 7.31 (d, $J = 5.4$ Hz, 1H), 7.49 (s, 1H), 7.59-7.65 (m, 6H), 7.62 (t, $J = 6.1$ Hz, 1H), 8.09 (s, 1H). $^{13}$C NMR (75 MHz; DMSO-$d_6$) $\delta_C$: 14.9, 15.1, 60.2, 63.6,
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73.6, 114.6, 114.7, 115.1, 115.7, 117.8, 127.1, 127.5, 127.9, 128.3, 128.7, 128.8, 129.2, 129.3, 129.6, 130.1, 133.8, 134.1, 141.2, 147.1, 157.1, 158.3, 162.7, 170.7. Analysis calculated for: C_{22}H_{20}N_{2}O_{2} : C 76.72, H 5.85, N 8.13 Found : C 76.67, H 5.91, N 8.18.

2,3-Bis(4-fluorophenyl)-2,3-dihydroquinazolin-4(1H)-one (9f)

![Chemical structure of 2,3-Bis(4-fluorophenyl)-2,3-dihydroquinazolin-4(1H)-one (9f)](image)

Solid, ESI MS (m/z) = 336 (M+H). \(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta\): 6.12 (s, 1H), 6.59 (s, 1H), 6.72-6.99 (m, 2H), 7.00 (dd, \(J = 5.7, 4.4, 4H\)), 7.05 (t, \(J = 6.4\) Hz, 1H), 7.34 (d, \(J = 6.2\) Hz, 2H), 7.68 (d, 9.1 Hz, 1H), 7.77 (s, 2H). \(^{13}\)C NMR (75 MHz; DMSO-\(d_6\)) \(\delta\): 71.9, 115.2, 115.5, 115.7, 116.1, 116.5, 116.7, 121.1, 123.7, 123.8, 127.4, 129.1, 129.5, 133.1, 135.2, 136.3, 136.4, 146.9, 159.8, 161.1, 162.4, 162.6, 163.5. Analysis calculated for: C_{20}H_{14}F_{2}N_{2}O : C 71.42, H 4.20, N 8.33 Found : C 71.49, H 4.14, N 8.28.

2-(4-Fluorophenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (9g)

![Chemical structure of 2-(4-Fluorophenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (9g)](image)

Solid, ESI MS (m/z) = 318 (M+H). \(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta\): 6.30 (s, 1H), 6.72-6.79 (m, 2H), 7.25-7.39 (m, 2H), 7.64 (s, 1H), 7.72 (dd, \(J = 6.1, 4.3\) Hz, 1H). \(^{13}\)C NMR (75 MHz; DMSO-\(d_6\)) \(\delta\): 71.5, 115.5, 115.6, 115.7, 116.1, 121.1, 121.4, 124.9, 127.4, 129.1, 129.2, 133.1, 136.3, 140.1, 146.9, 160.1, 162.4, 163.3. Analysis calculated for: C_{20}H_{15}FN_{2}O : C 75.46, H 4.75, N 8.80 Found : C 75.52, H 4.70, N 8.74.
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3-(4-Methoxyphenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9h)

Solid, ESI MS (m/z) = 330 (M+H).\(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta_{\text{H}}\): 3.71 (s, 3H), 6.18 (s, 1H), 6.68-6.75 (m, 2H), 6.85 (d, \(J = 6.9\) Hz, 2H), 7.13 (d, \(J = 2.9\) Hz, 2H), 7.23-7.37 (m, 5H), 7.52 (s, 1H), 7.70 (d, \(J = 1.9\) Hz, 1H). \(^1\)C NMR (75 MHz; DMSO-\(d_6\)) \(\delta_{\text{C}}\): 55.6, 73.6, 114.2, 115.1, 115.7, 115.8, 117.8, 123.9, 127.1, 128.3, 128.4, 128.8, 129.4, 134.1, 134.2, 137.4, 141.2, 141.8, 147.1, 157.2, 162.7. Analysis calculated for: C\(_{22}\)H\(_{20}\)N\(_2\)O\(_2\): C 76.34, H 5.49, N 8.48 Found: C 76.29, H 5.55, N 8.54.

3-(4-Bromophenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9i)

Solid, ESI MS (m/z) = 378 (M+H).\(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta_{\text{H}}\): 6.27 (s, 1H), 6.72 (q, \(J = 8.4\) Hz, 2H), 7.11 (d, \(J = 8.7\) Hz, 3H), 7.24-7.38 (m, 5H), 7.58 (s, 1H), 7.71 (d, \(J = 7.3\) Hz, 1H). \(^1\)C NMR (75 MHz; DMSO-\(d_6\)) \(\delta_{\text{C}}\): 73.4, 115.9, 115.4, 115.6, 115.9, 117.9, 127.2, 128.4, 128.8, 128.9, 129.1, 129.2, 134.2, 137.3, 140.8, 147.2, 158.7, 162.9. Analysis calculated for: C\(_{20}\)H\(_{13}\)BrN\(_2\)O: C 63.34, H 3.99, N 7.39 Found: C 63.39, H 3.94, N 7.45.

