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SYNTHESIS, CHARACTERIZATION AND ANTI OXIDANT ACTIVITY OF NOVEL CHALCONES AND DI HYDRO PYRIMIDINENONES DERIVATIVES

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ABSTRACT

Novel chalcones were synthesized by condensing 1-(2-chlorophenyl) ethanone with aromatic aldehydes derivatives in dilute ethanolic sodium hydroxide solution at room temperature according to Clasein-Schmidt condensation reaction. The synthesized chalcones compounds were reacted with urea and ethanol upon cyclisation gives pyramidinone derivatives. All these compounds were characterized by means of their IR, ^{1}H NMR spectroscopic data and microanalyses. The antioxidant activity done by DPPH method the results were compared with standard ascorbic acid.

KEYWORDS: Chalcones, Pyrimidinone, Antimicrobial activity, Clasein-Schmidt condensation.

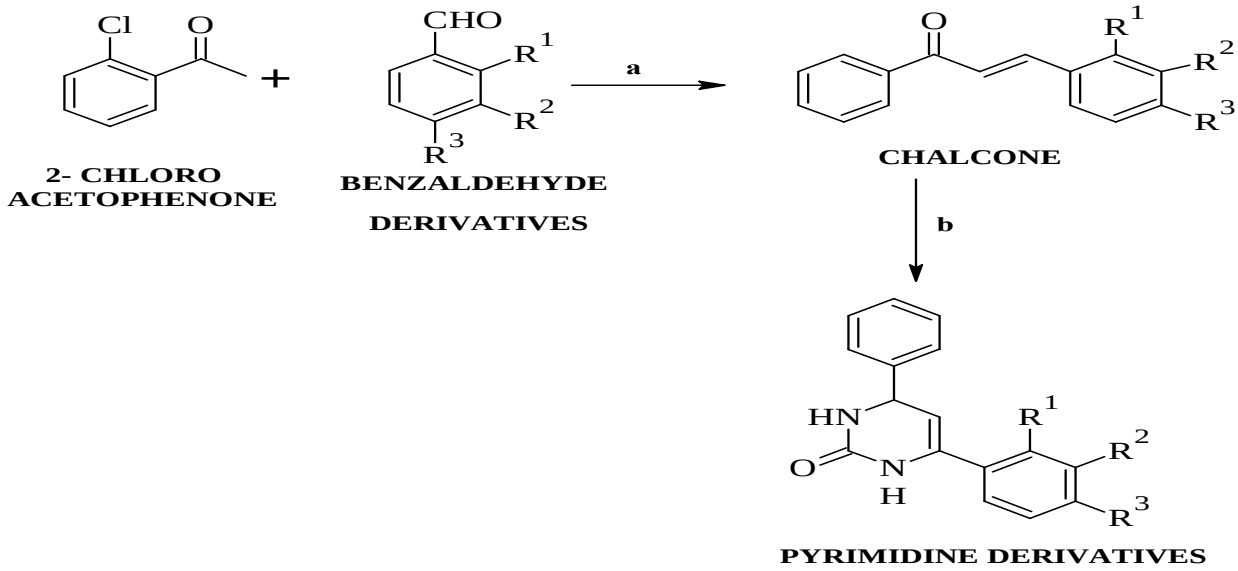
INTRODUCTION

Discovery of novel synthetic heterocyclic compounds are the target of organic scientists to cure the diseases. Hence, novel chalcones were synthesized because it is known to exhibit various biological activities. Chalcones have been reported to possess antioxidant antiulcer, antimalarial, antileishmanial, anti-inflammatory, antitumor, antitubercular, antibacterial activity and antifungal activity.[1] The presence of a reactive α,β- unsaturated keto functional group in chalcones is found to be responsible for their antimicrobial and other activities, which may be altered depending on the nature and position of substituent on the aromatic rings of aldehydes and 2-Chloro Acetophenone derivative.[2] In the present communication we report the reaction of 1-(2-chlorophenyl)ethanone with different aromatic aldehydes to afford novel chalcones and the synthesized chalcones compounds were reacted with urea and ethanol upon cyclisation gives Pyrimidinone derivatives. The structures of the various

synthesized compounds were assigned on the basis of elemental analysis, IR and ^{1}H NMR spectral data. The antioxidant activity done by DPPH method the results were compared with standard ascorbic acid.

