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Synthesis and Antimicrobial Activity of some novel Formazan Derivatives

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ABSTRACT

*In the present investigation, a series of uracil formazans (**5a-r**) were synthesized by condensation of schiff base (**4a-c**) and diazonium salt of various substituted aromatic amines. The intermediate schiff base (**4a-c**) was itself synthesized by condensation of (6-hydrazino-3-methyl uracil) with various aromatic aldehydes (**3a-c**). The structures of the compounds have been confirmed by elemental analysis and spectral analysis. Newly synthesized compounds were screened for their antimicrobial activities.*

Keywords: Schiff base, Formazan, Antimicrobial activity.

INTRODUCTION

Formazans have been found to possess important medical applications; the tetrazolium salts are classified as promoter of vitality formazans and heterocyclic hydrazones are known for their spectrum of biological activities such as antiviral [1,2] antimicrobial [3], anti-inflammatory [4], antifungal [5], anticancer [6], anti-HIV [7-8], *etc*. Several formazans show promising anti-fertility [9] and anti-parkinsonian activity [10-13].

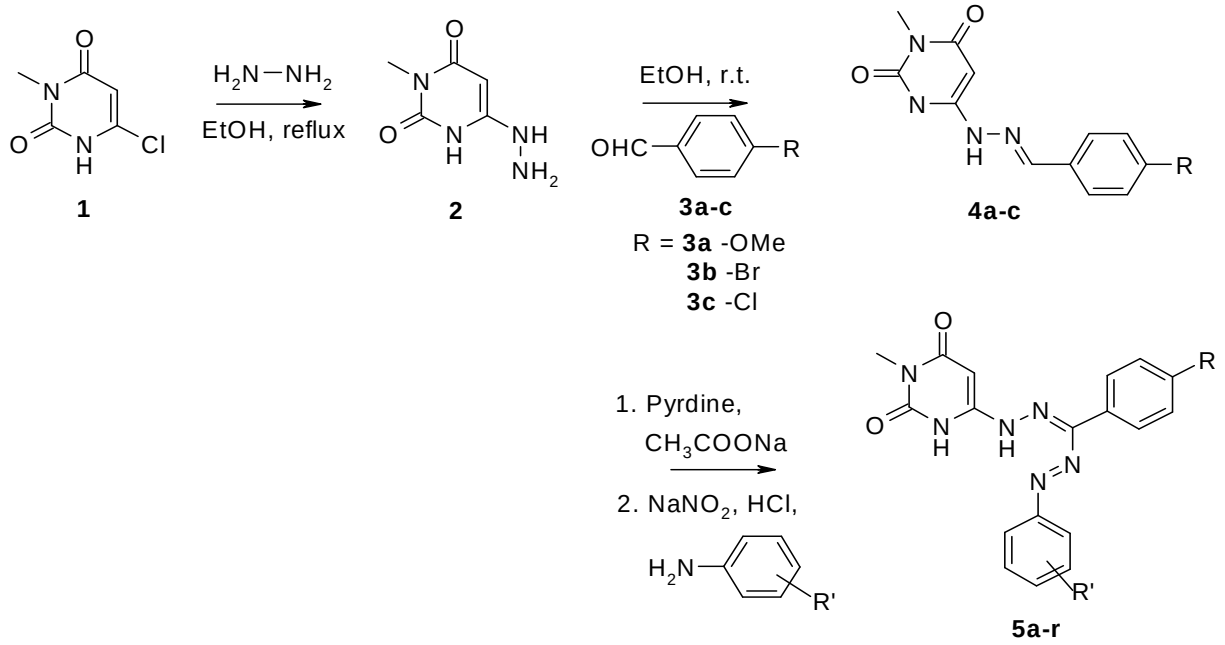
The importance of uracil and its annelated substrates is well recognized by synthetic as well as biological chemist, with the development of clinically useful anticancer (5-fluorouracil [14]) and antiviral drugs (AZT [15], BVDU [16, 17]). 6-(Arylazo) pyrimidine antimicrobials selectively inhibit replicative DNA synthesis in gram-positive bacteria by inhibiting, specifically, the replication-specific enzyme, DNA polymerase III **[**18-20].

