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SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF 1-PHENYL-3-(1,3-DIPHENYL-1H-PYRAZOL-4-YL)PROP-2-EN-1-ONE DERIVATIVES

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ABSTRACT

Several methods are available for the preparation of 4-functionalized pyrazole derivatives and have been well documented in the literature. As a part of drug discovery program, the 1-phenyl-3-(1,3-diphenyl-h-pyrazol-4-yl)prop-2-en-1-one derivatives were synthezied from 4-formyl pyrazole with corresponding substituted acetophenones. A mild and simple three steps approach for the preparation of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one derivatives, was employed using a wide range of substituted acetophenones that contain hydroxyl, halogens, methyl, methoxy, nitro and amino groups as substituents. 4-amino derivative (7), 3-methoxy,4-hydroxy derivative (11) and 3,4-dimethoxy derivative (12) exhibited marked antiinflammatory activities. These compounds also exhibited good antioxidant activities such as inhibition of DPPH, nitric oxide, superoxide radical, lipid peroxidation and reducing power ability. Many sterically held up compounds exhibited appreciable antiinflammatory and also antioxidant activities. Thus the antioxidant potential of these compounds may contribute to the anti-inflammatory activity.

Keywords: DPPH, Acetophenone, Nitric acid, Lipid peroxidation.

INTRODUCTION

Hetero aromatic compounds have attracted considerable attention in the design of biologically active molecules and advanced organic materials. Hence a practical method for the preparation of such compounds is of great interest in synthetic organic chemistry. Pyrazoles and its derivatives, a class of well known nitrogen containing heterocyclic compounds, occupy an important position in medicinal and pesticide chemistry with having a wide range of bioactivities such as antimicrobial [1-2], anticancer [3-5], anti-inflammatory [6-7], antidepressant [8], anticonvulsant [9], antihyperglycemic [10], antipyretic [11], antibacterial [12], antifungal activities [13] and selective enzyme inhibitory activities [14-15]. It has been found that these compounds have hypoglycemic activity, and are also known as inhibitors and deactivators of liver alcohol dehydrogenase and oxidoreductases. It has been shown *in vivo* that some of the pyrazole derivatives have appreciable anti hypertensive activity [16].

Pyrazoles are usually prepared by condensation between a hydrazine derivative and 1,3-dicarbonyl compound or by 1, 3-dipolar cycloaddition of diazoalkanes or nitrile imines to olefins or acetylenes. The anti-inflammatory potency of different compounds roughly corresponds with their ability to inhibit COX. The present work involves the preparation of some new 1, 3-Diphenyl pyrazoles which possess one or the other activity of compound. Substituted amine derivatives have received considerable attention during last two decades as they are

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endowed with variety of biological activities and have wide range of therapeutic properties. The Literature survey indicates that pyrazole derivatives possess different pharmacological and biological activities; which of most potent activity are anti-inflammatory and antioxidant activity.

EXPERIMENTAL WORK

Melting points were determined in open capillaries on a melting point apparatus (tempo) and were uncorrected. FTIR spectra were recorded using BRUKER. Acetophenones were procured from Sd.fine Ltd, Merck and all other chemicals were of laboratory grade. Purity of the compounds was checked by thin layer chromatography using precoated silica gel G plates. The spots were visualized in the iodine chamber.

SYNTHESIS OF 4-FUNCTIONALISED PYRAZOLES: (SCHEME 1)

STEP 1. General method for the synthesis of hydrazones

0.77g of substituted phenyl hydrazine hydrochloride was taken and 15ml of water was added to it. 0.44g of andhydrous sodium acetate was weighed and added to the above solution and 20ml of ethanol and 5.3mmoles of appropriate methyl ketone was added. Then the resulting mixture was refluxed for 1hr. On cooling, a solid separated out which was filtered, dried and recrystallized from ethanol to afford hydrazones.

