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Research Article

SYNTHESIS OF (2E)-1-(4-METHYLPIPERAZIN-1-YL)-3-SUBSTITUTED PHENYLPROP-2-EN-1-ONE CINNAMAMIDES

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ABSTRACT

Cinnamamides and its derivatives possessing various vital medicinal, pharmaceuticals, agricultural, biological and many other activities. In medicinal field several Cinnamamides and their derivatives are reported to show central nervous system depressant, anticonvulsant, muscle relaxant, antiallergic, antineoplastic, antitumor, anesthetic, analgesic and anti-infective activities, etc. In the agrochemical field, insecticidal, their avian repellent, herbicidal activities, and several excellent cinnamamide fungicides, for example dimethomorph, fluormorph and pyrimorph, have been successfully developed. Inspire of wide range of their applications and very less attention is paid towards the synthesis of cinnamamides derivatives containing heterocyclic moiety. Literature survey and biological activities' of cinnamamides have motivated to undertake the synthesized novel cinnamamides entitled "(2E)-1-(4-methylpeperazin-1-yl)-3-subsituted phenylprop-2-en-1-one Cinnamamides. The present study is related to the synthesis of some novel cinnamamides containing heterocyclic moiety.

Keywords: N-methyl piperazine, aromatic aldehydes, Cinnamamides.

INTRODUCTION

Cinnamamides constitute an important class of compounds with a variety of biological properties[1] such as nervous central system depressant, anticonvulsant, muscle relaxant, antiallergic, antioxidant[2], antineoplastic, anti-infective activities, antimicrobial activity, medicinal, pharmaceuticals[3-4], agricultural, *etc*. In agrochemical field, their avian repellent, Antifungicidal, insecticidal [5] and herbicidal activities. The Witting reaction is an important method for the synthesis of alkenes. The double bond forms specifically at the location of the original aldehyde or ketone. The synthesized compounds are neutral molecules but positive and negative centers on adjacent atoms connected by a sigma bond.

The nucleophilic Carbon of the witting reagent adds to the electrophilic carbon in the polar carbonyl group of aromatic aldehyde the C=O pi bond are used to from a sigma bond to the positive P atom to form intermediate knows as Oxaphosphetane, which on decomposition by breaking the C-P bond and C-O bonds leads to the formation of the C=C pi bond of cinnamamides. In the present study, the attempts were made to synthesize the series of (2E)-1-(4-methylpeperazin-1-yl)-3-substituted phenylprop-2-en-1-one Cinnamamides from Witting reagent**.** Synthesized compounds were characterized by elemental analysis and spectral studies.

EXPERIMENTAL

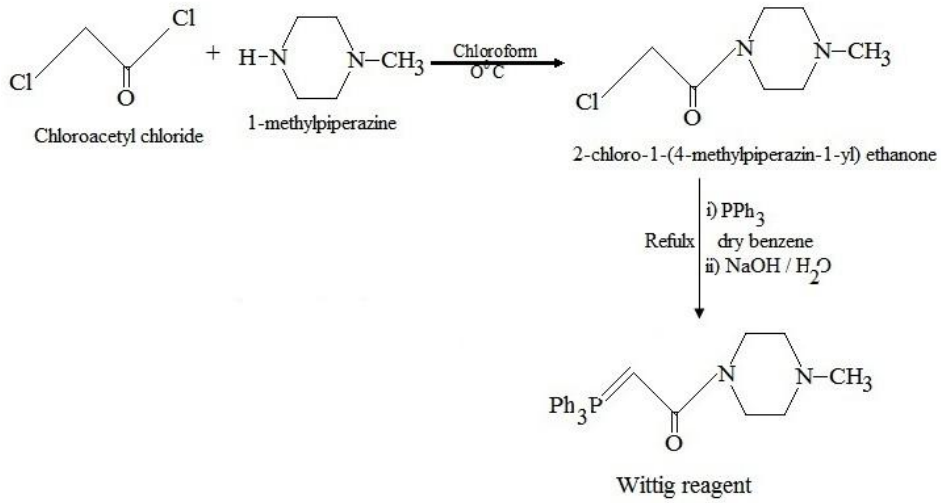
Part-I-Synthesis of Wittig reagent

N-methyl piperazine chloracetamide were synthesized by using equimolar solution of chloroacetylchloride and N-methyl piperazine in chloroform at 0^{o}C with continuous stirring in fuming chamber. When this reaction mixture gives the salt by adding its solution in benzene to the stirred solution of triphenylphosphine and reaction mixture was refluxed for 4-6 hrs. The solid products obtained were filtered and air dried. Thus for Purification obtained salt was dissolved in 100 ml water then 90 ml of dry benzene, add 1-2 drops of phenolphthalein indicator and add NaOH solution in it till pink colour persist this was indicates that the neutralization of present acid from reagent. Then benzene layer was separated and washed with water and concentrated to one third volume. Finally the product scratched with n-Hexane to obtain solid witting reagent.

