Biocidal screening of N-Substituted 4-biphenyl acetamides derivatives.

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Abstract

The present paper deals with the Biocidal screening of N-Substituted 4-biphenyl acetic acid amides synthesis by condensation of corresponding acid chlorides with suitable amines. the structure of newly synthesized compounds were elucidated on the basis of their IR, TLC and elemental analysis data. The compounds were also screened for their anti-bacterial and anti-fungal activity.

Key Words – Synthesis, biphenyl derivatives, spectral and biocidal activity.

Introduction

Biphenyl and its derivatives can be prepared by hydrogenation of coal-tar, by coupling reaction of organo metallic compounds, the reductive debromination of bromophenyl, by reductive halogenation of organic halide and by coupling reaction of chloro benzene, Recently, an efficient and convenient one step synthesis of 4-Biphenyl acetic acid using Pd/c as catalyst has been described.

4-BPAA itself has been reported to possess many effective pharma cological activities, such as anti-inflammatory, analgesic, anti-bacterial and topical non steroidal anti-inflammatory activity. The ointment and various types of patches containing 4-BPAA work very effectively as anti-inflammatory and analgesic agents. 4-BPAA cyclodextria inclusion compounds are reported to show effective mono nuclear rogenic

anti-inflammatory properties and its phenyl alkanamide derivatives have shown agro horticultural bacteriocidal activity.

The newly synthesized N-Substituted 4- biphenyl actamides derivatives are biocidal screening to evaluate their possible use as antifungal and antibacterial activities.

Experimental

All the chemicals used for the synthesis were of Analar grade. Distill solvent were used throughout the experiment.

Procedure of Preparation of Fungus Solution :

Take distilled water (25 ml) in a conical flask and add some procelline pieces in it. Then, sterilized the conical flask in autoclave upto 100 mm. pressure, Now, the pressure of autoclave comes down upto zero Point, then release the Pressure of autoclave and wait for few minuts. Now, open the autoclave and Put the conical flask on the table

for achieving room temperature. then, inject very few quantity of fungus used for the growth such as :- **Fujeerium-Udum** with the help of Anaculation needle in sterilized medium.

Procedure of Growing the Fungus :

Take two petric plates and paur 1 ml. solution of fungus (used for the identification of antifungal Properties of compound) in each Petric Plate, add Agar-Agar Media (15ml) in each Petric Plate. Then, wait for 4-5 days for the growth of fungus in these Petric Plates.

After the browth of particular fungus, cut the fungus of a particular size (3mm). These blocks were replaced in another petric plate alongwith Czapeck's media (15ml) and the solution of compound (1ml). Now, the identification of antifungal property of a Particular compound on specific fungus might be Possible.