2-(4-Methoxyphenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (9j)

Solid, ESI MS (m/z) = 330 (M+H).\(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta_{\text{H}}\): 3.68 (s, 3H), 6.22 (s, 1H), 6.72-6.86 (m, 4H), 7.18-7.32 (m, 7H), 7.53 (d, \(J = 2.2\) Hz, 1H), 7.73 (dd, \(J = 7.6, 1.4\) Hz,
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1H), 13C NMR (75 MHz; DMSO-d₆) δC: 55.4, 72.8, 114.1, 115.2, 115.8, 117.9, 126.4, 126.8, 128.3, 128.4, 129.1, 133.1, 134.1, 141.3, 147.1, 159.6, 162.8. Analysis calculated for: C₂₁H₁₈N₂O₂: C 76.34, H 5.49, N 8.48 Found : C 76.39, H 5.42, N 8.42.

2-(3-Methoxyphenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (9k)

Solid, ESI MS (m/z) = 330 (M+H). 1H NMR (300 MHz; DMSO-d₆) δH: 3.67 (s, 3H), 6.23 (s, 1H), 6.72-6.79 (m, 3H), 6.93 (t, J = 1.3 Hz, 2H), 7.18-7.34 (m, 6H), 7.61 (s, 1H), 7.71 (dd, J = 7.4, 1.2 Hz, 1H)., 13C NMR (75 MHz; DMSO-d₆) δC: 55.4, 72.8, 113.2, 113.7, 115.2, 115.8, 118.1, 119.1, 126.4, 126.5, 128.4, 129.1, 129.9, 134.2, 141.3, 142.8, 146.9, 159.6, 162.7. Analysis calculated for: C₂₁H₁₈N₂O₂: C 76.34, H 5.49, N 8.48 Found : C 76.38, H 5.55, N 8.53.

3-(4-Fluorophenyl)-2-(4-nitrophenyl)-2,3-dihydroquinazolin-4(1H)-one (9l)

Solid, ESI MS (m/z) = 363 (M+H). 1H NMR (300 MHz; DMSO-d₆) δH: 6.48 (s, 1H), 6.73-6.78 (m, 2H), 7.15-7.35 (m, 5H), 7.64-7.77 (m, 3H), 8.17 (d, J = 8.7 Hz, 2H), 13C NMR (75 MHz; DMSO-d₆) δC: 55.4, 72.8, 113.2, 113.7, 115.2, 115.8, 118.1, 119.1, 126.4, 126.5, 128.4, 129.1, 129.9, 134.2, 141.3, 142.8, 146.9, 159.6, 162.7. Analysis calculated for: C₂₀H₁₄FN₃O₃: C 76.34, H 5.49, N 8.48 Found : C 76.38, H 5.55, N 8.53.
2-(4-Hydroxyphenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (9m)

Solid, ESI MS (m/z) = 346 (M+H).\textsuperscript{1}H NMR (300 MHz; DMSO-\textit{d}_6) \( \delta_H \): 3.71 (s, 3H), 6.63-6.75 (m, 4H), 6.83 (d, \( J = 2.1 \) Hz, 1H), 7.09-7.16 (m, 5H), 7.38 (d, \( J = 1.8 \) Hz, 1H), 7.68 (dd, \( J = 5.4, 2.2 \) Hz, 1H), 9.57 (s, 1H). \textsuperscript{13}C NMR (75 MHz; DMSO-\textit{d}_6) \( \delta_C \): 55.6, 73.5, 114.1, 115.1, 115.4, 115.6, 117.6, 128.3, 128.6, 131.4, 133.9, 147.1, 157.6, 157.8, 162.8. Analysis calculated for: C\textsubscript{21}H\textsubscript{18}N\textsubscript{2}O\textsubscript{3}: C 72.82, H 5.24, N 8.09 Found : C 72.86, H 5.19, N 8.01.

2-(4-Hydroxyphenyl)-3-(3-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (9n)

Solid, ESI MS (m/z) = 346 (M+H).\textsuperscript{1}H NMR (300 MHz; DMSO-\textit{d}_6) \( \delta_H \): 3.68 (s, 3H), 6.72-6.86 (m, 4H), 7.18-7.32 (m, 6H), 7.53 (d, \( J = 2.2 \) Hz), 7.73 (dd, \( J = 7.3, 3.2 \) Hz, 1H). \textsuperscript{13}C NMR (75 MHz; DMSO-\textit{d}_6) \( \delta_C \): 55.5, 72.5, 114.2, 115.1, 115.4, 115.5, 117.4, 128.2, 128.5, 131.3, 133.8, 147.2, 157.7, 157.9, 162.9. Analysis calculated for: C\textsubscript{21}H\textsubscript{18}N\textsubscript{2}O\textsubscript{3}: C 72.82, H 5.24, N 8.09 Found : C 72.77, H 5.29, N 8.15.

3-(4-Chlorophenyl)-2-(4-hydroxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (9o)

Solid, ESI MS (m/z) = 350 (M+H).\textsuperscript{1}H NMR (300 MHz; DMSO-\textit{d}_6) \( \delta_H \): 6.59-6.99 (m, 4H), 7.23-7.56 (m, 6H), 7.93-8.00 (m, 2H).\textsuperscript{13}C NMR (75 MHz; DMSO-\textit{d}_6) \( \delta_C \): 73.2, 113.7, 114.2, 114.8,
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115.1, 116.9, 127.3, 127.5, 127.7, 129.1, 129.2, 139.1, 146.3, 157.9, 162.8. Analysis calculated for: C_{21}H_{15}ClN_{2}O_{2}: C 68.48, H 4.31, N 7.99 Found : C 68.53, H 4.26, N 8.05.

