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Antimicrobial studies of doped Sm(III) ion in the solution of some N & O donor atom ligands

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ABSTRACT: *Antimicrobial studies of doped Sm (III) ion in the solution of sulphonanilides have been carried out S. aureus, P. aeruginosa and E. coli in the present study. Their activity has been compare with sulphonanilide.*

Keywords: *Antimicrobial, Samarium, Sulphonanilide.*

I. INTRODUCTION

Complex compounds play an essential role in numerous system of chemical and biological importance[1], which becomes clear when we realize that chlorophyll, vital to photosynthesis in plants, is a magnesium complex and hemoglobin, carrying oxygen to human cells, is an iron complex. Many platinum complexes have been reported as anti-cancer agents[2] and many vanadium complexes behave as anti tumor agents[3]. Anti-inflammatory activities of some complexes of schiff's basses with cobalt have also been reported[4]. The complexing ability has been reported poor in case of lanthanide complexes and also the stability of lanthanide complexes is found similar to $[Ag(NH_3)_2]^+$ type of complex[5] but the complexes of lanthanide (III) metal ion with organic reagents are significant because of there uses in the field of industrial[6], biochemical[7] & medical chemistry[8]. Complexes of Sm(III) with different sulphonanilides have been reported earlier[9].
Present work deals with the antimicrobial studies of these complexes against gram positive and gram negative bacteria. The work will be useful in finding out the minimum inhibitory concentration (MIC) and minimum bactericidal concentration(MBC) for sulphonanilides and their systems with Sm(III) ion.

II. EXPERIMENTAL

Standrad grade chemicals - $SmCl_3.6H_2O$ and re-crystallized substituted sulphonanilides (prepared in this Lab-table 1) were used.

Ninteen systems were prepared for Sm(III) ion by using mentioned standard method[10].
The ligands and their systems have been screened for anti-microbial activities by Bauer- Kirby disc diffusion technique.

The anti-microbial activity of these systems have been tested against gram positive cocci *(Staphylococcus aureus)* and gram negative bacilli *(Pseudomonas aeruginosa* and E.*Coli*).

III. RESULTS AND DISCUSSION

In the present work of anti-microbial screening for sulphonanilide and their systems with Sm(III) against gram positive cocci and gram negative bacilli, following results have been observed

Sensitivity of *Staphylococcus aureus* against Sm(III) - sulphonanilide systems:

The decreasing order of sensitivity of ***Staphylococcus aureus*** against Sm(III) - sulphonanilide systems is given below-

Sm(III)-L_2 = Sm(III)-L_3 > Sm(III)-L_4 = Sm(III)-L_5 > Sm(III)-L_{12} = Sm(III)-L_{17} = Sm(III)-L_{19} >Sm (III)-L_6 = Sm(III)-L_{15} = Sm(III)-L_{20} = Sm(III)-L_1 > Sm(III)-L_8 = Sm(III)-L_9 = Sm(III)-L_{10} = Sm(III)-L_{11} = Sm(III)-L_{13} =Sm(III)-L_{14} = Sm (III)- L_{16} = Sm(III)- L_{18} = Sm(III)-L_7

No activity was observed in L_7, L_8, L_9, L_{10}, L_{11}, L_{13}, L_{14}, L_{16} and L_{18}, insignificant activity was observed in L_1,L_6 L_{15} L_{15} and L_{20} sulphonanilides, moderate activity was observed in L_{12} L_{17}, L_2. L_3. L_4 , L_5 and L_{19}. No system was found to have significant, appreciable and high activity.

Sensitivity of *Pseudomonas aeruginosa* against Sm(III) - sulphonanilide systems:

The decreasing order of sensitivity of ***pseudomonas aeruginosa*** against Sm(III) – sulphonanilide systems is
given below-

Sm(III)-L_2 = Sm(III)-L_7 > Sm(III)-L_{21} = Sm(III)- L_{16} > Sm(III)-L_8 = Sm(III)-L_1 = Sm(III)-L_6 = Sm(III)-L_{17}= Sm(III)-L_9 = Sm(III)-L_{20} > Sm(III)-L_3 = Sm(III)-L_4 = Sm(III)-L_{10} =Sm(III)-L_{11} = Sm(III)-L_{12} = Sm(III)-L_{14} = Sm(III)-L_{15} = Sm(III)-L_{18} = Sm(III)-L_{19} = Sm(III)-L_5

No activity was observed in L_3, L_4, L_5, L_{10}, L_{11}, L_{12}, L_{14}, L_{15}, L_{18} and L_{19}. insignificant activity was observed in L_1, L_8, L_6, L_9, L_{17} and L_{20}. moderate activity was observed in L_{21}, L_{16}, L_2 and L_7. No system was found to have significant, appreciable and high activity.