Experimental work[3]

Melting points were determined on a capillary melting point apparatus and are uncorrected. 1H NMR spectra was recorded in the indicated solvent on Bruker AV 400 MHz spectrometer using TMS as internal standard. Infrared spectra were recorded in KBr on Perkin-Elmer AC-1 spectrophotometer.



a) Ethanol , 40% KOH at room temperature
b) Urea and ethanol and NaOH, reflex 3-4 hrs

i) R^1:R^2 - H, R3: OH, ii) R^1:R^2 - H, R3: Cl, iii) R^1:R^2 - H, R3: SCH_3 iv) R^1:R^2 - H, R3: CH_3 ,V) R^1:R^2 - OCH_3, R3: H

Scheme –I.

Chalcone Procedure[4]**:** A mixture of 2- Chloro Acetophenone (0.001moles) and aryl aldehydes (0.001 moles) was stirred in methanol (20ml) and to it 3 mill moles of 40% KOH was added. The mixture was kept stirred continuously for 6 hrs and kept in dark place for overnight and it was acidified with 1:1 hydrochloric acid and water then it was filtered through vacuum by washing with water.

Pyrimidinone Procedure[5]**:** Chalcones(1eq),urea(1eq), To this mixture 10ml of ethanolic NaoH (1eq) was added at room temperature, reflux for 3-4 hr. The mixture was concentrated by distilling out the solvent under reduced pressure and poured into crushed ice. The obtained solid was purified and recrystallised using mixture of ethanol.

Spectral Data[6-7]

(2*E*)-1-(2-chlorophenyl)-3-(4-hydroxyphenyl)prop-2-en-1-one (CH-1)

IR(cm-1) 1715 (C=O), 3035 (H of Ar), 750 (C-Cl), 1580 (C=C), 2800 (OH); 7.4 (2H, d),7.6 (2H, d), 7.8 (1H, d),7.5 (2H, d), 7.9 (2H, d), 7.6 (2H, d).

(2*E*)-1-(2-chlorophenyl)-3-(4-chlorophenyl)prop-2-en-1-one (CH-2)

IR(cm-1) 1710 (C=O), 3060.39 (H of Ar), 696.55 (C-Cl), 1598.51 (C=C), 8.18 (1H, s),7.95 (1H, s), 7.42 (4H, t),7.17 (3H, d), 3.3 (1H, s).

(2*E*)-1-(2-chlorophenyl)-3-[4-(methylsulfanyl)phenyl]prop-2-en-1-one (CH-3)

IR(cm-1) 1695 (C=O), 3019 (H of Ar), 688.39 (C-Cl), 2590.29 (C-S), 8.5 (1H, s), 8.2 (2H, d), 8 (2H, t), 7.6 (2H, d), 7.4 (3H, t).

(2*E*)-1-(2-chlorophenyl)-3-(4-methylphenyl)prop-2-en-1-one (CH-4)

IR(cm-1) 1695.31 (C=O), 688.39 (C-Cl), 1600 (C=C), 3019 (H of Ar), 8.5 (1H, s),8.2 (2 H, d), 8 (2H, t),7.6 (2H, d), 7.4 (3H, t).

(2*E*)-1-(2-chlorophenyl)-3-(2,3-dimethoxyphenyl)prop-2-en-1-one (CH-5)

IR(cm-1) 1719.60 (C=O), 758 (C-Cl), 1743.1 (C=C), 2840 (C-O-CH_3), 7.4 (2H, d),8.42 (4 H, d), 7.8 (1H, d),7.5 (2H, d), 7.9 (2H, d).

4-(2-chlorophenyl)-6-(4-hydroxyphenyl)-3,4-dihydropyrimidin-2(1*H*)- one (PY-1)

IR(cm-1) 1794.24 (C=O), 3515 (N-H), 667.07 (C-Cl), 1450 (C=C), 3400 (Ar-OH), 3.366 (1H, s, -C-Cl), 6.0-9.1 (1H, m, Ar-H), 7.2-8.4 (5H, s, Ar-OH).

4-(2-chlorophenyl)-6-(4-chlorophenyl)-3,4-dihydropyrimidin-2(1*H*)- one (PY-2)

IR(cm-1) 1794.24 (C=O), 3515 (N-H), 667.07 (C-Cl), 1450 (C=C), 3.366 (1H, s, -C-Cl), 6.0-9.1 (1H, m, Ar-H), 7.2-8.4 (5H, s, Ar-OH).

4-(2-chlorophenyl)-6-(4-methylphenyl)-3,4-dihydropyrimidin-2(1*H*)- one (PY-3)

IR(cm-1) 1794.24 (C=O), 3515 (N-H), 667.07 (C-Cl), 1450 (C=C), 3.366 (1H, s, -C-Cl), 6.0-9.1 (1H, m, Ar-H), 7.2-8.4 (5H, s, Ar-OH).