3-(3-Bromophenyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one (9p)

Solid, ESI MS (m/z) = 368 (M+H).\textsuperscript{1}H NMR (300 MHz; DMSO-\textit{d}_6) \delta_H: 6.28 (s, 1H), 6.65-6.80 (m, 3H), 7.20 (t, \(J = 3.7\) Hz, 1H), 7.37-7.41 (m, 5H), 7.45-7.66 (m, 5H), \textsuperscript{13}C NMR (75 MHz; DMSO-\textit{d}_6) \delta_C: 70.7, 115.7, 116.1, 120.4, 120.8, 121.2, 124.6, 127.6, 127.8, 128.1, 128.3, 128.6, 133.1, 135.6, 138.9, 144.4, 147.1, 163.1. Analysis calculated for: C_{20}H_{14}Cl_{2}N_{2}O_{2}: C 65.06, H 3.82, N 7.59 Found : C 64.99, H 3.20, N 7.88.

2-(4-Bromophenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (9q)

Solid, ESI MS (m/z) = 378 (M+H).\textsuperscript{1}H NMR (300 MHz; DMSO-\textit{d}_6) \delta_H: 6.21 (s, 1H), 6.68-6.80 (m, 3H), 7.20-7.35 (m, 4H), 7.43 (d, \(J = 9.4\) Hz, 2H), 7.45 (d, \(J = 8.1\) Hz, 2H), 7.60-7.78 (m, 3H), \textsuperscript{13}C NMR (75 MHz; DMSO-\textit{d}_6) \delta_C: 70.6, 115.5, 115.6, 116.1, 121.1, 121.4, 124.9, 127.4, 129.1, 129.5, 131.5, 133.1, 139.2, 140.1, 146.9, 163.4. Analysis calculated for: C_{20}H_{15}BrN_{2}O: C 63.34, H 3.99, N 7.39 Found : C 64.39, H 4.04, N 7.32.

2-(4-Bromophenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (9r)

Solid, ESI MS (m/z) = 408 (M+H).\textsuperscript{1}H NMR (300 MHz; DMSO-\textit{d}_6) \delta_H: 3.75 (s, 3H), 6.34 (s, 1H), 6.66-6.85 (m, 5H), 7.22 (d, \(J = 3.7\) Hz, 2H), 7.28
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(\(t, J = 4.2 \text{ Hz, 1H}\), 7.37 (dd, \(J = 7.7, 5.3 \text{ Hz, 3H}\), 7.47 (d, \(J = 6.3 \text{ Hz, 1H}\)), \(^{13}\text{C NMR (75 MHz; DMSO-}\text{d}_6\)) \(\delta_{\text{C}}\) : 55.5, 68.4, 112.1, 113.9, 115.1, 115.7, 117.4, 121.2, 121.6, 124.4, 127.4, 128.7, 132.7, 133.1, 139.3, 141.7, 146.6, 160.1, 163.8. Analysis calculated for: C\(_{21}\)H\(_{17}\)BrN\(_2\)O\(_2\) : C 61.63, H 4.19, N 6.84 Found : C 61.69, H 4.14, N 6.90.

2-(4-Fluorophenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (9s)

Solid, ESI MS (m/z) = 348 (M+H).\(^1\text{H NMR (300 MHz; DMSO-}\text{d}_6\)) \(\delta_{\text{H}}\) : 3.73 (s, 3H), 6.28 (s, 1H), 6.67-6.87 (m, 5H), 7.18-7.31 (m, 5H), 7.47 (t, \(J = 5.9 \text{ Hz, 2H}\)), 7.66 (d, \(J = 5.0 \text{ Hz, 1H}\)), \(^{13}\text{C NMR (75 MHz; DMSO-}\text{d}_6\)) \(\delta_{\text{C}}\) : 55.5, 71.4, 112.9, 113.9, 115.1, 115.7, 121.1, 121.8, 123.9, 127.4, 128.7, 129.7, 131.4, 133.1, 139.5, 141.7, 146.6, 160.1, 163.9. Analysis calculated for: C\(_{21}\)H\(_{17}\)FN\(_2\)O\(_2\) : C 72.40, H 4.92, N 8.04 Found : C 72.45, H 4.4, N 7.99.

3-(4-Fluorophenyl)-2-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (9t)

Solid, ESI MS (m/z) = 364 (M+H).\(^1\text{H NMR (300 MHz; DMSO-}\text{d}_6\)) \(\delta_{\text{H}}\) : 3.75 (s, 3H), 6.29 (s, 1H), 6.64-6.87 (m, 5H), 7.22-7.30 (m, 4H), 7.43 (t, \(J = 7.9 \text{ Hz, 2H}\)), 7.66-7.80 (m, 3H), \(^{13}\text{C NMR (75 MHz; DMSO-}\text{d}_6\)) \(\delta_{\text{C}}\) : 55.4, 69.6, 112.1, 113.9, 115.2, 115.3, 115.7, 121.1, 121.5, 124.9, 1274, 128.7, 129.1, 133.1, 140.4, 141.8, 146.6,
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160.1, 164.1. Analysis calculated for: C\textsubscript{21}H\textsubscript{17}ClN\textsubscript{2}O\textsubscript{2} : C 69.14, H 4.70, N 7.68 Found : C 69.19, H 4.63, N 7.61.