STEP 2. General method for the synthesis of 4-formyl pyrazoles

30ml of dimethylformamide and 7.25 ml of phosphorous oxychloride was added to the 20.24 mmoles of hydrazones. The reaction mixture was stirred at 55-60˚C for 5hr. Then it was cooled to room temperature and poured it into ice cold water and neutralized with saturated aqueous sodium bicarbonate solution where upon a solid separated out that was filtered. It was washed with the excess of cold water. Then dried and recrystallised from acetic acid to afford aldehydes.

STEP 3. General procedure for the synthesis of pyrazolyl propenones (Chalcones)

A mixture of compound 4-formyl pyrazole (0.0089 mol) and methylketones (0.0178 mol) were added to 4% ethanolic potassium hydroxide solution (50 ml). The reaction mixture was kept at 0-5˚C with stirring for 2hr, the separated product that appeared to be collected by filtration and recrystallized from ethanol.

PHARMACOLOGICAL STUDIES

Anti-Inflammatory Activity

Carrageenan-induced paw edema model

Carrageenan-induced hind paw edema model was used for determination of anti-inflammatory activity. According to the method of Winter et al., 1962, the rats will be divided into groups of five or six animals. One group consisting of six animals served as control, while the other groups of five animals will be received the test compound or standard drug. The rats will be dosed (100mg/Kg) orally with the test compounds one hour before injection of 0.05ml of 1% suspension of carrageenan into the subplanar region of the rat hind paw. Additional groups will be similarly treated with 100mg/Kg Ibuprofen (positive controls) or 10 ml/kg 0.5% sodium carboxy methylcellulose (vehicle controls).

The volume of the injected paw will be measured by water displacement in a plethysmograph immediately after carrageenan injection. The paw volume will be again measured after 3 hours. A mark will be made at the lateral maleolus and the foot will be dipped to the same distance into the arm of the plethysmograph [17].

The difference between the two readings was taken as the volume of edema, and the percentage anti-inflammatory activity was calculated using following equation:

Percentage edema inhibition = $100\ (1-V_t / V_c)$

Where, V_c = Volume of the edema in the control group

V_t = Volume of the edema in the treated group

In vitro Antioxidant Studies

DPPH radical scavenging activity

0.1mM solution of DPPH solution in ethanol was prepared and 1ml of this solution was mixed with 1ml of the test solutions. An equal amount of DPPH solution in the ethanol served as control. Finally, after 30min of incubation, the absorbance was measured at 517nm. Decreasing of the DPPH solution absorbance indicates an increase of the DPPH radical-scavenging activity.

DPPH radcal-scavenging activity was calculated according to the following equation:

$$\% \text{ inhibition} = ((A_0-A_t) / A_0 \text{ X } 100$$

Where A_0 was the absorbance of the control (without drug) and A_t was the absorbance of test.

Nitric oxide scavenging activity

Nitric oxide was generated from sodium nitroprusside, which at physiological P^H liberates nitric acid. This nitric acid gets converted to nitrous acid and further forms nitrite ions (NO_2^-) which diazole with sulphalinic acid and couple with naphthylethyldiamine (griess reagent), producing pink colour which can be measured at 546nm. Sodium nitroprusside (10mM, 2ml) in phosphate buffer saline was incubated with the test compounds in at room temperature for 120min. After 120min, 0.5ml of the incubated solution was added with 1ml of griess reagent and the absorbance was measured at 546nm.

The nitric oxide radicals scavenging activity was calculated according to the following equation:

$$\% \text{ inhibition} = ((A_0-A_t) / A_0 \text{ X } 100$$

Where A_0 was the absorbance of the control (without test solution) and A_t was the absorbance of the test.