In the present study we have synthesized eighteen substituted formazan derivatives (**5a-r**) by coupling Schiff base prepared from 6-hydrazino-3-methylpyrimidine-2,4(*1H,3H*)-dione **(2)** and various aldehydes **(3a-c)** with appropriate aryl diazonium chlorides in pyridine. (**Scheme 1**)
The structures of these derivatives were assigned on the basis of elemental analysis, IR and ^{1}H-NMR and ^{13}C-NMR spectral data. The synthesized compounds were screened for their antimicrobial activities.

EXPERIMENTAL SECTION

Melting points were determined in open capillaries on a Thomas Hoover apparatus and are uncorrected. ^{1}H-NMR & ^{13}C-NMR spectra were recorded on a Bruker AM 300 (300 MHz) instrument using tetramethylsilane (TMS) as an internal standard. Chemical shifts are given in parts per million (ppm). Splitting patterns are designated as follows: s- singlet, d- doublet, t-triplet, q- quartet and m- multiplet. Mass spectra (MS) were recorded on Shimadzu LC-MS. The reactions were followed on pre-coated TLC plates (Silica gel 60 F254, Merck), visualizing the spots in ultraviolet light.

Scheme-1:



Target compounds **5a-r** were prepared according to **Scheme-1** Reaction of .6-chloro-3-methylpyrimidine-2,4(1*H*,3*H*) dione with hydrazine hydrate afforded 6-hydrazino-3-methy lpyrimidine-2,4(1*H*,3*H*)-dione **(2)** which was further condensed with *para* substituted benzaldehyde **(3a-c)** in presence of ethanol as a reaction medium gave schiff base **(4a-c).** Formation of schiff base **(3a-c)** was confirmed by appearance of IR band in the region 1650 cm^{-1} due to -N=CH- group, 1695 cm^{-1} due to >C=O group of amide, 3172 cm^{-1} due to -NH- group (secondary amine) of schiff base, **3** and disappearance of IR band in the region 3378 cm^{-1} & 1710 cm^{-1} corresponding to -NH_2 group and -CHO group of 6-hydrazino-3-methylpyrimidine-2,4(1*H*,3*H*)-dione **(2)** and *para* substituted benzaldehyde **(3a-c)** respectively. ^{1}H-NMR spectra showed a singlet at δ 4.9 ppm due to -N=CH- (1H) of schiff base **(4a-c)** and disappearance of signal δ 9.9 ppm due to –CHO (1H) of *para* substituted benzaldehyde **(3a-c)**. Similarly, ^{13}C-NMR spectra showed a signal at δ 73.7 ppm due to -N=CH- of schiff base **(4a-c).** Further reaction of

schiff base **(4a-c)** and diazonium salt of substituted aromatic amines in pyridine at 0-5 ºC afforded substituted formazans **(5a-r).** These compound show IR absorption band at 1600-1615 cm^{-1} due to –C=N- group, 1660-1724cm^{-1} due to >C=O group of amide, 3250-3300 cm^{-1} due to -NH- group (secondary amine) and 1508-1535 cm^{-1} due to -N=N group and the disappearance of bands at 1651 cm^{-1} (-N=CH-) also confirmed the formation of **5a-r.** ^{1}H-NMR spectra of formazans **(5a-r)** shows disappearance of singlet at δ 4.9 ppm due to -N=CH- of compound **4a-c.** The synthetic route of above mentioned compounds is shown in **Scheme-1**.