Part-II- Synthesis of (2E)-1-(4-methylpeperazin-1-yl)-3-Substituted phenylprop-2-en-1-one Cinnamamides

Equimolar solution of Witting reagent and different aromatic aldehydes were taken in dry benzene and refluxed for 4 to 6 hrs. The progress of reaction was monitored by thin layer chromatography. Melting points were taken by open capillary method. The elemental analysis was calculated for carbon, hydrogen, nitrogen and chlorine. IR spectra were recorded with TMS as internal standard using CDCl3. All Synthesized compounds were purified by coloum chromatography. All chemicals used were of analytical grade.

SCHEME: - I



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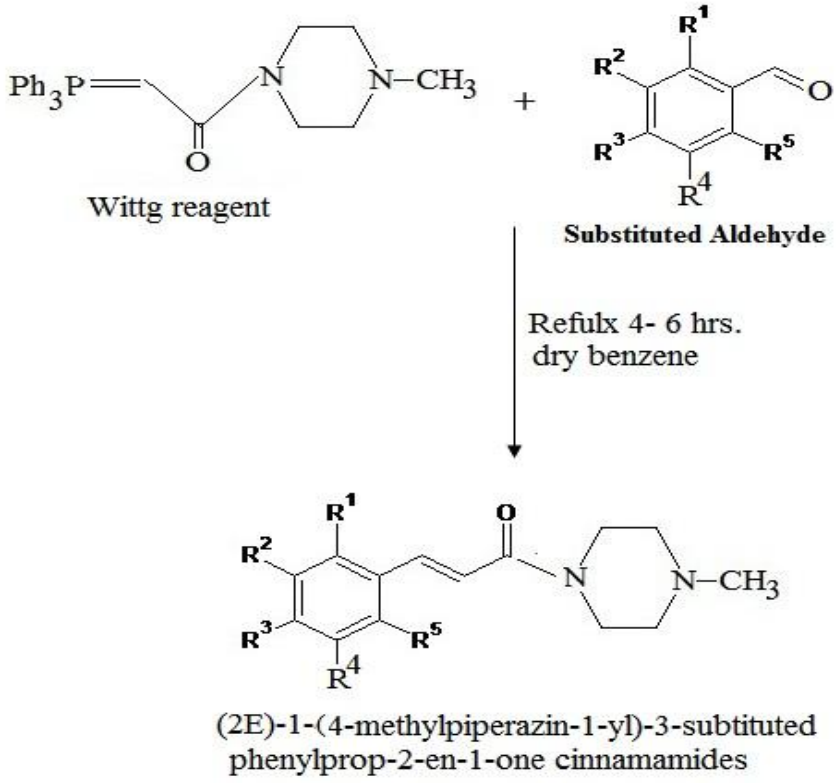

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Table-1:-Substituted aromatic aldehydes used in the synthesis of Cinnamamides

Sr No.	Entries	R1	R2	R3	R4	R5
1	**Ia**	H	H	H	H	H
2	**Ib**	H	H	OMe	H	H
3	**Ic**	H	OMe	OMe	H	H
4	**Id**	H	OMe	OMe	OMe	H
5	**Ie**	H	-O-CH_2-O-		H	H
6	**If**	NO_2	H	H	H	H
7	**Ig**	H	H	Cl	H	H
8	**Ih**	H	H	NO_2	H	H
9	**Ii**	H	H	$N(Me)_2$	H	H
10	**Ij**	H	H	OH	H	H

Table-2:- Characteristics data for synthesized Cinnamamides

Sr. No.	Entries	Molecular Formula	Molecular weight	Yield %	M.P. ^{0}C
1	**Ia**	$C_{14}H_{18}ON_2$	230	76	69
2	**Ib**	$C_{15}H_{20}O_2N_2$	260	62	165
3	**Ic**	$C_{16}H_{22}O_3N_2$	290	54	205
4	**Id**	$C_{17}H_{24}O_4N_2$	320	78	172
5	**Ie**	$C_{15}H_{18}O_3N_3$	288	66	62
6	**If**	$C_{14}H_{17}O_3N_2$	261	58	102
7	**Ig**	$C_{14}H_{17}ON_2Cl$	264.5	78	79
8	**Ih**	$C_{14}H_{17}O_3N_3$	275	70	218
9	**Ii**	$C_{16}H_{23}ON_2$	259	56	200