Superoxide scavenging activity

The scavenging activity towards the superoxide radical (O_2^-) was measured in terms of generation of O_2^- by following alkaline DMSO method (Henry et al., 1976). 0.3g potassium superoxide and 0.4ml of dry DMSO were allowed to stand in contact for 24hr and the solution was filtered immediately before use. Filtrate (200µl) was added to 2.8ml of an aqueous solution containing NBT (56µM), EDTA (10µM) and potassium phosphate buffer (10mM). Test compounds, 1ml at various concentrations (25-100µM/ml) were added, the absorbance was recorded at 560nm against a control.

$$\% \text{ inhibition} = \frac{OD_c - OD_t}{OD_c} X\ 100$$

Inhibition of iron induced lipid peroxidation

Preparation of rat brain homogenate

Albino wistar rats (180-250g) of either sex were used for the study. The rats were decapitated and the brain was removed and perfused transcardially with the ice-cold normal saline to prevent contamination of brain tissue with blood. Tissue was weighed and homogenate (10%W/V) was prepared in 0.15M KCl and centrifuged at 800rpm for 10minutes. The supernatant was used immediately for the study.

Procedure

The incubation mixture contained in a final volume of 1ml of brain homogenate (400µl), KCl (150mM) and ethanol (10µl) or test compound dissolved ethanol.

Lipid peroxidation was initiated by adding, Fe^{+3} (100µM) to give the final concentration stated (Ciutti et al., 1991). After incubating for 20 minutes at 37˚C, reactions were stopped by adding 2ml of ice-cold 0.25M HCl containing 15% trichloroacetic acid, 0.38% thiobarbituric acid and 0.05% BHT. Then it is followed by heating at 80˚C for 15minutes, samples were cooled and centrifuged at 800rpm for 10minutes. The absorbance of the supernatant was measured at 532nm. Percentage inhibition of TBARS (thiobarbituric acid reactive substances) formed by test compounds was calculated by comparing with control. Iron solutions were prepared freshly in distilled water and used immediately since most buffers trap hydroxyl radical or interfere with iron conversion.

$$\% \text{ inhibition} = \frac{OD_c - OD_t}{OD_c} X\ 100$$

Reducing power ability (RPA)

A spectrophotometric method was used for the measurement of reducing power. For this 2.5ml of test solutions was mixed with 2.5ml of phosphate buffer (0.2M, P^H 6.6) and 2.5ml of 1% potassium ferricyanide. The mixture was incubated at 50˚C for 20min, then rapidly cooled, mixed with 2.5ml of 10% trichloroacetic acid and centrifuged at 3000rpm for 10min. The 2.5ml of supernatant liquid was diluted with distilled water (2.5ml) and then ferric chloride (0.5ml, 0.1%) was added and allowed to stand for 10min. the absorbance was read spectrometrically at 700nm [18-20].

$$\% \text{ inhibition} = \frac{OD - OD_t}{OD_c} X\ 100$$

RESULTS AND DISCUSSION

A series of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one derivatives were synthesized by treating phenyl hydrazine hydrochloride with acetophenone in ethanol and refluxed for about 1hr in presence of sodium acetate, which gave crystals of hydrazones. These hydrazones were further stirred with dimethyl formamide and phosphorous oxychloride at 55-60˚C for 5hr. Then it was cooled to room temperature and poured into ice cold water and neutralized with saturated aqueous sodium bicarbonate solution where upon a solid separated out that was filtered. It was washed with excess of cold water, then dried and recrystallized from acetic acid to form 4-formyl pyrazole. The 4-formyl pyrazole was stirred with methyl ketones in presence of 4% ethanolic potassium hydroxide solution for 2hr. A solid was separated out, which was filtered and recrystallized by using ethanol. Several 1-phenyl-3-(1,3-diphenyl-h-pyrazol-4-yl)prop-2-en-1-one derivatives were synthesized and yields ranges were given in the table-1.

The IR spectra of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one derivatives displayed bands at cm^{-1} 3049-3061 due to C-H stretching, 1661-1811 due to C=O stretching, 1656-1671 due to C=C stretching, 1593-1599 due to C=N stretching, in case of fluoro and chloro the peaks were also observed at 1291 due to C-F stretching, 698-700 due to C-Cl stretching.