Table 1. Different substituent's for R and R' 5a-r

Compounds	R	R'	MP in °C	% Yield
5a	-OCH_3	H	254	66
5b	-OCH_3	*o*-CH_3	257	64
5c	-OCH_3	*o*-OCH_3	245	61
5d	-OCH_3	*m*-OCH_3	221	60
5e	-OCH_3	*p*-OCH_3	223	63
5f	-OCH_3	*p*-CL	255	62
5g	-OCH_3	*m*-Cl	229	65
5h	-OCH_3	*p*-F	228	63
5i	-OCH_3	*m*-F	224	60
5j	-OCH_3	*p*-*t*-butyl	180	76
5k	-Br	*o*-CH_3	256	74
5l	-Br	*p*-F	232	73
5m	-Br	*m*-F	254	73
5n	-Br	*m*-Cl	202	71
5o	-Cl	-H	246	65
5p	-Cl	*o*-CH_3	260	63
5q	-Cl	*m*-OCH_3	198	61
5r	-Cl	*m*-F	244	62

Preparation of 6-hydrazino-3-methylpyrimidine-2,4(1*H*,3*H*)-dione (2) [21]:
6-chloro-3-methylpyrimidine-2,4(1*H*,3*H*)-dione (0.003mol) and Hydrazine hydrate (0.005 mol) were added to 4 ml of methoxy ethanol in a round bottom flask. The reaction mixture was heated to reflux for 20 minutes, cooled to room temperature and filtered. It was washed with ethanol and dried to get 6-hydrazino-3-methylpyrimidine-2,4(1*H*,3*H*)-dione in 64% yield mp:236-238ºC

Preparation o f Benzyl(1-methyl-2,6-dioxo-1,2,3,6-tetrahydropyrimidin-4-yl)hydrazone (4a-c):
A mixture of 6-hydrazino-3-methylpyrimidine-2,4(1*H*,3*H*)-dione (0.1 mol) and various *para* substituted benzaldehydes **3a-c** (0.1 mol) in ethanol (20 mL) was stirred for 10 min at 25^{o}C. After the completion of reaction it was poured into ice-cold water with stirring. The solid product obtained was filtered, washed with water and recrystallized from ethanol to get Benzyl(1-methyl-2,6-dioxo-1,2,3,6-tetrahydropyrimidin-4-yl)hydrazone (**4a-c**).
4a. Yield (85%), mp 233^{o}C [22]; IR: 3172 (NH),1298 (CN), 1695 (CO), 1651 (N=CH), 3107 & 1514 (aromatic ring, CH & C=C) cm^{-1}. ^{1}H-NMR (300 MHz;DMSO-d6): 3.05 (3H, s, NCH_3), 4.90 (1H, s, N=C*H*), 6.78 (2H, d, *J* = 9 Hz), 7.03 (2H, d, *J* = 9 Hz), 7.14 (1H, s, C=C*H*-CO-), 10.82 (1H, s, N*H*CO), 10.89 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; DMSO-d6): 26.1, 73.7, 113.9, 126.7, 128.8, 143.5, 150.0, 150.9, 160.5, 162.9.

4b. Yield (80%), mp 275^{o}C; ^{1}H-NMR (300 MHz;DMSO-d6): 3.08 (3H, s, NC*H*$_3$), 4.91 (1H, s, N=C*H*), 7.57 (2H, d, *J* = 9 Hz), 7.83 (2H, d, *J* = 9 Hz), 7.93 (1H, s, C=C*H*-CO-), 11.01 (1H, s, N*H*CO), 11.18 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; DMSO-d6): 24.6, 72.9, 121.2, 127.6, 129.9, 131.9, 140.7, 148.4, 149.4, 161.4.
4c. Yield (81%), mp 260^{o}C [22]; ^{1}H-NMR (300 MHz;DMSO-d6): 3.09 (3H, s, NC*H*$_3$), 4.91 (1H, s, N=C*H*), 7.57 (2H, d, *J* = 9 Hz), 7.93 (2H, d, *J* = 9 Hz), 7.96 (1H, s, C=C*H*-CO-), 11.01 (1H, s, N*H*CO), 11.17 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; DMSO-d6): 26.1, 74.4, 128.5, 128.9, 129.9, 142.1, 149.9, 150.9, 160.5, 162.9.