Sensitivity of *Escherichia coli* against Sm(III) - sulphonanilide systems:

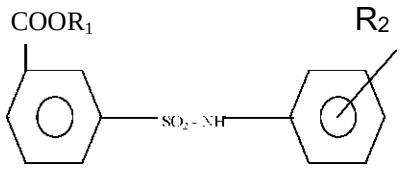
The decreasing order of sensitivity of ***Escherichia coli*** against Sm(III) – sulphonanilide systems is given below-

Sm(III)-L_2 = Sm(III)-L_3 = Sm(III)-L_{13} > Sm(III)-L_1 = Sm(III)-L_4 = Sm(III)-L_5 = Sm(III)-L_7 = Sm(III)-L_8 = Sm(III)-L_9 = Sm(III)-L_{10} = Sm(III)-L_{11} = Sm(III)-L_{12} = Sm(III)-L_{14} = Sm(III)-L_{15} = Sm(III)-L_{16} > Sm(III)-L_6 = Sm(III)-L_{17} = Sm(III)-L_{18} = Sm(III)-L_{19} = Sm(III)-L_{20}

No activity was observed in L_6, L_{17}, L_{18}, L_{19} and L_{20}. insignificant activity was observed in L_1, L_4, L_5, L_7, L_8, L_9, L_{10}, L_{11}, L_{12}, L_{14}, L_{15} and L_{16}. moderate activity was observed in L_2, L_3 and L_{13}. No system was found to have significant, appreciable and high activity.

IV. FIGURE AND TABLES

Table 1: A Simplified representation Of sulphonanilides



	R^1	R^2
L_1	H	o-CH_3
L_2	H	m-CH_3
L_3	H	p-CH_3
L_4	CH_3	o-CH_3
L_5	CH_3	m-CH_3
L_6	CH_3	p-CH_3
L_7	H	o-Cl
L_8	H	m-Cl
L_9	H	p-Cl
L_{10}	CH_3	o-Cl
L_{11}	CH_3	m-Cl
L_{12}	CH_3	p-Cl
L_{13}	C_2H_5	o-Cl
L_{14}	C_2H_5	m-Cl
L_{15}	C_2H_5	p-Cl
L_{16}	H	o-OCH_3
L_{17}	H	p-OCH_3
L_{18} L_{19}	CH_3 CH_3	o-OCH_3 p-OCH_3

Table 2: Sensitivity of *staphylococcus aureus* against sulphonanilides and Sm(III) -sulphonanilide systems Concentration of the compound used has been taken 300 µg/disc. Compounds & Systems (1-19) have been written serially

S. No.	Sulphonanilide	Sm(III) - sulphonanilide
1.	-	-
2.	-	+
3.	±	+
4.	±	±
5.	-	±
6.	±	-
7.	±	-
8.	-	--
9.	-	--
10	-	-
11.	--	--
12.	-	±
13.	-	--
14.	-	-
15.	-	-
16.	±	-
17.	-	±
18.	--	--
19.	--	±

Table 3: Sensitivity of *Pseudomonas aeruginosa* against sulphonanilides and Sm(III) –sulphonanilide systems Concentration of the compound used has been taken 300 □g/disc(1-19) have been written serially

S. No.	Sulphonanilide	Sm(III) - sulphonanilide
1.	--	-
2.	--	±
3.	±	--
4.	-	--
5.	--	--
6.	--	-
7.	-	±
8.	--	-
9.	--	-
10	-	--
11.	-	--
12.	-	--
13.	--	-
14.	-	--
15.	±	--
16.	±	±
17.	-	-
18.	--	--
19.	--	--

Table 4: Sensitivity of *Escherichia coli* against sulphonanilides and Sm(III) – sulphonanilide systems Concentration of the compound used has been taken 300 □g/disc. Compounds & systems(1-19) have been written serially

S. No.	Sulphonanilide	Sm(III) - sulphonanilide
1.	-	-
2.	--	±
3.	±	±
4.	--	-
5.	-	-
6.	±	--
7.	±	-
8.	-	-
9.	--	-
10	-	-
11.	-	-
12.	-	-
13.	-	±
14.	-	-
15.	-	-
16.	±	-
17.	-	--
18.	-	--
19.	-	--

V. CONCLUSION

- No sulphonanilide or systems was found to have remarkable activity.
- No systematic trend was found among antibacterial activity of sulphonanilides and their systems of Sm(III). Few systems of Sm(III) was found to show moderate and significant activity against bacterial species.
- No zone of inhibition is noticed with pure solvent. No systematic trend was found among antibacterial activity of systems of Sm(III).
- The order of activity for Sm(III) systems against three micro-organisms was found as:

Staphylococcus aureus > Pseudomonas aeruginosa > E. Coli.

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