2.6.4 GENERAL PROCEDURE FOR THE PREPARATION OF CHAIN DERIVATIVES OF 2-SUBSTITUTED- 2,3 DIHYDROQUINAZOLINONES:

A mixture of 2-substituted- 2,3-dihydroquinazolinone and chloro alkyl amine hydrochloride in presence of anhydrous K\textsubscript{2}CO\textsubscript{3} in dry acetone (20 mL) were refluxed for 1-2 h. After completion of reaction as evidenced by TLC, solvent was removed in vacuo. The residue obtained was suspended in ethyl acetate and extracted with water. Aqueous layer was further extracted with ethyl acetate. Combined organic layers were dried with Na\textsubscript{2}SO\textsubscript{4}, filtered and solvent was removed in vacuo to give different amino alkyl chain derivatives of 2-substituted- 2,3-dihydroquinazolinone.

2.6.5 CHARACTERISATION DATA FOR THE SYNTHESIZED COMPOUNDS

3-(4-Chlorophenyl)-2-(4-(2-(piperidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11a)

Solid, ESI MS (m/z) = 462 (M+H).\textsuperscript{1}H NMR (300 MHz; Pyr) δ\textsubscript{H} : 1.26-1.51 (m, 6H), 2.22-2.33 (m, 4H), 2.58 (t, J = 5.9 Hz, 2H), 3.98 (t, J = 5.9 Hz, 2H), 6.50 (s, 1H), 6.82 (t, J = 8.7 Hz, 2H), 7.00 (d, J = 8.0 Hz, 1H), 7.32 (d, J = 1.4 Hz, 3H), 7.46-7.58 (m, 4H), 8.35 (d, J = 24.7 Hz, 1H), 8.46 (s, 1H), \textsuperscript{13}C NMR (75 MHz; Pyr) δ\textsubscript{C} : 24.2, 26.1, 54.8, 57.7, 66.1, 73.7, 114.6,
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115.1, 116.3, 118.1, 128.4, 128.6, 128.9, 131.3, 132.7, 134.1, 140.3, 147.5, 159.3, 163.5. Analysis calculated for: C_{27}H_{28}ClN_{3}O_{2}: C 70.20, H 6.11, N 9.10 Found : C 70.26, H 6.06, N 9.16.

3-(4-Chlorophenyl)-2-(4-(2-(pyrrolidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11b)

![Chemical Structure](image)

Solid, ESI MS (m/z) = 448 (M+H).\(^1\)H NMR (300 MHz; CDCl\(_3\)-d\(_6\)) \(\delta_H\) : 1.76-1.91 (m, 4H), 2.57-2.69 (m, 4H), 2.80 (t, \(J = 8.6\) Hz, 2H), 3.99 (t, \(J = 8.7\) Hz, 2H), 6.06 (s, 1H), 6.71-6.80 (m, 4H), 6.94 (s, 1H), 7.12-7.29 (m, 5H), 7.19 (s, 1H), 7.81 (d, \(J = 8.2\) Hz, 1H), \(^{13}\)C NMR (75 MHz; CDCl\(_3\)+DMSO-d\(_6\)) \(\delta_C\) : 28.6, 59.7, 60.1, 72.1, 82.5, 83.2, 83.8, 109.9, 119.6, 120.1, 120.6, 123.2, 133.3, 133.4, 133.6, 133.9, 136.9, 137.3, 139.1, 144.6, 151.8, 164.2, 168.4. Analysis calculated for: C\(_{26}\)H\(_{26}\)ClN\(_3\)O\(_2\) : C 69.71, H 5.85, N 9.38 Found : C 69.77, H 5.79, N 9.43.

2-(4-(1-(Dimethylamino)propan-2-yl)oxy)phenyl)-3-(4-fluorophenyl)-2,3-dihydroquinazolin-4(1H)-one (11c)

![Chemical Structure](image)

Solid, ESI MS (m/z) = 420 (M+H).\(^1\)H NMR (300 MHz; Pyridine) \(\delta_H\) : 0.99 (d, \(J = 3.6\) Hz, 3H), 2.21 (s, 6H), 2.86-2.94 (m, 1H), 3.69-3.71 (m, 1H), 3.96-4.01 (m, 1H), 6.47 (s, 1H), 6.87-7.09 (m, 4H), 7.20 (s, 2H), 7.34 (t, \(J = 7.0\) Hz, 1H), 7.46-7.57 (m, 3H), 8.28 (s, 1H), 8.38 (d, \(J = 8.6\) 1H), \(^{13}\)C NMR (50 MHz; Pyridine) \(\delta_C\) : 13.8, 32.1, 42.9, 47.8, 60.1, 72.1, 76.1, 116.6, 116.9, 117.2, 117.6, 118.3, 120.1, 130.4, 130.8, 131.2, 131.3, 134.8, 135.9, 139.6,
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149.5, 160.2, 161.3, 165.4. Analysis calculated for: C\textsubscript{25}H\textsubscript{26}FN\textsubscript{3}O\textsubscript{2} : C 71.58, H 6.25, N 10.02 Found : C 71.65, H 6.19, N 9.96.