Preparation of uracil formazans (5a-r) [23]:
Substituted anilines (0.01 mole) were dissolved in aq. HCl (10 mL). It was cooled and aq. $NaNO_2$ (0.7g) was slowly added. Benzyl (1-methyl-2,6-dioxo-1,2,3,6-tetrahydropyrimidin-4-yl)hydrazone (0.01 mole) was dissolved in dry pyridine (10 mL) and sodium acetate (0.3 g) was added. The contents were cooled in an ice-bath and stirred. To it a clear and cold solution of diazonium salt of substituted anilines was added drop wise for 1 hr at low temperature (0-5°C). The reaction mixture was kept in ice-bath for 5 min and then poured into ice water. The resulting dark coloured mass was collected by filtration, washed with water till it was free from pyridine and dried. The product was crystallized from ethanol. (**5a-r).**
5a. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.40 (3H, s, -N-C*H*$_3$), 3.89 (3H, s, Ar -OC*H*$_3$), 7.01- 7.81(9H, m, Ar-*H*) 8.46 (1H, s, C=C*H*), 9.35 (1H, s, N*H*CO), 14.88 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.8, 55.5, 114.5, 114.7, 116.6, 126.0, 126.1, 129.5, 130.5, 141.8, 147.0, 148.6, 158.9, 160.0, 162.7.; MS *m*/*z*: 378.
5b. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$):2.45 (3H, s, Ar-C*H*$_3$), 3.36 (3H, s, -N-C*H*$_3$), 3.87 (3H, s, Ar -OC*H*$_3$), 6.91- 7.99 (8H, m, Ar-*H*) 8.46 (1H, s,C=C*H*), 9.35 (1H, s, N*H*CO), 14.65 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 17.8, 27.8, 55.5, 114.5, 115.5, 115.8, 125.1, 125.8, 126.1, 127.7, 130.5, 130.7, 140.4, 147.1, 148.7, 158.4, 160.0, 162.7.; MS *m*/*z*: 392.
5c. IR: 3265 (NH), 1718,1662 (>C=O of amide, C=O str.), 1612 (-N=C<, C=N str. in schiff base), 1514 (-N=N- str. in formazan), 1437 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.38 (3H, s, -N-C*H*$_3$), 3.86 (3H, s, Ar -OC*H*$_3$), 4.01 (3H, s, Ar -OC*H*$_3$), 6.94- 7.97 (8H, m, Ar-*H*), 8.46 (1H, s,C=C*H*), 9.32 (1H, s, N*H*CO), 15.09 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.7, 55.5, 56.0, 110.9, 114.2, 114.5, 115.8, 121.8, 126.2, 130.1, 130.4, 146.5, 148.4, 148.7, 159.1, 160.3, 161.1, 162.6; MS *m*/*z*: 408.
5d. IR: 3267 (NH), 1722,1664 (>C=O of amide, C=O str.), 1605 (-N=C<, C=N str. in schiff base), 1512 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.33 (3H, s, -N-C*H*$_3$), 3.81 (6H, s, Ar -OC*H*$_3$), 6.67- 7.74 (8H, m, Ar-*H*), 8.38 (1H, s,C=C*H*), 9.28 (1H, s, N*H*CO), 14.79 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.7, 55.5, 55.6, 101.6, 109.3, 112.1, 114.3, 114.5, 126.1, 130.2, 130.5, 143.1, 146.9, 148.6, 158.9, 160.0, 160.9, 162.7.; MS *m*/*z*: 408.
5e. IR: 3267 (NH), 1720,1664 (>C=O of amide, C=O str.), 1606 (-N=C<, C=N str. in schiff base), 1512 (-N=N- str. in formazan), 1440 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.26 (3H, s, -N-C*H*$_3$), 3.74 (3H, s, Ar -OC*H*$_3$), 3.78 (3H, s, Ar -OC*H*$_3$), 6.83- 7.69 (8H, m, Ar-*H*), 8.31 (1H, s,C=C*H*), 9.24 (1H, s, N*H*CO), 14.89 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.6, 55.4, 55.5, 113.7, 114.4, 114.8, 117.9, 126.2, 130.4, 135.4, 147.1, 148.7, 158.1, 158.3, 160.1, 162.5.; MS *m*/*z*: 408.
5f. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.40

