INTRODUCTION

The thiazole chemistry has been extensively developing because of their unique physiological properties. Thiazoles are stable, non-carcinogenic aromatic compounds with relatively small size. Heterocyclic systems containing thiazole show wide range of activities. The versatility of these nuclei is demonstrated by the fact that some of these compounds exhibit antifungal, antibacterial, antihistaminic, anti thyroid and anti tubercular activities. The synthetic importance of thiazoles, thiadiazoles, thiadiazines and their condensed heterocyclic systems have been increased much by their recent uses as anthelmintics, anti neoplastic, vulcanization accelerators and photographic sensitizers Thiazoles and pyrazoles are highly versatile ring systems displaying a large number of mild to potential pharmacological activities. Some of them are utilized as medicines. According to literature survey, Thiazoles were reported to possess anti-microbial, analgesic, antiinflammatory, anti-cancer, anti-tubercular, anthelmintic and diuretic activities. Anti-microbial activities of some substituted thiazoles are well established because it posses (S-C=N) toxophoric unit. Thiazoles have enhanced lipid solubility with hydrophilicity. Thiazoles are easily metabolized by routine biochemical reactions and are non-carcinogenic in nature. In addition, pyrazoles are reported as anti-microbial, analgesic, anti-inflammatory, anti hypertensive, anti-depressant and anticancer agents. We herewith proposed to synthesize novel compounds containing both pyrazole and thiazole moieties. Antipyrine was the first pyrazolin-5-one derivative used as an analgesic and antipyrine derivatives have been synthesized and evaluated as potent anti-inflammatory, analgesic and antimicrobial agents. Also the chemistry of antipyrine and its derivatives has been extensively investigated due to its physiological properties. Pyrazoline derivatives have also been reported in the literature to exhibit various pharmacological activities such as antimicrobials, Anti inflammatory and hypertensive.

MATERIALS AND METHODS

The commercially available AR and LR grade chemicals were used without further purification. Chemical reagents and solvents were purchased from sigma aldrich. Melting points were determined in an open glass capillaries on gallen camp apparatus and corrected. The percentage compositions of the elements (CHNS) for the compounds were determined using an elemental analyzer CHNS model fison EA 1108. The infrared spectra were recorded as potassium bromide disc using a perkin- elmer spectrophotometer GX. The 'H and 13C nuclear magnetic resonance spectra were recorded using JEOL JNM-ECP 400 spectrometer in DMSO-d6 as the solvent using TMS as an internal standard, and chemical shifts are expressed as ppm. Mass spectra were recorded on micro-mass Q-TOF and shizmadzu LCMS 2010A mass spectrometer and the reactions were followed by TLC (silica gel, aluminium sheets 60 F254, Merck).

Final compound,
The compounds were screened for their antibacterial activity against several microorganisms. The Antimicrobial Activity showed that most of the synthesized compounds exhibited mild to moderate antimicrobial activity against the tested microorganisms. The results are presented in Table 1, 2, 3, and 4.

### Result and Discussion

Most of the synthesized compounds exhibited myristic acid-mild to moderate antimicrobial activity against the tested microorganisms compared to standard drugs. Compounds 2d and 2h displayed moderate anti-bacterial activity, while the remaining compounds showed lesser activity. All the compounds exhibited moderate antifungal activity. The entire synthesized compound exhibited better anti-fungal activity than anti-bacterial activity. In addition to that, many compounds are most active against gram-positive bacteria than the gram-negative one. The potent anti-microbial activity exhibited by 2d and 2h is due to the incorporation of electron donating groups. The interesting results observed that both electrons donating as well as electron with drawing groups were found to increase the anti-microbial properties, where as unsubstituted derivatives exhibited lesser degree of activity. In conclusion, the present study highlights the importance of pyrazole and thiazole ring features responsible for the anti-microbial activities and therefore may serve as a lead molecule for further modification to obtain clinically useful novel entities.