2-(4-(1-(Dimethylamino)propan-2-yloxy)phenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (11d)

Solid, ESI MS (m/z) = 432 (M+H).\textsuperscript{1}H NMR
(300 MHz; Pyridine) \(\delta_H\) : 0.98 (d, J = 4.5 Hz, 3H), 2.21 (s, 6H), 2.82-2.92 (m, 1H), 3.54 (s, 3H), 3.65-3.75 (m, 1H), 3.91-4.00 (m, 1H), 6.47 (s, 1H), 6.86-7.00 (m, 4H), 7.21 (s, 2H), 7.34-7.47 (m, 2H), 7.57 (d, J = 7.0 Hz, 2H), 8.25 (s, 1H), 8.42 (d, J = 5.7 Hz) , \textsuperscript{13}C NMR (50 MHz; Pyridine) \(\delta_C\) : 13.8, 20.1, 43.1, 47.8, 56.8, 59.9, 66.2, 71.9, 76.3, 116.1, 116.5, 116.8, 117.9, 118.6, 119.9, 130.4, 130.8, 130.9, 135.2, 135.7, 149.5, 159.9, 161.2, 165.4. Analysis calculated for: C\textsubscript{26}H\textsubscript{29}N\textsubscript{3}O\textsubscript{3} : C 72.37, H 6.77, N 9.74 Found : C 72.42, H 6.71, N 9.69.

2-(4-(2-(Dimethylamino)ethoxy)phenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one(11e)

Solid, ESI MS (m/z) = 418 (M+H).\textsuperscript{1}H NMR
(300 MHz; DMSO-\textsubscript{d\textsubscript{6}}) \(\delta_H\) : 2.40 (s, 6H), 2.84 (t, J = 5.7 Hz, 2H), 3.73 (s, 3H), 4.04 (t, J = 7.1 Hz, 2H), 6.54 (s, 1H), 6.72-6.80 (m, 2H), 6.91 (d, J = 7.1 Hz, 4H), 7.20 (t, J = 8.8 Hz, 1H), 7.37 (d, J = 6.3 Hz, 2H), 7.51 (d, J = 6.8 Hz, 2H), 7.66 (d, J = 5.4 Hz, 1H), \textsuperscript{13}C NMR (50 MHz; DMSO-\textsubscript{d\textsubscript{6}}) \(\delta_C\) : 45.3, 55.5, 57.6, 66.7, 70.6, 76.1, 113.9, 114.4, 115.2, 116.6, 121.1, 125.1, 127.4, 128.6, 131.4, 132.5, 133.5, 146.9,
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3-(4-Methoxyphenyl)-2-(4-(2-(pyrrolidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11f)

Solid, ESI MS (m/z) = 444 (M+H).\textsuperscript{1}H NMR (200 MHz; Pyridine) δ\textsubscript{H}: 1.51-1.68 (m, 4H), 2.43-2.49 (m, 4H), 2.73 (t, J = 8.9 Hz, 2H), 3.56 (s, 3H), 3.97 (t, J = 8.9 Hz, 2H), 6.47 (s, 1H), 6.86-7.01 (m, 4H), 7.22 (s, 2H), 7.32-7.48 (m, 2H), 7.57-7.61 (m, 2H), 8.24 (s, 1H), 8.43 (d, J = 4.6 Hz, 1H), 8.73 (s, 1H), \textsuperscript{13}C NMR (75 MHz; DMSO-d\textsubscript{6}) δ\textsubscript{C}: 24.1, 53.1, 55.5, 57.6, 66.4, 70.6, 113.9, 114.4, 115.2, 116.1, 121.2, 125.5, 127.4, 128.6, 131.4, 132.5, 133.1, 146.9, 156.5, 158.4, 163.8. Analysis calculated for: C\textsubscript{27}H\textsubscript{29}N_3O_3: C 73.11, H 6.59, N 9.47 Found: C 73.06, H 6.54, N 9.41.

3-(4-Methoxyphenyl)-2-(4-(2-(piperidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11g)

Solid, ESI MS (m/z) = 458 (M+H).\textsuperscript{1}H NMR (300 MHz; Pyridine) δ\textsubscript{H}: 0.85-1.46 (m, 6H), 2.32 (s, 4H), 2.56 (t, J = 5.9 Hz, 2H), 3.50 (s, 3H), 3.93 (t, J = 5.7 Hz, 2H), 6.43 (s, 1H), 6.84-6.97 (m, 4H), 7.18-7.56 (m, 6H), 8.23 (s, 1H), 8.40 (d, J = 7.0 Hz, 1H), \textsuperscript{13}C NMR (50 MHz; Pyridine) δ\textsubscript{C}: 26.2, 28.1, 56.7, 56.8, 59.7, 68.1, 76.3, 116.5, 116.7, 118.5, 119.9, 130.4, 130.8, 135.2, 135.7, 149.5, 159.9, 161.2, 165.4. Analysis calculated for: C\textsubscript{28}H\textsubscript{31}N_3O_3: C 73.50, H 6.83, N 9.18 Found: C 73.55, H 6.89, N 9.13.
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3-Phenyl-2-(4-(2-(piperidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11h)

Solid, ESI MS (m/z) = 428 (M+H).\(^1\)H NMR (200 MHz; DMSO-\(d_6\)) \(\delta_H\) : 1.21-1.44 (m, 6H), 2.33-2.49 (m, 4H), 2.53 (t, \(J = 8.7\) Hz, 2H), 3.92 (t, \(J = 8.5\) Hz, 2H), 6.18 (s, 1H), 6.66-6.85 (m, 4H), 7.13-7.34 (m, 6H), 7.61 (s, 1H), 7.72 (d, \(J = 6.9\) Hz, 1H), \(^1\)^C NMR (50 MHz; DMSO-\(d_6\)) \(\delta_C\) : 29.5, 31.1, 36.9, 59.9, 62.9, 71.1, 77.9, 119.8, 120.4, 120.9, 123.5, 131.5, 131.9, 133.5, 133.6, 134.2, 138.2, 139.3, 146.4, 152.2, 164.5, 167.9. Analysis calculated for: C\(_{27}\)H\(_{29}\)N\(_3\)O\(_2\) : C 75.85, H 6.84, N 9.83 Found : C 75.91, H 6.79, N 9.78.