(3H, s, -N-C*H*$_3$), 3.89 (3H, s, Ar -OC*H*$_3$), 6.98- 7.80 (8H, m, Ar-*H*), 8.45 (1H, s,C=C*H*), 9.35 (1H, s, N*H*CO), 14.91 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.8, 55.5, 114.5, 116.3, 116.6, 118.0, 118.1, 126.1, 130.5, 138.1, 147.0, 148.6, 158.9, 160.0, 162.8, ; MS *m*/*z*: 396.

5g. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.41 (3H, s, -N-C*H*$_3$), 3.90 (3H, s, Ar -OC*H*$_3$), 6.98- 7.71 (8H, m, Ar-*H*), 8.47 (1H, s,C=C*H*), 9.34 (1H, s, N*H*CO), 14.79 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.8, 55.5, 114.5, 114.6, 115.6, 116.5, 118.0,118.2, 126.0, 130.5, 130.6, 138.1,146.8, 148.5, 158.8, 160.1, 162.8.; MS *m*/*z*: 396

5h. IR: 3257 (NH), 1724,1668 (>C=O of amide, C=O str.), 1606 (-N=C<, C=N str. in schiff base), 1514 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.32 (3H, s, -N-C*H*$_3$), 3.82 (3H, s, Ar -OC*H*$_3$), 6.91- 7.73 (8H, m, Ar-*H*), 8.38 (1H, s,C=C*H*), 9.27 (1H, s, N*H*CO), 14.78 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 26.8, 54.5, 113.5, 114.2, 116.6, 125.0, 128.6, 129.6, 130.1, 139.4, 145.9, 147.5, 158.1, 158.8, 161.8.; MS *m*/*z*: 412

5i. IR: 3263 (NH), 1722,1668 (>C=O of amide, C=O str.), 1606 (-N=C<, C=N str. in schiff base), 1514 (-N=N- str. in formazan), 1440 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.39 (3H, s, -N-C*H*$_3$), 3.90 (3H, s, Ar -OC*H*$_3$), 6.98- 7.81 (8H, m, Ar-*H*), 8.43 (1H, s,C=C*H*), 9.36 (1H, s, N*H*CO), 14.79 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.8, 55.5, 114.5, 114.6, 115.6, 116.5, 125.7, 126.0, 130.5, 130.6, 135.5, 143.0, 146.8, 148.5, 159.4, 159.7, 162.8.; MS *m*/*z*: 412

5j. IR: 3265 (NH), 1722,1668 (>C=O of amide, C=O str.), 1606 (-N=C<, C=N str. in schiff base), 1512 (-N=N- str. in formazan), 1438 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$):1.33 (9H, s, -C(C*H*$_3$)$_3$), 3.38 (3H, s, -N-C*H*$_3$), 3.88 (3H, s, Ar -OC*H*$_3$), 3.78 (3H, s, Ar -OC*H*$_3$), 6.97-7.80 (8H, m, Ar-*H*), 8.44 (1H, s,C=C*H*), 9.36 (1H, s, N*H*CO), 14.92 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.7, 31.3, 34.6, 55.5, 114.2, 114.5, 116.3, 126.2, 126.4, 130.4, 139.4, 147.1, 148.7, 149.5, 158.6, 160.1, 162.6.; MS *m*/*z*: 434.