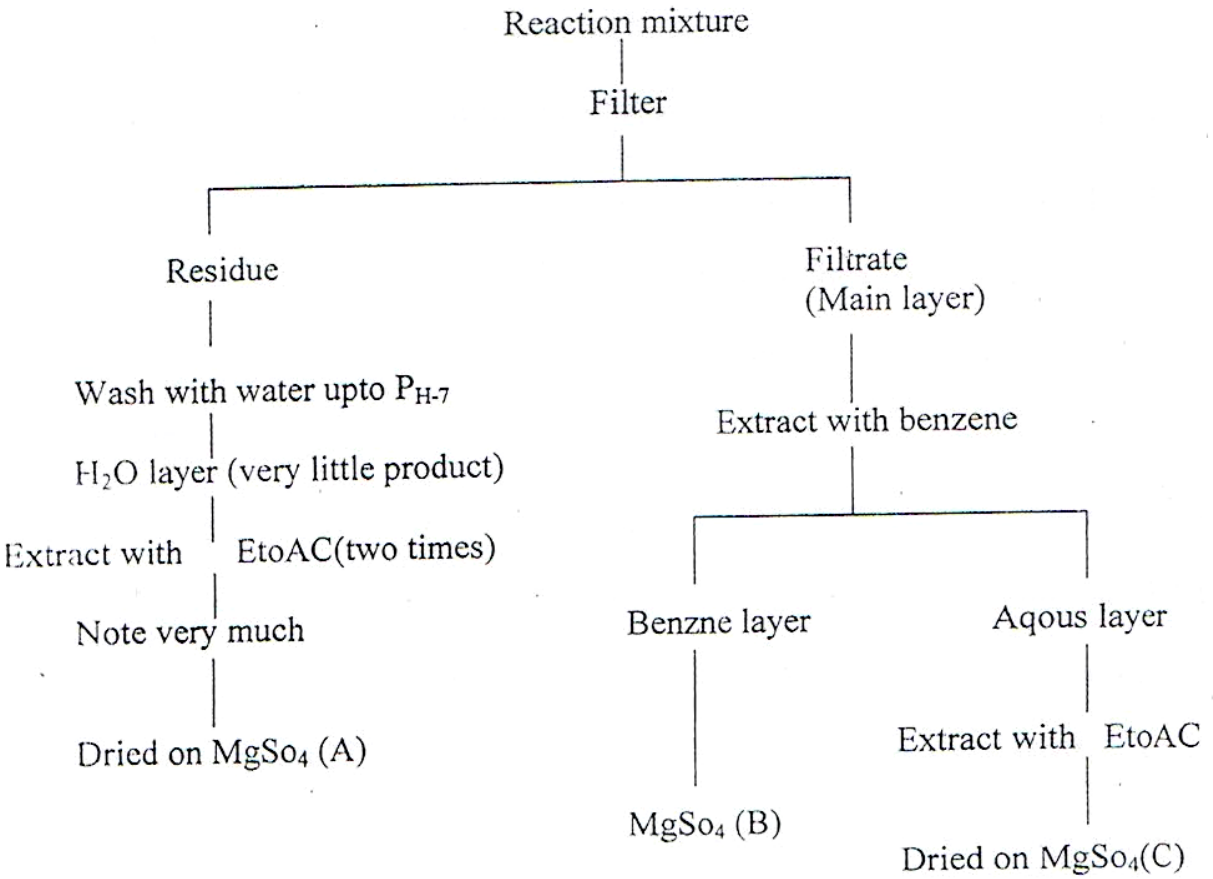
Procedure of Preparation of solutions for compounds of different ppm :

Absolute ethyl alcohal was used for dissolving all the six compounds. Thus, control Plate of each experiment having only absolute ethyl alcohal in it for the preparation of solution of different ppm's of a particular compound. Weigh the compound (10ml) and dissolved it in absolute. Ethyl alcohal (10ml) for the preparation of solution of 1000 ppm. Now, take 3 ml solution of this 1000 ppm and add 1 ml absolute ethyl alchoal for the preparation of solution of 750 ppm. Take 2 ml. solution of 1000 ppm and add 2 ml. absolute ethyl alcohal for then preparation of solution of 500 ppm. Take 1 ml. solution of 1000 ppm. And add 3 ml. absolute alcohal for the preparation of solution of 250ppm. only control 250 ppm. 500 ppm and 1000 ppm's solutions were used in all the experiments. Three replicates used within one experiments. Thus 12 petric plates were used in one experiment.

Synthesis of Compounds

This paper includes the synthesis of simple N-Substituted 4-biphenyl acetamides analoges. The syhthesis of these analoges containing two step. In 1st step converted 4-biphenyl acetic acid[13] (4-BPAA) into 4-biphenyl acetyl chloride[4-BPAC(as a various liquid)] by refluxing 4-BPAA with thionyl chloride in dry benzene for 2 ½ hours and in 2nd step viscous oil treated with different type of suitable amines at room temp in the presence of 4N-NaOH by stirring, in order to prepared different

types of amides of 4BPAA. This scheme is clear from following diagramatic ɐpresentation.



Ist Step 4-BPAC (1gm) in dry benzene (25 ml) {benzene distilled over on anhydrous Cacl21 and thionyl chloride (1ml) added in a 100 ml of R.B. flask, and refluxed the reaction mixture for 2 ½ hrs. After 1 hour the colour of mixture change from yellow to brown. After 2 ½ hrs thionyl chloride along with benzene. Traces of thionyl chloride removed with the help of vaccum pump 4-Biphenyl acetyl chloride obtained in oily form and w3ecl without further purification in next step to form different types of amides of 4-BPAA.