2-(4-(2-Morpholinoethoxy)phenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (11i)

Solid, ESI MS (m/z) = 430 (M+H).\(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta_H\) : 2.40 (t, \(J = 9.4\) Hz, 4H), 2.60 (t, \(J = 6.5\) Hz, 2H), 3.52 (t, \(J = 5.6\) Hz, 4H), 4.01 (t, \(J = 5.6\) Hz, 2H), 6.20 (s, 1H), 6.68-6.86 (m, 4H), 7.15-7.35 (m, 6H), 7.53 (s, 1H), 7.73 (d, \(J = 9.1\) Hz, 1H), \(^1\)^C NMR (50 MHz; DMSO-\(d_6\)) \(\delta_C\) : 59.2, 62.5, 70.8, 71.7, 77.9, 119.8, 120.4, 120.9, 123.1, 131.5, 131.8, 133.5, 134.2, 138.3, 139.3, 146.4, 152.2, 163.9, 167.9. Analysis calculated for: C\(_{26}\)H\(_{27}\)N\(_3\)O\(_3\) : C 72.71, H 6.34, N 9.78 Found : C 72.77, H 6.40, N 9.73.
2-(4-(2-(Dimethylamino)ethoxy)phenyl)-3-(4-fluorophenyl)-2,3-dihydroquinazolin-4(1H)-one (11j)

Solid, ESI MS \((m/z) = 406\) (M+H). \(^1\)H NMR (300 MHz; Pyridine) \(\delta_H\): 2.21 (s, 6H), 2.55 (t, \(J = 5.7\) Hz, 2H), 3.93 (t, \(J = 5.7\) Hz, 2H), 6.44 (s, 1H), 6.86 (d, \(J = 2.7\) Hz, 4H), 6.97-7.09 (m, 4H), 7.33 (t, \(J = 5.3\) Hz, 1H), 7.45-7.56 (m, 1H), 8.21 (s, 1H), 8.35 (d, \(J = 7.5\) Hz, 1H), \(^{13}\)C NMR (50 MHz; DMSO-\(d_6\)) \(\delta_C\): 45.3, 57.6, 66.7, 71.5, 114.4, 115.2, 116.1, 116.1, 116.2, 121.2, 123.7, 123.8, 127.4, 128.6, 132.5, 133.1, 135.2, 146.9, 155.4, 159.8, 162.4, 163.5. Analysis calculated for: \(C_{24}H_{24}FN_3O_2\): C 71.09, H 5.97, N 10.36 Found: C 71.02, H 6.02, N 10.30.

2-(4-(2-(Diisopropylamino)ethoxy)phenyl)-3-(2-fluorophenyl)-2,3-dihydroquinazolin-4(1H)-one (11k)

Solid, ESI MS \((m/z) = 462\) (M+H). \(^1\)H NMR (300 MHz; DMSO-\(d_6\)) \(\delta_H\): 0.81 (s, 12H), 2.50 (t, \(J = 5.3\) Hz, 2H), 7.85-3.01 (m, 2H), 4.09 (t, \(J = 7.3\) Hz, 2H), 6.59 (s, 1H), 6.72-6.83 (m, 4H), 7.18-7.24 (m, 4H), 7.39 (d, \(J = 5.2\) Hz, 2H), 7.49 (t, \(J = 6.4\) Hz, 1H), 7.07 (d, \(J = 5.7\) Hz, 1H), \(^{13}\)C NMR (50 MHz; DMSO-\(d_6\)) \(\delta_C\): 20.1, 46.3, 48.7, 66.5, 72.8, 72.9, 114.4, 115.7, 115.9, 116.1, 121.1, 125.2, 126.8, 126.9, 127.3, 127.4, 127.6, 127.9, 128.2, 128.4, 128.6, 133.1, 133.4, 146.3, 155.8, 156.5, 159.1, 162.8. Analysis calculated for: \(C_{28}H_{32}FN_3O_2\): C 72.86, H 6.99, N 9.10 Found: C 72.80, H 7.04, N 9.04.
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2-(4-(3-(Dimethylamino)propoxy)phenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (11l)

Solid, ESI MS (m/z) = 432 (M+H). ¹H NMR (200 MHz; DMSO-d₆) δH : 2.08-2.11 (m, 2H), 2.58 (s, 6H), 3.06 (t, J = 4.1 Hz, 2H), 3.73 (s, 3H), 3.94 (t, J = 8.5 Hz, 2H), 6.54 (s, 1H), 6.72-6.80 (m, 2H), 6.91-6.97 (m, 4H), 7.20 (t, J = 2.6 Hz, 1H), 7.36 (d, J = 5.7 Hz, 2H), 7.53 (dd, J = 7.3, 6.5 Hz, 2H), 7.66 (d, J = 4.9 Hz, 1H), ¹³C NMR (50 MHz; DMSO-d₆) δC : 27.4, 47.8, 55.4, 55.6, 65.9, 70.6, 113.9, 114.1, 115.2, 115.9, 121.2, 125.1, 127.4, 128.7, 131.4, 132.5, 133.1, 146.9, 157.1, 158.4, 163.8. Analysis calculated for: C₂₆H₂₉N₃O₃: C 72.37, H 6.77, N 9.74 Found : C 72.43, H 7.71, N 9.80.