5k. IR: 3261 (NH), 1722,1670 (>C=O of amide, C=O str.), 1612 (-N=C<, C=N str. in schiff base), 1535 (-N=N- str. in formazan), 1431 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$):2.48 (3H, s, Ar-C*H*$_3$), 3.41 (3H, s, -N-C*H*$_3$), 7.12- 7.99 (8H, m, Ar-*H*) 8.42 (1H, s,C=C*H*), 9.32 (1H, s, N*H*CO), 14.61 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 17.8, 27.8, 115.2, 115.9, 125.2, 126.1, 126.5, 127.7, 129.9,130.8, 132.3, 140.2, 148.1, 148.5, 157.5, 159.9.; MS *m*/*z*: 441.

5l. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.34 (3H, s, -N-C*H*$_3$), 7.03- 7.65 (8H, m, Ar-*H*) 8.40 (1H, s,C=C*H*), 9.27 (1H, s, N*H*CO), 14.80 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 29.6, 116.4, 116.7,118.1, 118.2, 126.5, 129.9, 132.2, 132.3, 136.6, 139.2, 147.9, 148.5, 158.1.; MS *m*/*z*: 445

5m. IR: 3265 (NH), 1722,1670 (>C=O of amide, C=O str.), 1612 (-N=C<, C=N str. in schiff base), 1531 (-N=N- str. in formazan), 1436 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.41 (3H, s, -N-C*H*$_3$), 6.88- 7.73 (8H, m, Ar-*H*) 8.48 (1H, s,C=C*H*), 9.32 (1H, s, N*H*CO), 14.76 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.9, 103.7, 112.3, 112.8, 113.0, 115.2, 126.7, 130.0,130.8, 132.2, 132.4, 143.3, 143.7, 147.9, 148.5, 158.8; MS *m*/*z*: 445.

5n. IR: 3244 (NH), 1724,1672 (>C=O of amide, C=O str.), 1612 (-N=C<, C=N str. in schiff base), 1533 (-N=N- str. in formazan), 1454 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.34 (3H, s, -N-C*H*$_3$), 6.84- 7.67 (8H, m, Ar-*H*) 8.42 (1H, s,C=C*H*), 9.24 (1H, s, N*H*CO), 14.76 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 29.6, 114.7, 115.3, 116.6, 125.8, 126.0, 129.9, 130.0, 132.1, 132.4, 132.8, 142.7, 147.7, 148.4, 158.6, 161.1.; MS *m*/*z*: 461

5o. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.33 (3H, s, -N-C*H*$_3$), 7.13- 7.73 (8H, m, Ar-*H*) 8.42 (1H, s,C=C*H*), 9.25 (1H, s, N*H*CO), 14.76 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 27.6, 114.3, 116.5, 126.1, 129.2, 129.4, 129.6, 131.7, 137.8, 141.4, 147.7, 148.3, 157.8, 159.7.; MS *m*/*z*: 382.

5p. IR: 3265 (NH), 1724,1668 (>C=O of amide, C=O str.), 1608 (-N=C<, C=N str. in schiff base), 1519 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$):2.49 (3H, s, Ar-C*H*$_3$), 3.42 (3H, s, -N-C*H*$_3$), 7.11- 7.99 (8H, m, Ar-*H*) 8.44 (1H, s,C=C*H*), 9.32 (1H, s, N*H*CO), 14.62 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 17.8, 27.8, 115.2, 115.9, 125.2, 126.1, 127.7, 129.3, 129.8, 130.8, 131.9, 138.0, 140.2, 148.0, 148.5, 157.5, 159.9.; MS *m*/*z*: 396