IInd Step Dissolved benzamide (260mg) in benzene (10ml) in a R.B. flask of 50 ml (1_A) (542 mg) in dry benzene (10ml), and add in slowly drop by drop under stirring

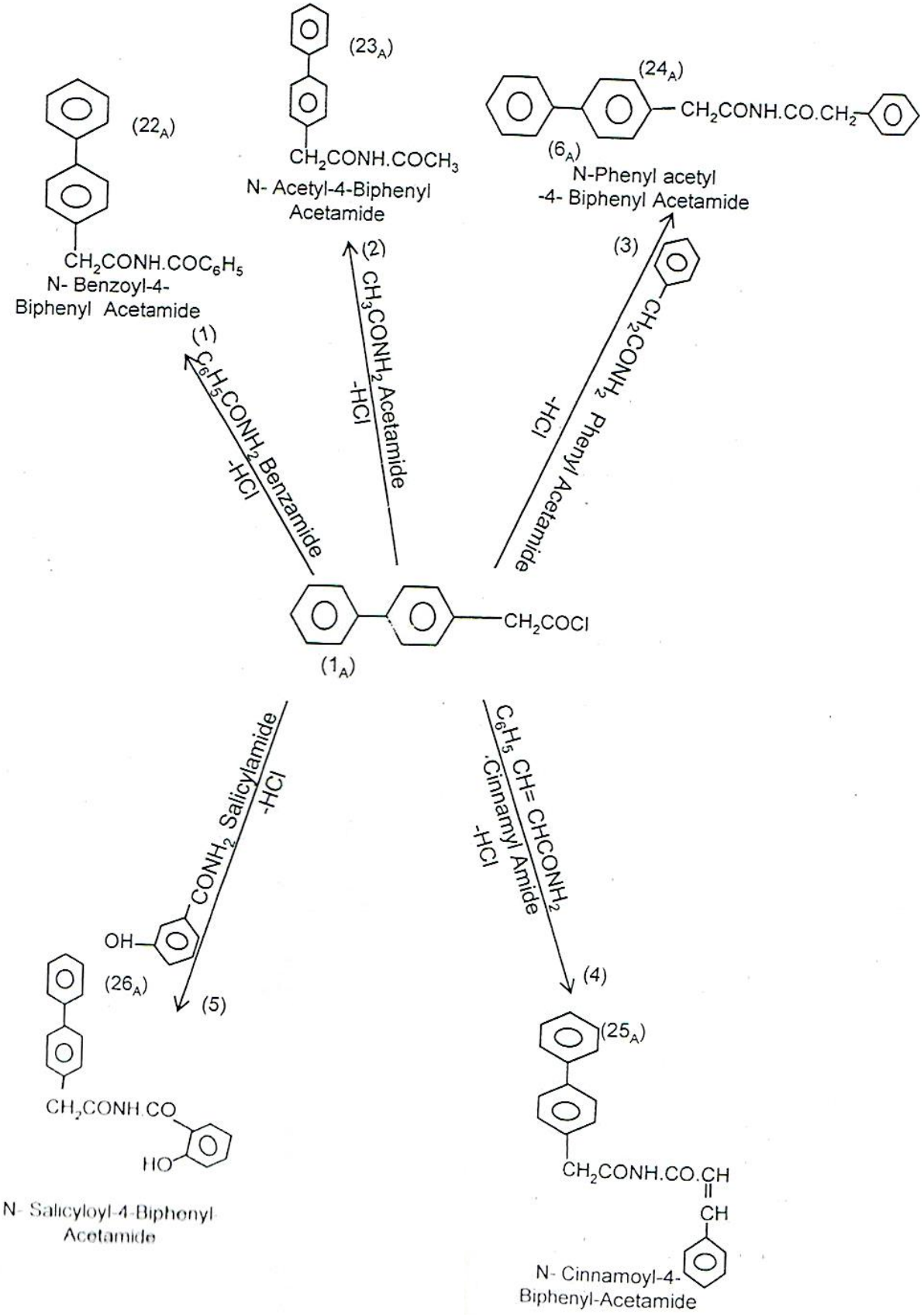
at room temperature in the R.B. flask. Stirring continue for three hours. Then check the T.L.c. shows that reaction become complete.