NMR spectra were taken for compounds 1,2,3,4,8, and 9. The compounds showed multiplet at δ 7.0-8.0ppm due to the aromatic protons. Compound 8 showed a singlet at δ 3.9ppm due to methoxy protons, compound 2 showed a singlet at δ 2.4ppm due to methyl protons. Olefinic protons were seen at δ 7.5-7.9 with J value of 9Hz.

The physical data such as molecular weight, molecular formula, melting point, R_f value and yields were given in the table 1. The compounds of present study were characterized through IR, H^1NMR spectral analysis.

Anti-inflammatory activity of the synthesized compounds were carried out by the carrageenan induced edema model in rats (dose – 100mg/kg). Anti-inflammatory activity of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-

one derivatives were screened and was listed in the table – 2.

In Vitro ANTIOXIDANT STUDIES

The antioxidant studies of the test compounds were carried out by using *in vitro* antioxidant methods like DPPH radical, nitric oxide radical, ion induced lipid peroxidation assay, superoxide dismutase radical and reducing power ability activities.

All the compounds were screened for nitric oxide scavenging activity at 100µM concentrations. The data was given in table-4. Among the electron donating groups, 4-nitro derivative of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one (6) was found to exhibit highest activity of 75% and other groups such as, 4-dichloro derivative (10) and 4-chloro (4) derivatives showed moderate activity of 46.4% and 42.9% respectively. Unsubstituted derivative (1) showed activity of 54%. when phenolic groups, hydroxyl group was substituted, it showed an increase in activity, 4-hydroxyl derivative (3) exhibited activity of 65.6%. when substituted with two groups such as 2,4-dihydroxy derivative (9), 3-methoxy, 4-hydroxy derivative (11) and 3,4-dimethoxy derivative (12) exhibited decrease in activity of 64%, 49.2% and 43.4%, respectively.

Among the non phenolic groups, electron with drawing groups, the 4-amino derivative (7) showed highest activity of 59.9%. Other derivatives such as, 4-methyl derivative and 4-methoxy derivative (8) showed less activity of 38.2% and 31.3%, respectively.

All the compounds were screened for superoxide scavenging activity at 100µM concentrations. The data was given in table-5. Among the electron donating groups, disunstituted derivatives such as, 2,4-dihydroxy derivative of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one (9) showed highest activity of 85%. 3,4-dimethoxy derivative (12) and 3-methoxy,4-hydroxy derivative (11) showed good activity of 78% and 68%, respectively. The one substituted derivatives exhibited decrease in activity compared to disubstituted derivatives. 4-amino derivative (7) and 4-methyl derivative (2) showed activity of 75.8% and 47.5%, respectively. Among the electron with drawing groups, 4-nitro derivative (6) showed highest activity of 71.9%. Other groups such as, 4-chloro derivative (4) and 4-fluoro derivative (5) showed decrease in activity of 59.6% and 36.2%, respectively. 3,4-dichloro derivative (10) and unsubstituted derivative (1) showed less activity compared to the reference standard compound, ascorbic acid.

All the compounds were screened for their inhibitory effect on ferric induced lipid peroxidation at 100µM concentrations. The data was given in table-6. Unsubstituted derivative of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one (1) showed activity of 30%. the phenyl ring was substituted by electron donating groups by nitro, hydroxyl and metoxy derivatives increase the activity. Among the electron donating groups 3,4-dimethoxy derivative (12) exhibited highest activity of 57.3%. Other derivatives 4-amino derivative (7), 3-methoxy,4-hydroxy derivative (11) and 4-methoxy derivative (8) showed decrease in activity of 49.5%, 35.6% and 34.3%, respectively. Among the electron with drawing groups only 4-nitro derivative (6) exhibited good activity of 46%. Other groups showed less activity compared to the standard reference compound, α-tocopherol.