3-(4-Fluorophenyl)-2-(4-(2-(pyrrolidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11m)

Solid, ESI MS (m/z) = 432 (M+H). ¹H NMR (300 MHz, DMSO-d₆) δ 1.75 – 1.57 (m, 4H), 2.60 – 2.42 (m, 3H), 2.64 (t, J = 7.2 Hz, 2H), 4.06 (t, J = 7.2 Hz, 2H), 4.84 (s, 1H), 6.82 – 6.69 (m, 4H), 7.00 (dd, J = 7.5, 1.5 Hz, 1H), 7.25 – 7.12 (m, 2H), 7.50 – 7.33 (m, 5H), 7.68 (dd, J = 7.5, 1.5 Hz, 1H). ¹³C NMR (75 MHz, DMSO-d₆) δ : 24.8, 54.2, 54.9, 67.3, 69.6, 113.3, 116.1, 116.5, 116.7, 121.3, 127.1, 129.2, 129.9, 132.7, 134.3, 136.2, 145.8, 159.7, 162.9, 164.2. Analysis calculated for: C₂₆H₂₆FN₃O₂: C 72.37, H 6.07, N 9.74, Found : C 72.44, H 6.01, N 9.68.
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2-(4-(2-Morpholinoethoxy)phenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (11n)
Solid, ESI MS (m/z) = 430 (M+H). $^1$H NMR (300 MHz; DMSO-$d_6$) $\delta_H$: 2.50 (t, $J = 4.7$ Hz, 4H), 2.69 (t, $J = 3.8$ Hz, 2H), 3.57 (t, $J = 4.7$ Hz, 4H), 4.06 (t, $J = 3.8$ Hz, 2H), 4.94 (s, 1H), 6.82 – 6.69 (m, 4H), 6.95 – 7.13 (m, 2H), 7.30– 7.50 (m, 3H), 7.55–7.73 (m, 3H). $^{13}$C NMR (75 MHz; DMSO-$d_6$) $\delta_C$: 53.7, 55.7, 67.8, 67.3, 69.6, 136.2, 137.9, 145.8, 159.8, 164.2. Analysis calculated for: C$_{26}$H$_{27}$N$_3$O$_3$: C 72.71, H 6.34, N 9.78 Found : C 72.76, H 6.28, N 9.84.

2-(4-(2-(Diisopropylamino)ethoxy)phenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (11o)
Solid, ESI MS (m/z) = 474 (M+H). $^1$H NMR (300 MHz, DMSO-$d_6$) $\delta$: 7.79 –7.89 (m, 2H), 7.68 (dd, $J = 7.5$, 1.5 Hz, 1H), 7.38 –7.50 (m, 3H), 6.91 –7.05 (m, 3H), 6.69 – 6.82 (m, 4H), 4.94 (s, 1H), 4.07 (t, $J = 7.1$ Hz, 2H), 3.79 (s, 3H), 2.80– 3.06 (m, 4H), 1.00 (d, $J = 6.1$ Hz, 12H). $^{13}$C NMR (75 MHz, DMSO-$d_6$) $\delta$: 21.2, 45.3, 50.4, 56.8, 67.1, 69.6, 113.3, 114.9, 116.3, 121.3, 127.1, 127.8, 129.9, 132.1, 145.8, 156.9, 159.8, 164.2. Analysis calculated for: C$_{29}$H$_{35}$N$_3$O$_3$: C 72.54, H 7.45, N 8.87 Found : C 72.60, H 7.39, N 8.94.
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2-(4-(2-(Diisopropylamino)ethoxy)phenyl)-3-(4-fluorophenyl)-2,3-dihydroquinazolin-4(1H)-one (11p)

Solid, ESI MS (m/z) = 462 (M+H). $^1$H NMR (300 MHz, DMSO-$d_6$) $\delta$: 1.30 (d, $J=6.1$ Hz, 12H), 2.75 (t, $J=6.1$ Hz, 2H), 2.93 (t, $J=7.0$ Hz, 2H), 4.07 (t, $J=7.0$ Hz, 2H), 4.07 (t, $J=7.0$ Hz, 2H), 4.94 (s, 1H), 6.69–6.82 (m, 4H), 7.06 (dd, $J=7.5$, 1.5 Hz, 1H), 7.19 (dd, $J=8.5$, 7.0 Hz, 2H), 7.50 – 7.32 (m, 5H), 7.68 (dd, $J=7.5$, 1.5 Hz, 1H),$^{13}$C NMR (75 MHz, DMSO-$d_6$) $\delta$: 21.2, 45.3, 50.4, 67.1, 69.6, 113.3, 116.1, 116.5, 116.7, 121.3, 127.1, 129.2, 129.9, 132.7, 134.3, 136.2, 145.8. Analysis calculated for: C$_{28}$H$_{23}$FN$_3$O$_2$ : C 72.86, H 6.99, N 9.10 Found : C 72.80, H 7.05, N 9.04.