Workup the reaction mixture with benzene (150ml) in a R.B. flask of 50 ml (1_A) after 21 hours. Thus extract the reaction mixture with benzene gently 3-4 times compound gets dissolved in benzene layer placed on $MgSo_4$ for 5-10 minutes. Now filter and concentrate the filterate by recovered the benzene through distillation. Concentrate residue was treate with hexane for complete pptation. Pale yellow crystalline solid separate out, filter through whattman filter paper No. 42 Wash with hexane 2-3 times, dry & weigh).

The same procedure were synthesized N-Substituted 4-Biphenyl acetamide derivatives such as –

1. N-Benzoyl – 4 – Biphenyl acetamide (22_A)
2. N-Acetyle – 4 – Biphenyl acetamide (23_A)
3. N-Phenyl acetyl – 4 – Biphenyl acetamide (24_A)
4. N-Cinnamyl – 4 – Biphenyl acetamide (25_A)
5. N-Salicyloyl – 4 – Biphenyl acetamide (26_A)

Synthesis of N-Substituted 4-biphenyl acetamides derivatives.



Result and Biocidal Activity

Various types of amides of N-Substituted 4-BPAA having two-Co groups and laving-CO-NH-CO type bonding During the synthesis of such type of the compounds first of all we do the acetylation of N-Substituted 4 -BPAA as discussed earlier then 4-Biphenyl acetyle chloride (4 - BPAC) react with different types of uitable aliphatic and aromatic amines having free–NH2 group to prepare a various types of amides of N-Substituted 4-BPAA. The characteristic JR bands (4000-200 cm^{-1}) for the 4-BPAA, 4-BPAC and 4-BPAA derivatives compounds provide meaningful information regarding the bonding sites of the amides. The IR spectra show characteristic bands in the region 3243-3255 cm^{-1} with free $>NH_2$[14] and the region 1630-1645 cm^{-1} showed >CO group.

In this scheme commercially available and synthesized amides were used those having free-NI-12 group. But the results were not poor and an average 30-90% yield of such type of the synthesized amides obtained and with very few failures.

The analytical results, melting point, colour, yield and 1R bands of the compounds are presented in table.

S.No.	Code	Experimental yield (100%)	Yield obtained (%)
1.	22A	685 mg	260mg (43.96%)
2	23A	550 mg	270mg(49.09%)
3	24A	685 mg	200mg (29.20%)
4	25A	740 mg	345mg (46.22%)
5	26A	720 mg	360mg (50%)

The compounds were also screened for their antifungal activity of disc-plate method(15 against C.lunata Seven days old culture were used as test organism which were grown on dextrose-agar medium. The fungi were grown at R.T. 10 ± 30C and the average of three replications was recorded with control plate. The percentage inhibition (16) was calculated as (C-T) x 100/C where C-diameters of fungus colony in control plate and T-diameter of Fungus colony in test plate.

All the compounds show positive results and resist the growth of a particular fungus. This has been observed from experimental observations, that as the concentration of the solution of a particular compound increased, the resistant power of a particular compound was also increased to resist the growth of a particular fungus.

REFERENCE

1- Wedel, Arno; Ber, Fer- schungszeent. Juelinch, Germany 1-213, (1997).

2- Blais, Jules M; Froese, kanneth L; Schindler, David, W; muiir, Derek C.G; Organo halogen compounds 39, 189-192 (1998).

3- Otha, s; Kuriyama, S; Aozasa, 0; Nakao, T; Tanahashi,M; Miyata, H; Bull. Environ. Contam. Toxicol 64(5). 630-637(2000).

4- Buckland, Simon J; Scobie, supan E; Hannath, Mary Louise, Heslop, vivienne; organo halogen compound, 38, 71-74 (1998)

5- Environmental Protection Agency; Fed. Regist. 65(248), 81373- 81381(2000).

6. Venkatraman, sripathy; Li, Chao-j im; Org Left. 1(2) 1133-1135 (1998).

7. Kushwaha, B.S; Sengar A-K; Singh, Jaipal; Oriental J. Chem.; 22(2), 411-414 (2006)

8. J. M. vincent, Farmers. Bull; USDA, 159,850(1947).

9 Granby, kit; Paulsen matte; Ereeius (Den.) Pubi. - evendsmidd- eslystyr(Den), 245,1- 67,(1997).

10. Dorussen Harry,L; wassenberg wilfvied, B.A; Water science technology{35(10)}, 73-78 (1997).