All the compounds were screened for their reducing power ability at 100µM concentrations. The data was given in table-7. Unsubstituted derivative of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one (1) showed activity of 65.9%. substitution with electron donating or electron with drawing groups exhibited increase in activity. substitution with electron with drawing groups, 3,4-dichloro derivative (10) and 4-nitro derivative (6) showed highest activity of 74.5% and 69.2%, respectively. 4-chloro derivative (4) and 4-fluoro derivative (5) showed less activity of 36% and 39.4%, respectively.

Among the electron donating groups 3-methoxy,4-hydroxy derivative (11) exhibited highest activity of 76.4%. 4-amino derivative (7) and 4-methoxy derivative (8) exhibited moderate activity of 59.9% and 42.2%, respectively. 2,4-dihydroxy derivative (9) and 4-methyl derivative (2) exhibited less activity compared to the reference standard compound, ascorbic acid.

SUMMARY

An eco friendly and easy method has been used to synthesize the title compounds. These methods include mild conditions and yields were satisfactory. The reactions led to the expected products were obtained in good yields and the compounds were purified by the ethanol.The synthesized products were characterized by their physical and spectral data.

The compounds synthesized in the above scheme were screened for *in vitro* antioxidant activities by scavenging of free radicals such as DPPH, nitric oxide, superoxide, inhibition of iron induced lipid peroxidation and reducing power ability. Antiinflammatory activity was also evaluated for the title compounds.

The present work has been shown that 4-amino derivative (7), 3-methoxy,4-hydroxy derivative (11) and 3,4-dimethoxy derivative (12) exhibited highest activity of antiinflammatory compareble to the standard drug, Ibuprofen. The compounds were tested for the biochemical studies, many of the compounds exhibited good superoxide, nitric oxide scavenging, reducing power ability and also in inhibition of lipid peroxidation comparable to the standard reference drugs.

The derivatives which exhibited anti-inflammatory activity by carrageenan induced paw edema method also showed good free radical scavenging and

inhibition of lipid peroxidation. It is possible that good antioxidant potential of these compounds may be contribute to the antiinflammatory activity observed with the series of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one derivatives.

In view of significant activities observed with these derivatives, it may be of interest to synthesize more analogs with the appropriate substitutions at the phenyl ring of these compounds as potential anti-inflammatory and antioxidant agents and also to evaluate them in other disease models. Hence, further extension of the work in this direction may be promising.