2-(4-(3-(Dimethylamino)propoxy)phenyl)-3-(4-methoxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (11q)

Solid, ESI MS (m/z) = 432 (M+H). $^1$H NMR (300 MHz, DMSO-$d_6$) $\delta$: 1.82 (q, $J=7.6$ Hz, 2H), 2.34 (t, $J=7.7$ Hz, 2H), 3.79 (s, 3H), 4.04 (t, $J=7.6$ Hz, 2H), 4.93 (s, 1H), 6.69 – 6.82 (m, 4H), 6.91 – 7.05 (m, 3H), 7.68 (dd, $J=7.5$, 1.5 Hz, 1H), 7.79 – 7.89 (m, 2H),$^{13}$C NMR (75 MHz, DMSO-$d_6$) $\delta$: 164.2, 159.8, 156.9, 145.8, 136.7, 132.7, 132.2, 129.9, 127.8, 127.1, 121.3, 116.3, 114.9, 113.3, 69.6, 67.1, 56.9, 56.8, 45.5, 27.2. Analysis calculated for: C$_{26}$H$_{29}$N$_3$O$_3$ : C 72.37, H 6.77, N 9.74, Found : C 72.43, H 6.71, N 8.98.
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3-Phenyl-2-(4-(2-(pyrrolidin-1-yl)ethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11r)

Solid, ESI MS (m/z) = 414 (M+H). $^1$H NMR (300 MHz, DMSO-$d_6$) $\delta$ : 1.57–1.75 (m, 4H), 2.42–2.60 (m, 3H), 2.64 (t, $J = 7.2$ Hz, 2H), 4.06 (t, $J = 7.2$ Hz, 2H), 4.79 (s, 1H), 6.69–6.82 (m, 4H), 6.95–7.13 (m, 2H), 7.30–7.50 (m, 5H), 7.55–7.73 (m, 3H). $^{13}$C NMR (75 MHz, DMSO-$d_6$) $\delta$: 24.8, 54.2, 54.9, 67.3, 69.6, 113.3, 116.3, 121.3, 126.2, 127.1, 128.4, 129.9, 132.7, 136.2, 137.9, 145.8, 159.8, 164.2.

Analysis calculated for: C$_{26}$H$_{29}$N$_3$O$_3$: C 75.52, H 6.58, N 10.16, Found: C 72.43, H 6.71, N 8.98.

2-(4-(2-(Dimethylamino)ethoxy)phenyl)-3-phenyl-2,3-dihydroquinazolin-4(1H)-one (11s)

Solid, ESI MS (m/z) = 388 (M+H). $^1$H NMR (300 MHz, DMSO-$d_6$) $\delta$ : 1H NMR (300 MHz, DMSO-$d_6$) $\delta$: 2.72 (t, $J = 7.2$ Hz, 2H), 4.07 (t, $J = 7.2$ Hz, 2H), 4.93 (s, 1H), 6.69–6.82 (m, 4H), 6.95–7.13 (m, 2H), 7.30–7.50 (m, 5H), 7.55–7.73 (m, 3H). $^{13}$C NMR (75 MHz, DMSO-$d_6$) $\delta$: 45.5, 58.5, 68.1, 69.6, 113.3, 116.3, 121.3, 126.2, 127.15, 128.4, 129.9, 132.7, 136.2, 137.9, 145.8, 159.8, 164.2. Analysis calculated for: C$_{24}$H$_{25}$N$_3$O$_2$: C 74.39, H 6.50, N 10.84, Found: C 74.44, H 6.56, N 10.80.
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3-(4-Fluorophenyl)-2-(4-(2-morpholinoethoxy)phenyl)-2,3-dihydroquinazolin-4(1H)-one (11t)

Solid, ESI MS (m/z) = 388 (M+H). $^1$H NMR (300 MHz, DMSO-d$_6$) δ : $^1$H NMR (300 MHz, DMSO-d$_6$) δ : 2.72 (t, $J = 7.2$ Hz, 2H), 4.07 (t, $J = 7.2$ Hz, 2H), 4.93 (s, 1H), 6.69 – 6.82 (m, 4H), 6.95– 7.13 (m, 2H), 7.30 –7.50 (m, 5H), 7.55– 7.73 (m, 3H).$^{13}$C NMR (75 MHz, DMSO-d$_6$) δ : 45.5, 58.5, 68.1, 69.6, 113.3, 116.3, 121.3, 126.2, 127.15, 128.4, 129.9, 132.7, 136.2, 137.9, 145.8, 159.8, 164.2. Analysis calculated for: C$_{24}$H$_{25}$N$_3$O$_2$: C 74.39, H 6.50, N 10.84, Found : C 74.44, H 6.56, N 10.80.
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Figure 2.2. $^1$H and $^{13}$C NMR of 5 in DMSO-$d_6$
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Figure 2.3. $^1$H NMR and $^{13}$C NMR of 9i in DMSO-$d_6$
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Figure 2.4. $^1$H NMR and $^{13}$C NMR of 9j in DMSO-$d_6$
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Figure 2.5. $^1$H NMR and $^{13}$C NMR of 11e in Pyr.