4-(2-chlorophenyl)-6-(2,3-dimethoxyphenyl)-3,4-dihydropyrimidin-2(1H)-one (PY-4)

IR(cm-1) 1794.24 (C=O), 3515 (N-H), 667.07 (C-Cl), 1450 (C=C), 2860 (C-O-CH_3),3.366 (1H, s, -C-Cl), 6.0-9.1 (1H, m, Ar-H), 7.2-8.4 (5H, s, Ar-OH).

4-(2-chlorophenyl)-6-[4-(methylsulfanyl)phenyl]-3,4-dihydropyrimidin-2(1*H*)-one(PY-5)
IR(cm-1) 2568.21 (C-S), 147 (S-CH_3), 674.39 (C-Cl), 1614.81 (C=C), 3.366 (1H, s, -C-Cl), 6.0-9.1 (1H, m, Ar-H), 7.2-8.4 (5H, s, Ar-OH), 2.5-2.55 (1H, s, C-S).

Antioxidant activity by DPPH method[8]

Antioxidant behavior of these chalcones and pyrimidines derivatives were measured *in vitro* by the inhibition of generated stable 2,2-diphenyl- 1-picrylhydrazyl (DPPH) free radical. Methods vary greatly as to the generated radical, the reproducibility of the generation process and the end point that is used for the determination. The DPPH solution was prepared by dissolving accurately weighed 22 mg of DPPH in 100 ml of ethanol. From this stock solution, 18 ml was diluted to 100 ml with ethanol to obtain 100 µM DPPH solutions. The sample solution was prepared by accurately weighed 2.1 mg of each of the compounds and dissolved in 1 ml of freshly distilled DMSO separately to obtain solutions of 2.1 mg/ml concentration and the standard solution of was prepared by accurately weighed 10.5 mg of α-Tocopherol and dissolved in 1 ml of freshly distilled DMSO to get 10.5 mg/ml concentration.

A solution of test compound in ethanol (500 µl) was added to the ethanolic solution of DPPH radical. The reaction mixture was vortexed thoroughly and left in the dark at room temperature for 30 min. The absorbance of the mixture was measured spectrophotometrically at 517 nm against the corresponding blank solution. The final concentration of the samples and standard Ascorbic acid solutions used is 100 µg/ml. The percentage scavenging DPPH radical inhibitions were calculated by using the following formula.

$$\text{DPPH radical scavenging activity (\%)} = \frac{(\text{Abs control} - \text{Abs sample})}{\text{Abs control}} \times 100$$

Where, Abs control was the absorbance of DPPH radical and ethanol, Abs sample was the absorbance of DPPH radical and sample/standard.

The scavenging activity was expressed in terms of IC50, the concentration of the samples required to give a 50% reduction in the intensity of the signal of the DPPH radical. The results were done at least in triplicate.

RESULTS AND DISCUSSION

Table. 1.

S. No	CODE	Antioxidant activity (%inhibition)
1	CP01	70
2	CP02	88
3	CP03	78
4	CP04	66
5	**CP05**	62
6	PY01	64
7	PY02	81
8	PY03	72
9	PY04	60
10	PY05	51
11	Ascorbic acid	48

Five novel 1,3-diphenyl-2-propene-1-one chalcones and pyrimidinones were designed and synthesized by the condensation 1,3-diphenyl-2-propene-1-one with various aromatic aldehydes in dilute ethanolic potassium hydroxide solution at room temperature. And synthesized chalcones upon reaction with urea and sodium hydroxide forms pyrimidinone compounds. The obtained compound structures were characterized by its IR and ^{1}H NMR spectral data. Based on the values the compounds pyridiminone were shows better activity than chalcones due the compounds will having the lesser scavenging activity than the chalcones due the ring moiety. Here the compound contains the electron with drawing along the electron releasing groups maximum anti oxidant activity than the other molecule here compound PY05 (6-(3-methoxyphenyl)-4-phenyl-3,4-dihydropyrimidin-2(1*H*)-one) show activity along with standard ascorbic acid.

CONCLUSION

From the above results it is evident that synthesized chalcone derivatives and di hydro Pyrimidinone derivatives showed significant in vitro anti oxidant activity. In particularly, compounds containing the electron releasing groups (like OCH_3, OH) show the maximal antioxidant activity compare with standard compound ascorbic acid.

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