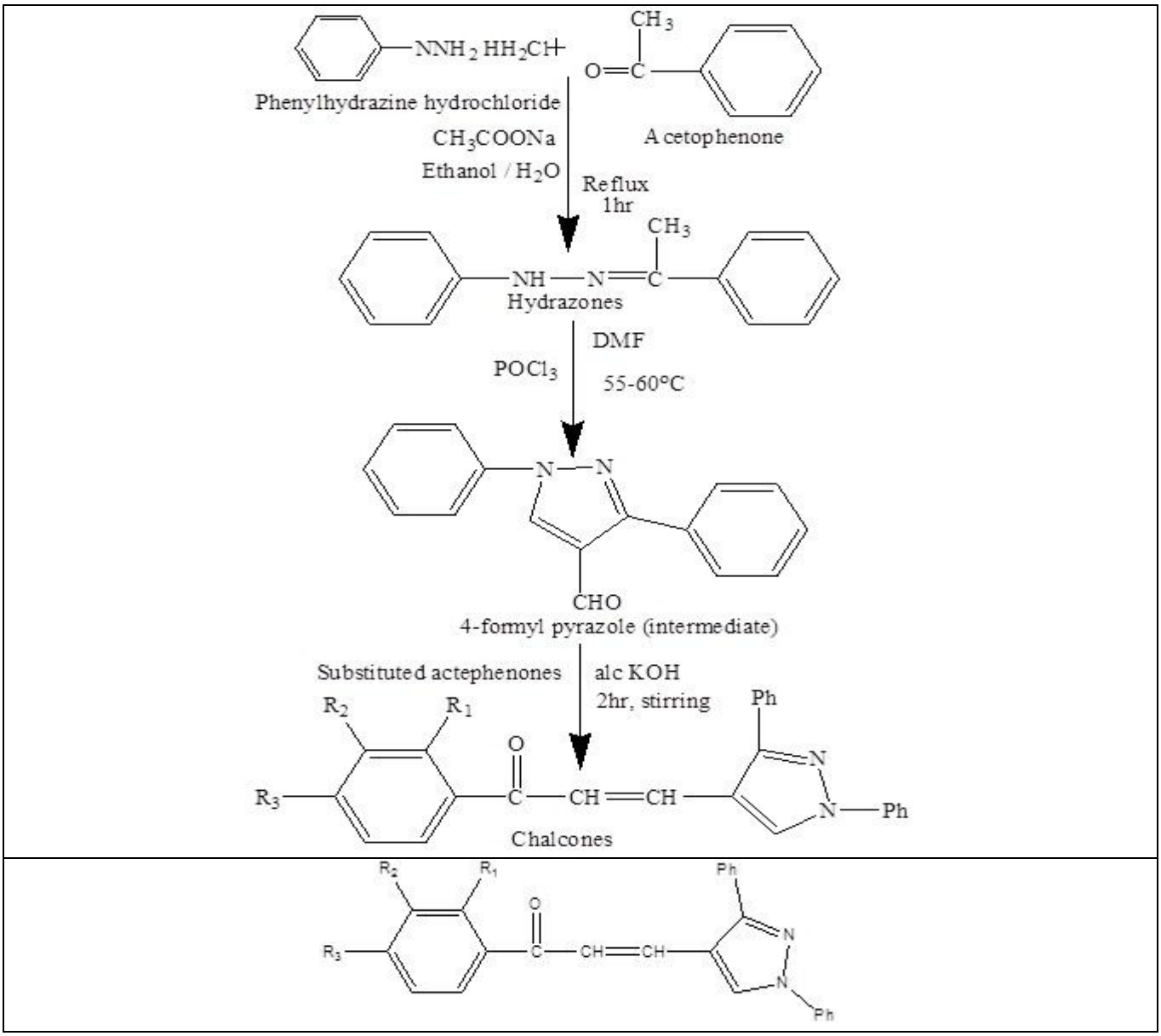

Table 1. Physical and spectral data of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one derivatives

Compound code	R_1	R_2	R_3	Molecular formula	Melting Point	Rf Value	IR	NMR (300 MHz, $CDCl_3$)
1	H	H	H	$C_{24}H_{18}N_2O$	127˚C	0.602	3063.22 (C-H str, Aromatic), 1811.91 (C=O str), 1677.61 (C=C str)	δ 7.0-8.0 (m,15H, Ar-H), δ 7.89-7.86 (d,1H,olefinic) J=9Hz,