5q. IR: 3246 (NH), 1724,1668 (>C=O of amide, C=O str.), 1612 (-N=C<, C=N str. in schiff base), 1535 (-N=N- str. in formazan), 1442 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz; $CDCl_3$): 3.40 (3H, s, -N-C*H*$_3$), 3.88 (3H, s, Ar -OC*H*$_3$), 6.74- 7.79 (8H, m, Ar-*H*), 8.47 (1H, s,C=C*H*), 9.31 (1H, s, N*H*CO), 14.78 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 25.7, 53.5, 99.7, 107.3, 110.2, 112.4, 127.3, 127.7, 128.2, 129.8, 136.0, 140.8, 145.8, 146.5, 156.0, 157.8, 159.0.; MS *m*/*z*: 412

5r. IR: 3253 (NH), 1722,1666 (>C=O of amide, C=O str.), 1612 (-N=C<, C=N str. in schiff base), 1531 (-N=N- str. in formazan), 1435 (C-N str.) cm^{-1}; ^{1}H-NMR (300 MHz;$CDCl_3$): 3.33 (3H, s, -N-C*H*$_3$), 6.81- 7.73 (8H, m, Ar-*H*) 8.42 (1H, s,C=C*H*), 9.24 (1H, s, N*H*CO), 14.69 (1H, s, *H*N-N=C); ^{13}C-NMR (75.5 MHz; $CDCl_3$): 26.8, 103.1, 111.3, 111.8, 112.0, 114.2, 128.4, 128.8, 129.9, 130.7, 137.1, 142.4, 146.7, 147.3, 157.4, 158.5 ; MS *m*/*z*: 400.

Table 2: Antimicrobial activity of compounds, zone of inhibition in mm.

Compounds	E.coli (-)	S.aureus(+)	S.cerevisiae	C.albicans
5a	4.1	2.2	**8.2**	5.0
5b	3.8	3.7	4.5	**12.8**
5c	**9.4**	4.6	**7.2**	3.4
5d	3.5	3.0	2.0	2.0
5e	4.1	4.2	4.2	**11.2**
5f	4.0	3.9	4.6	**12.6**
5g	3.2	3.1	2.9	2.8
5h	2.8	2.9	2.8	1.8
5i	3.2	2.5	**6.3**	2.5
5j	4.2	4.1	**10.5**	**8.8**
5k	5.1	**9.6**	2.1	2.6
5l	2.8	2.8	2.9	3.0
5m	2.1	2.3	2.8	2.7
5n	**8.5**	4.2	2.2	2.2
5o	6.2	**13.9**	2.1	2.3
5p	5.1	**8.3**	2.4	2.8
5q	3.5	3.5	2.3	2.0
5r	2.1	2.3	**7.2**	3.3
GENTAMICIN	16.2	14.3	-	-
MICONAZOLE	-	-	11.5	13.2

Antimicrobial activity

The synthesized compounds **5a-r** were screened for their antibacterial activity against *E. Coli* and *S.Aureus* and antifungal activity against *S.Cerevisiae* and *C.albicans* at a concentration of 60 µg/mL in DMF by cup-plate method [24, 25]. Standard anti-bacterial and antifungal drug, gentamycin and miconazole respectively were also tested under similar conditions for comparison. Zone of inhibition in mm of synthesized compounds and standard drugs are shown in **Table 2**.

CONCLUSION

A series of novel uracil formazans (**5a-r)** were synthesized, the structures of the compounds have been confirmed by elemental analysis and spectral analysis. Most of the synthesized compounds have shown antibacterial and antifungal activity to some extent. Among the synthesized compounds, **5c** and **5n** show some activity, while rest show feeble activity against *E. coli*. Against *S.Aureus* the compound **5o** shows good activity, while compounds **5k** and **5p** show moderate activity. The remaining compounds have been found to be less active against *S.Aureus*. The compound **5j** shows good activity, while compounds **5a, 5c, 5i**, and **5r** show moderate activity against S.Cerevisiaec The compounds **5b** and **5f** show good activity while compounds **5e** and **5j** show moderate to good activity against *C. albicans.*

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