10	**Ij**	$C_{14}H_{18}O_2N_2$	246	64	82

Table-3:-Elemental analysis of synthesized compounds-

Sr. No.	Entries	Molecular Formula	% C	% H	% O	% N	% Cl
1	**Ia**	$C_{14}H_{18}ON_2$	73.06 (73.04)	7.88 (7.83)	7.00 (6.96)	12.19 (12.17)	---
2	**Ib**	$C_{15}H_{20}O_2N_2$	69.26 (69.23)	7.72 (7.69)	12.36 (12.31)	10.82 (10.77)	---
3	**Ic**	$C_{16}H_{22}O_3N_2$	66.26 (66.21)	7.64 (7.59)	16.62 (16.55)	9.70 (9.66)	---
4	**Id**	$C_{17}H_{24}O_4N_2$	63.80 (63.75)	7.54 (7.50)	20.06 (20.00)	8.80 (8.75)	---
5	**Ie**	$C_{15}H_{18}O_3N_3$	62.58 (62.50)	6.30 (6.25)	16.71 (16.66)	14.62 (14.58)	---
6	**If**	$C_{14}H_{17}O_3N_2$	64.42 (64.36)	6.53 (6.51)	18.42 (18.39)	10.75 (10.72)	---
7	**Ig**	$C_{14}H_{17}ON_2Cl$	64.02 (63.51)	6.48 (6.42)	6.10 (6.05)	10.56 (10.58)	13.40 (13.42)
8	**Ih**	$C_{14}H_{17}O_3N_3$	62.12 (61.10)	6.21 (6.18)	17.46 (17.45)	15.28 (15.27)	---
9	**Ii**	$C_{16}H_{23}ON_2$	74.16 (74.13)	8.90 (8.88)	6.20 (6.17)	10.84 (10.81)	---

In bracket calculated percentages of element.

Spectral Data Studies:-

Ia=(2E)-1-(4-methylpeperazin-1-yl)-3- phenylprop-2-en-1-one Cinnamamides-

IR (cm^{-1})1656, 1595

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.7(d), (1H), (CH=CHCO), J=15.94 HZ; 6.8(d), (1H), (CH=CHC_6H_5) J=15.94 HZ; 7.2-7.5(m), (5H), (C_6H_5).

Ib- IR (cm^{-1})1685, 1600

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.9(d), (1H), (CH=CHCO), J=15.60 HZ; 7.0(d), (1H), (CH=CHC_6H_5) J=15.60HZ; 3.2(s), (3H), (OMe); 7.2(d), (2H); 7.4(d), (2H).

Ic- IR (cm^{-1})1678, 1644

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.9(d), (1H), (CH=CHCO), J=15.70 HZ; 7.2(d), (1H), (CH=CHC_6H_5) J=15.70HZ; 3.2(s), (6H), (OMe); 6.9-7.1(m), (3H), Ar-H.

Id- IR (cm^{-1})1688, 1636

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.9(d), (1H), (CH=CHCO), J=15.84 HZ; 7.4(d), (1H), (CH=CHC_6H_5) J=15.84HZ; 3.2(s), (9H), (OMe); 6.6(s), (2H), Ar-H.

Ie-IR(cm^{-1}) 1670, 1650

1HNMR-1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.9(d), (1H), (CH=CHCO), J=15.84 HZ; 7.4(d), (1H), (CH=CHC_6H_5) J=15.84HZ; 4.8(s), (4H), (H_2COCH_2); 7.4-7.6(s), (3H), Ar-H.

If- IR (cm^{-1})1664, 1680

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.8(d), (1H), (CH=CHCO), J=15.72 HZ; 7.3(d), (1H), (CH=CHC_6H_5) J=15.72HZ; 7.4-7.5(m), (4H), Ar-H.1H

Ig- IR (cm^{-1})1656, 1580

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.6(d), (1H), (CH=CHCO), J=15.70 HZ; 6.8(d), (1H), ($CH=CHC_6H_5$) J=15.70HZ; 7.3-7.5(m), (4H).

Ih- IR (cm^{-1})1664, 1680

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.7(d), (1H), (CH=CHCO), J=15.70 HZ; 6.8(d), (1H), ($CH=CHC_6H_5$) J=15.70HZ; 7.3-7.4(m), (4H).

Ii- IR (cm^{-1})1654, 1546

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.7(d), (1H), (CH=CHCO), J=15.70 HZ; 6.8(d), (1H), ($CH=CHC_6H_5$) J=15.70HZ; 7.3-7.4(m), (4H); 2.5 (s), (6H), NMe_2.

Ij- IR (cm^{-1})1656, 1680, 2550

1H NMR-(δ)-2.2(s), (3H), NMe; 2.9(t), (4H); 3.5(t), (4H); 6.7(d), (1H), (CH=CHCO), J=15.70 HZ; 6.8(d), (1H), ($CH=CHC_6H_5$) J=15.70HZ; 7.3-7.4(m), (4H); 5.6 (s), (1H), OH.

RESULT AND DISCUSSION

All synthesized novel cinnamamides compounds contained heterocyclic moiety in the form of N-methyl Piperazine. The Witting reaction is an important method for the synthesis of alkenes. By using this method novel cinnamamides containing heterocyclic moiety entitled (2E)-1-(4-methylpeperazin-1-yl)-3-substituted phenylprop-2-en-1-one Cinnamamides are synthesized from different aromatic aldehydes and Witting reagents having good yields. The yields of synthesized compounds were ranging from 54 to 78%. All synthesized compounds were characterized on the basis of melting point, elemental analysis, Rf value, IR spectra and 1HNMR spectral analysis.

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