								δ7.69-7.66 (d,1H,olefinic) J=9Hz
2	H	H	4-CH_3	$C_{25}H_{20}NO_2$	143˚C	0.44	3051.31 (C-H str, Aromatic), 2918.05 (C-H str, CH_3), 1658.82 (C=C str), 1594.88 (C=N str)	δ 7.0-8.0 (m,14H, Ar-H), δ 7.86-7.89 (d,1H,olefinic) J=9Hz, δ 7.47-7.50 (d,1H,olefinic) J=9Hz, δ 2.4 (s,3H, CH_3)
3	H	H	4-OH	$C_{24}H_{18}N_2O_2$	139˚C	0.68	3407.96 (O-H str), 3061.22 (C-H str, Aromatics), 1731.88 (C=O str), 1671.48 (C=C str), 1594.05 (C=N str)	δ 10.0 (s,1H,-OH), δ 7.0-8.0 (m,14H, Ar-H), δ 7.78-7.80 (d,1H,olefinic) J=9Hz, δ 7.48-7.51 (d,1H,olefinic) J=9Hz
4	H	H	4-Cl	$C_{24}H_{17}ClN_2O$	149˚C	0.17	3061.15 (C-H str), 1807.57 (C=O str), 1671.17 (C=C str), 1591.76 (C=N str), 699.12 (C-Cl str)	δ 7.0-8.0 (m,14H, Ar-H), δ 7.82-7.79 (d,1H,olefinic) J=9Hz,δ 7.69-7.66 (d,1H,olefinic) J=9Hz
5	H	H	4-F	$C_{24}H_{17}FN_2O$	179˚C	0.23	3063.18 (C-H str, Aromatic), 1599.37 (C=N str), 1663.24 (C=C str), 1291.89 (C-F str)	-
6	H	H	4-NO_2	$C_{24}H_{17}N_3O_3$	154˚C	0.45	1663.45 (C=C str), 1593.01 (C=N str), 1520.84,1346.73 (N-O str)	-
7	H	H	4-NH_2	$C_{24}H_{19}N_3O$	172˚C	0.42	3055.16 (C-H str, Aromatic), 3348.36 (N-H str), 1656.75 (C=C str), 1595.68(C=N str)	
8	H	H	4-OCH_3	$C_{25}H_{20}N_2O_2$	159˚C	0.71	3049.59 (C-H str, Aromatic), 1658.73 (C=O str), 1604.17 (C=C, str), 1533.67 (C=N, str), 1030.06 (O-CH_3, str)	δ 7.0-8.0 (m,14H, Ar-H), δ 7.95-7.98 (d,1H,olefinic) J=9Hz, δ 7.52-7.49 (d,1H,olefinic) J=9Hz, δ 3.9 (s,3H,Ar-OCH_3)

9	2-OH	H	4-OH	$C_{24}H_{18}N_2O_3$	166˚C	0.39	3397.68 (O-H str), 3060.41 (C-H str, Aromatic), 1672 (C=C, str), 1597.07 (C=N str)	δ 10.0 (s,1H,-OH), δ 8.5 (s,1H,-OH), δ 7.0-8.0 (m,14H,Ar-H),δ 7.78-7.81 (d,1H,olefinic) J=9, δ 7.52-7.49 ((d,1H,olefinic) J=9
10	H	3-Cl	4-Cl	$C_{24}H_{16}Cl_2N_2O$	134˚C	0.15	3063.01 (C-H str, Aromatic), 1685.49 (C=C str), 1661.37 (C=O str), 1595.25 (C=N str), 698.69 (C-Cl str)	
11	H	3-OCH_3	4-OH	$C_{25}H_{20}N_2O_3$	152˚C	0.49	3326.10 (O-H str), 3060.29 (C-H str, Aromatic), 1735.01 (C=O str), 1671.14 (C=C str), 1596.01 (C=N str), 1015.85 (O-CH_3 str)	
12	H	3-OCH_3	4-OCH_3	$C_{26}H_{22}N_2O_3$	168˚C	0.35	3060.63 (C-H str Aromatic), 1740.53 (C=O str), 1669.38 (C=C str), 1594.87 (C=N str), 1020.61 (O-CH_3 str)	

Table 2. Anti-inflammatory activity of 1-phenyl-3-(1,3-diphenyl-1h-pyrazol-4-yl)prop-2-en-1-one derivatives

