

FUNGICIDAL ACTIVITIES OF Co (II), Ni (II) AND Cu (II) COMPLEXES WITH DDA, DAA AND NAA

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ABSTRACT

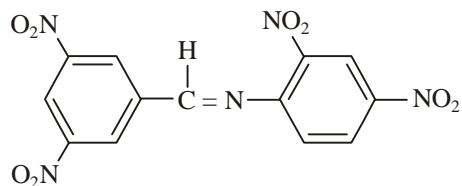
Fungicidal activities of Co (II), Ni (II) and Cu (II) complexes with the Schiff bases 3,5,-dinitrobenzylidene-2,4-dinitroaniline, 3,5-dinitrobenzylidene-4-amino acetanilide, 3-nitrobenzylidene-2-aminoacetanilide has been studied.

Key words: Fungicidal activities, Co (II), Ni (II), Cu (II) Complexes, DDA, DAA, NAA.

INTRODUCTION

Extensive fungicidal activities of various new class of chemotherapeutically important Schiff bases metal coordinated drugs^{1,2} are now increasing and drawing very much attention of the scientists working in the related field. Infact these drugs after suitable modifications, in structure of their derivatives of such complexes have earned the reputation of much useful physiologically actives phtherapeutic agents. Therefore with this objective this study has been done to observe the impact of chelation on the therapeutic values of the metal complexes of synthesized Schiff bases³⁻⁵.

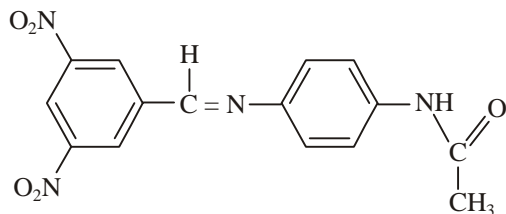
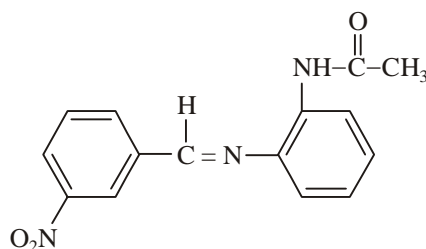
For synthesis of metal complexes of Co (II), Ni (II) and Cu (II), 3,5-dinitrobenzylidene-2,4-dinitroaniline, 3,5,-dinitrobenzylidene-4-amino acetanilide, 3-Nitrobenzylidene-2-aminoacetanilide were used as schiff's bases, as displayed in the Chart-I.



(3,5,-Dinitrobenzylidene-2,4-dinitroaniline)

DDA (1)

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**(3,5,-Dinitrobenzylidene-4-amino acetanilide)****DAA (2)****(3-Nitrobenzylidene-2-aminoacetanilide)****NAA (3)****Chart 1****EXPERIMENTAL**

The fungicidal activities of the synthesized ligand metal complexes of respective metal schiff's bases salts as per chart-I, were done using the techniques of cup-plate method. *In vitro* fungicidal activity was observed against the fungi, namely (1) *Aspergillus fumigatus*, (2) *Aspergillus flavous*, (3) *Aspergillus niger*, (4) *Aspergillus terreus*, (5) *Chrysosporium tropioum* (6) *Candida albicans* (7) *Curvularia prasadii* (8) *Keratinomyces ajelloi* (9) *Microsporum syspeum* (10) *Penicillium liliacinum* (11) *Rhizopus nodosus* (12) *Trichophyton rubrum* 12 S (13) *Trichophyton rubrum* 5 S (14) *Trichoderma viride* and (15) *Vertioillium lecanni*. Streptomycin 500 ppm was taken as standards for comparison of the fungicidal activities, respectively. The zone of inhibition was compared with standard drugs after 25 h of incubation at 26°C for the fungicidal activities.

The fungicidal activities were assayed by following filter paper disc-plate method⁶⁻⁹.

Culture media

The Sabrouad's dextrose agar medium was used, during the experiment for assaying (seed agar) and for maintaining the culture which consisted of; Peptone (10.0 g), Dextrose, (45 g), Agar (10 g) and distilled water (300 mL).

Sterilization

The media and the slants for the preparation of sub-cultures of the organisms were; sterilized by autoclaving them at 20 lbs. pressure for 50 minutes. The petri dishes used were first sterilized by keeping them for 50 hours at 100°C in an electrically heated air oven.

Preparation of agar plates

Spore suspension (5%, V/V) of each organism was mixed with sterilized SDA medium and 25 mL of each of this was poured in each sterilized petri dish of 90 mm dia, and were allowed to gel. After gelling, the sterile paper discs were prepared using Whatmann No. 1 filter paper of 6 mm diameter which were carefully moistened in the complexes to be tested and were placed on the Agar plates. The plates were then incubated for 36 hours at $26 \pm 1^\circ\text{C}$.

Standard

The well known antifungal, Griseofulvin (500 ppm.) was employed as standard substance for fungicidal examination in the present study for comparison.

Determination of antifungal activity

The antifungal activity was estimated in terms of the inhibitory zones, which appeared around the filter paper discs. After incubation the zones were measured with the help of transmitted light and the experiments were repeated in triplicate.

The observations are recorded in Table 1, 2 and 3. Griseofulvin (500 ppm.) as standard antifungal control was taken for comparing the antifungal activity of the synthesis complexes.

Table 1: Fungicidal activities of metal complexes of Co (II), Ni (II) and Cu (II) with - 3,5-dinitrobenzylidene-2,4-dinitroaniline

S. No.	Organism	Diameter of growth of inhibition zone (mm) including the diameter of well (6.0 mm)			
		Co (II)	Ni (II)	Cu (II)	Control streptomycin 500 ppm
1	<i>Aspergillus fumigatus</i>	11	9	10	17
2	<i>Aspergillus flavous</i>	10	9	11	18

Cont...