### Antimicrobial Activity

The compounds were screened for their antibacterial activity against four strains of bacteria: *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, and *Candida albicans* and *Aspergillus niger* using paper disc technique. The zone of inhibition against all the microorganisms was measured in millimeter. The antifungal activity studies were carried out against *Candida albicans*, *Aspergillus niger*, *Aspergillus niger* fumigatus, *Rhizopus* sps., *Penicillium* sps., *Mucor* sps. The results are presented in the Table 1, 2, 3, and 4.

### Spectral Data

2a) IR(KBr):µ(cm⁻¹) 3277(NHR str), 1645(C=O str) 1550, 1519(AR C-C str), 563(C-S-C str), CH₁-N (2750 cm⁻¹): H NMR(DMSO, ppm): 7.49(S,1H,CH of thiazole) 6.66(1-N-N 8.35(S,1H,N=CH)), 6.67-7.23(m,9H,Ar-H); MS(EI): 394.10(M+): E. Analysis. Found: C, 63.57; H, 4.58; Cl, 8.95; N, 17.69. Calculated: C, 60.45; H, 4.52; Cl, 8.92; N, 17.58; S, 8.07 mol. formula: C₂₉H₂₉Cl₂N₂S₂.

### Brain Heart Infusion (BHI) Agar Composition

- Calf brains (infusion from 200 g) 12.5
- Beef heart (infusion from 250 g) 5.0
- Protease peptone 10.0
- Sodium chloride 5.0
- D (+) Glucose 2.0
- Disodium hydrogen phosphate 2.5
- Agar 10.0
- Final pH 7.4 +/- 0.2 at 37°C
- Store prepared media below 8°C, protected from direct light.
- Store dehydrated powder, in a dry place, in tightly-sealed containers at 2-25°C.

### Directions

- Suspend the above ingredients in 1 liter of distilled water.
- Boil to dissolve the medium completely.
- Distribute into tubes, plates or flasks and sterilize by autoclaving at 121°C for 15 minutes.

### Table 1

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Microorganisms</th>
<th>Control</th>
<th>2a</th>
<th>2b</th>
<th>2c</th>
<th>2d</th>
<th>Ciprofloxacin</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td><em>Klebsiella pneumoniae</em></td>
<td>-</td>
<td>7 mm</td>
<td>8 mm</td>
<td>9 mm</td>
<td>21 mm</td>
<td>20 mm</td>
</tr>
<tr>
<td>2</td>
<td><em>Staphylococcus aureus</em></td>
<td>-</td>
<td>16 mm</td>
<td>15 mm</td>
<td>20 mm</td>
<td>18 mm</td>
<td>20 mm</td>
</tr>
<tr>
<td>3</td>
<td><em>Escherichia coli</em></td>
<td>-</td>
<td>20 mm</td>
<td>20 mm</td>
<td>22 mm</td>
<td>25 mm</td>
<td>24 mm</td>
</tr>
<tr>
<td>4</td>
<td><em>Streptococcus faecalis</em></td>
<td>-</td>
<td>10 mm</td>
<td>20 mm</td>
<td>8 mm</td>
<td>24 mm</td>
<td>26 mm</td>
</tr>
<tr>
<td>5</td>
<td><em>Bacillus subtilis</em></td>
<td>-</td>
<td>10 mm</td>
<td>15 mm</td>
<td>15 mm</td>
<td>22 mm</td>
<td>24 mm</td>
</tr>
<tr>
<td>6</td>
<td><em>Pseudomonas aeruginosa</em></td>
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<td>10 mm</td>
<td>14 mm</td>
<td>30 mm</td>
<td>21 mm</td>
<td>15 mm</td>
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</table>

Note: - no zone of inhibition
CONCLUSION
The main aim of the present study is to synthesize and investigate the anti microbial activity of the heterocyclic derivatives containing pyrazole and thiazole moieties with the hope of discovering new structures serving as potential broad spectrum antimicrobial agents. The antibacterial and antifungal data revealed that the compounds showed good to moderate antimicrobial activity. Basically introduction of pyrazole moiety in the structure of the final compound has increased the antifungal activity compared to the other. From the study, it can be concluded that all the synthesized compounds demonstrated potential antimicrobial activity.
REFERENCES

22. Lozach N. Forty years of heterocyclic sulphur chemistry in sulphur reports 1990; 10(7).

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