Compound code	Edema volume[b] ml (±SEM)	Edema inhibition[c] (%)
1	0.64 (0.21)[a]	44*
2	0.42 (0.01)[a]	62*
3	0.38 (0.29)[a]	65.7*
4	0.35 (0.03)[a]	61.5*
5	0.29 (0.32)[a]	67.2*
6	0.39 (0.08)[a]	65.4*
7	0.25 (0.24)[a]	78*
8	0.54 (0.31)[a]	51.9*
9	0.63 (0.14)[a]	40.6
10	0.89 (0.32)[a]	39.7
11	0.27 (0.15)[a]	75*
12	0.30 (0.013)[a]	73*
Standard drug	0.24 (0.05)[a]	79

Control edema volume = 1.118 (±0.14). At 100mg/kg p.o, Edema volume was measured 3hours after carrageenan injection and expressed as mean ± standard errer mean. % edema inhibition calculated by comparing edema volume with that of the respective vehicle treated control animals. Statistically significant ($P < 0.01$, Mann-Whitney).

Table 3. Effect of 1-phenyl-3-(1,3-diphenyl-1h-pyrazol-4-yl)prop-2-en-1-one derivatives on DPPH stable free radical scavenging

Compound code	% inhibition at 100µM
1	6.78
2	21.2

3	22.8
4	6
5	15.3
6	7
7	33.5
8	45.2
9	2.1
10	17.7
11	7.7
12	10.53
STD	71.8

4-Methoxy derivative of 1-phenyl-3-(1,3-diphenyl-1H-pyrazol-4-yl)prop-2-en-1-one (8), 4-amino derivative (7) showed moderate activity of 45.2%, 33.5% respectively. Among the phenollic compounds, substitution with hydroxyl group such as, 4-hydroxy derivative (3) showed activity of 22.8%. The ability of these compounds to scavenging DPPH free radical is less than the standard reference compound, ascorbic acid. All the compounds were screened for reduction of DPPH at 100µM concentrations. The data was given in table- 3.

Table 4. Effect of 1-phenyl-3-(1,3-diphenyl-1h-pyrazol-4-yl)prop-2-en-1-one derivatives on nitric oxide free radical scavenging

Compound code	% inhibition at 100µM
1	54
2	38.2
3	65.6
4	42.9
5	12.4
6	66.9
7	59.9
8	31.3
9	64
10	46.4
11	49.2
12	43.4
STD	73.4

Table 5. Effect of 1-phenyl-3-(1,3-diphenyl-1h-pyrazol-4-yl)prop-2-en-1-one derivatives on superoxide free radical scavenging

Compound code	% inhibition at 100µM
1	5.1
2	47.5
3	19.9
4	59.6
5	36.2
6	71.9
7	75.8
8	29.7
9	85
10	7.8
11	68
12	78
STD	79.3

Table 6. Effect of 1-phenyl-3-(1,3-diphenyl-1h-pyrazol-4-yl)prop-2-en-1-one derivatives on iron induced lipid peroxidation

Compound code	% inhibition at 100µM
1	30
2	17.36
3	28.8
4	19.7
5	24.5
6	46
7	49.5
8	34.3
9	16.2
10	27.5
11	35.6
12	57.3
STD	73.3

Table 7. Effect of 1-phenyl-3-(1,3-diphenyl-1h-pyrazol-4-yl)prop-2-en-1-one derivatives on reducing power ability

Compound code	% inhibition at 100µM
1	65.9
2	22.9
3	50.7
4	36
5	39.4
6	69.2
7	59.9
8	42.2
9	28.3
10	74.5
11	76.4
12	47.4
STD	77

CONCLUSION

4-amino derivative (7), 3-methoxy,4-hydroxy derivative (11) and 3,4-dimethoxy derivative (12) exhibited marked antiinflammatory activities. These compounds also exhibited good antioxidant activities such as inhibition of DPPH, nitric oxide, superoxide radical, lipid peroxidation and reducing power ability. Many sterically hindered compounds exhibited appreciable antiinflammatory and also antioxidant activities. Thus the antioxidant potential of these compounds may contribute to the anti-inflammatory activity.

CONFLICT OF INTEREST

No conflict of interest

AKNOWLEDEGEMNET

None

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