S. No.	Organism	Diameter of growth of inhibition zone (mm) including the diameter of well (6.0 mm)			
		Co (II)	Ni (II)	Cu (II)	Control streptomycin 500 ppm
3	<i>Aspergillus niger</i>	12	7	9	17
4	<i>Aspergillus terreus</i>	7	8	12	17
5	<i>Chrysosporium tropiolum</i>	8	8	12	18
6	<i>Candida albicans</i>	8	6	9	17
7	<i>Curvularia prasadii</i>	9	8	8	16
8	<i>Keratinomyces ajelloi</i>	12	9	9	16
9	<i>Microsporum sypseum</i>	9	9	10	18
10	<i>Penicillium liliacinum</i>	10	9	11	17
11	<i>Rhizopus nodosus</i>	8	6	10	15
12	<i>Trichophyton rubrum 12 S</i>	9	4	11	16
13	<i>Trichophyton rubrum 5 S</i>	7	5	10	17
14	<i>Trichoderma viride</i>	11	6	9	14
15	<i>Verticillium lecanii</i>	11	7	8	15

Table 2: Fungicidal activities of metal complexes of Co (II), Ni (II) and Cu (II) with - 3,5-dinitrobenzylidene-4-amino acetanilide

S. No.	Organism	Diameter of growth of inhibition zone (mm) including the diameter of well (6.0 mm)			
		Co (II)	Ni (II)	Cu (II)	Control streptomycin 500 ppm
1	<i>Aspergillus fumigatus</i>	8	8	12	17
2	<i>Aspergillus flavous</i>	6	10	10	18
3	<i>Aspergillus niger</i>	8	9	11	17
4	<i>Aspergillus terreus</i>	7	7	11	17

Cont...

S. No.	Organism	Diameter of growth of inhibition zone (mm) including the diameter of well (6.0 mm)			
		Co (II)	Ni (II)	Cu (II)	Control streptomycin 500 ppm
5	<i>Chrysosporium tropiolum</i>	6	7	12	18
6	<i>Candida albicans</i>	5	6	10	17
7	<i>Curvularia prasadii</i>	8	8	10	16
8	<i>Keratinomyces ajelloi</i>	6	6	11	16
9	<i>Microsporum syspeum</i>	7	5	12	18
10	<i>Penicillium liliacinum</i>	4	2	10	17
11	<i>Rhizopus nodosus</i>	5	1	11	15
12	<i>Trichophyton rubrum 12 S</i>	7	4	12	16
13	<i>Trichophyton rubrum 5 S</i>	8	4	10	17
14	<i>Trichoderma viride</i>	6	7	9	14
15	<i>Vertioillum lecanni</i>	7	6	9	15

Table 3: Fungicidal activities of metal complexes of Co (ii), Ni (ii) and Cu (ii) with -3-nitrobenzylidene-2-aminoacetanilide

S. No.	Organism	Diameter of growth of inhibition zone (mm) including the diameter of well (6.0 mm)			
		Co (II)	Ni (II)	Cu (II)	Control streptomycin 500 ppm
1	<i>Aspergillus fumigatus</i>	6	8	10	17
2	<i>Aspergillus flavous</i>	9	9	12	18
3	<i>Aspergillus niger</i>	8	7	11	17
4	<i>Aspergillus terreus</i>	7	10	10	17
5	<i>Chrysosporium tropiolum</i>	10	9	9	18

Cont...

S. No.	Organism	Diameter of growth of inhibition zone (mm) including the diameter of well (6.0 mm)			
		Co (II)	Ni (II)	Cu (II)	Control streptomycin 500 ppm
6	<i>Candida albicans</i>	11	6	12	17
7	<i>Curvularia prasadii</i>	10	5	13	16
8	<i>Keratinomyces ajelloi</i>	9	7	12	16
9	<i>Microsporium syspeum</i>	10	6	14	18
10	<i>Penicillium liliacinum</i>	8	8	13	17
11	<i>Rhizopus nodosus</i>	7	7	11	15
12	<i>Trichophyton rubrum 12 S</i>	6	6	12	16
13	<i>Trichophyton rubrum 5 S</i>	8	6	10	17
14	<i>Trichoderma viride</i>	7	7	12	14
15	<i>Vertioillium lecanni</i>	8	6	11	15

RESULTS AND DISCUSSION

A critical perusal of the observation Tables 1, 2 and 3 reveals that in case of complexes of 3, 5-dinitrobenzylidene-2,4-dinitroaniline with Co (II), Ni (II), and Cu (II), the Co (II) and Cu (II) complexes have considerable fungicidal activities the highest being against *aspergillus terreus* and *chrysosporium tropioum* with Cu (II) and *aspergillus niger* and *keratinomyces ajelloi* against Co (II), whereas in case of complexes of 3,5-dinitrobenzylidene-4-amino acetanilide, considerable fungicidal activity was noticed with Cu (II), complexes agar the maximum being with as *aspergillus fumigatus*, *chrysosporium tropioum*, *microsporium syspeum*, *Trichophyton rubrum 12 S*, respectively.

In addition to above in case of 3-nitrobenzylidene-2-amino acetanilide very much encouraging results were observed with *curvularia prasadii*, *microsporium syspeum*, and *penicillium liliacinum* along with to considerable fungicidal activities were also noticed against *aspergillus flavous*, *candida albicans*, *keratinomyces ajelloi* and *trichophyton rubrum 12, S*. Since some of these fungicidal are causes of several human diseases of skins, therefore these metal complexes may potentially be explored in future for the cure of disease developed due to the above fungicides.

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