

# INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN CHEMISTRY AND PHARMACEUTICAL SCIENCES

(p-ISSN: 2348-5213; e-ISSN: 2348-5221)

www.ijrcrps.com Coden: IJCROO (USA)



## Research Article

### ANTIMICROBIAL INVESTIGATIONS OF SOME PHOSPHAZIDES ADDUCTS

ATUL GUPTA AND S.P.S. JADON\*

Department of Chemistry, S.V. College Aligarh- 202001, India.

\*Corresponding Author: [sps\\_jadan@yahoo.co.in](mailto:sps_jadan@yahoo.co.in), [atulguptan@gmail.com](mailto:atulguptan@gmail.com)

#### Abstract

Phosphazide adducts synthesized by the refluxing  $[\text{NP}(\text{OH})_2]_3$  with some organic acid in presence of conc.  $\text{H}_2\text{SO}_4$  were screened against the *E. coli* ( $\text{gm}^{-\text{ve}}$ ), *Proteus mirabilis* ( $\text{gm}^{-\text{ve}}$ ) and *Candida albicans*, fungi. The adducts are found effective against these bacteria and fungi and may be used as medicine for the diseases caused by these bacteria and fungi.

**Keywords:** Synthesis, Medicine, Antibacterial activity.

#### Introduction

The adducts of  $[\text{NP}(\text{OH})_2]_3$  with some organic acids<sup>1-6</sup> such as cinnamic acid, oleic acid, acrylic acid, hippuric acid, salicylic acid, nicotinic acid and tannic acid have been investigated and reported, but their antibacterial studies has not been done so far.

#### Materials and Methods

During the synthesis of the adduct of  $[\text{NP}(\text{OH})_2]_3$  which was prepared<sup>7</sup> by the reaction of NaOH on  $[\text{NP}(\text{Cl})_2]_3$  in a non polar solvent double distilled Anal-R-grade chemicals were used. The each organic acid, salicylic, hippuric nicotinic, glutamic, adipic, tannic was mixed with  $[\text{NP}(\text{OH})_2]_3$  in 1:1 ratio in presence of 1 ml. conc.  $\text{H}_2\text{SO}_4$  and refluxed for 6 to 8 hrs. the products, formed, were, separated washed with alcohol and ether subsequently dried and stored. The adducts were tested against gram-ve bacteria *E. coli*, *Proteus mirabilis* (PM) and *Candida albicans* (CA) fungi using in vitro technique. The inhibited area photographed was measured in (mm) and enlisted in table 1.

#### Results and Discussion

The adducts of  $[\text{NP}(\text{OH})_2]_3$  with salicylic acid, nicotinic acid, Glutamic acid, Adipic acid, Tannic acid and Hippuric acid are subsequently termed as AG-1, AG-2,

AG-3, AG-4, AG-5, AG-6, *E.coli*  $\text{gm}^{-\text{ve}}$  bacteria which is found in unposturised milk of cow or buffalo, enters in to the human body causing skin diseases, swelling, Phemonia and destroy the cell membrane and tissues. *Proteus mirabilis*  $\text{gm}^{-\text{ve}}$  bacteria causes blood storm infection, renal failure, wound infection and septicemia etc. while *Candida albicans* courses primary infections of the AIDS.

Therefore the bacteria were screened against the adducts of the phosphazene and result were found vary enthusiastic. The adducts of salicylic acid is more effective against both bacteria and fungi (table -1). The adduct AG-2 is effective 16 mm against *Proteus mirabilis*, 27 mm against *E. coli* and 13 mm against the *Candida albicans*, similarly except AG-6, AG-4 and AG-5 are found effective against both bacteria and fungi, to a greater extent.

From the results it is evident that all these adducts may be used as medicine against the diseases caused by the *E. coli*, *Proteus mirabilis* bacteria and *Candida albicans* fungi. This may be due to the hydrolysis of  $\text{N}_3\text{P}_3$  ring into  $\text{NH}_4^+$  and  $\text{PO}_4^{-3}$  ions, which prevent the hydrolysis of the urase and other enzymes, which is done by *Proteus mirabilis* ( $\text{gm}^{-\text{ve}}$ ), *E. coli* ( $\text{gm}^{-\text{ve}}$ ), bacteria and *Candida albicans* fungi in the body causing different diseases.

**Table 1: Zone of inhibition of Bacteria and fungi with compound**

S. No.	Compounds	G –ve Bacteria (mm)		Fungi (mm)
		<i>E. coli</i>	<i>Proteus mirabilis (PM)</i>	<i>Candida albicans</i>
1.	AG – 1	+46	+39	+35
2	AG – 2	+27	+16	+13
3	AG – 3	+13	+19	+10
4	AG – 4	+11	+26	+14
5	AG – 5	+14	+18	+13.5
6	AG – 6	+12	+24	-

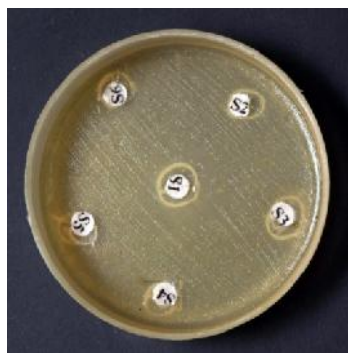


Plate 1  
*Proteus mirabilis* (G–ve)  
bacteria, effect of  
compounds AG-1 to AG-6



Plate 2  
*E. coli* (G –ve)  
Bacteria, effect of  
compounds AG-1 to AG-6

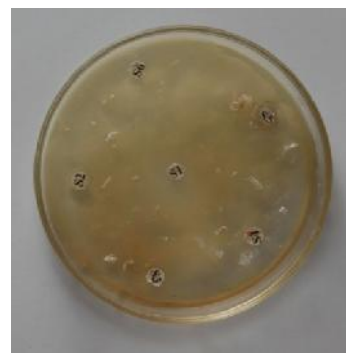


Plate 3  
*Candida albicans* fungi,  
effect of compounds  
AG-1 to AG-6

**Fig. 1: Zone inhibition of compounds against G–ve bacteria, *E. coli*, *Proteus mirabilis* and Fungi, *Candida albicans*.**

### Acknowledgments

Authors wish to thank to, Jai Hospital Agra for bacteriology analysis.

### References

1. Rani, I. and Jadon, S.P.S; (2008). *Asian J. Chem.*, 20 (7): 5711-5716.
2. Rani, I. and Jadon, S.P.S; (2008). *Int. J. Chem. Sci.*, 6 (2): 519-525.
3. Gupta, A. and Jadon, S.P.S; (2009). *Int. J. Chem. Sci.*, 7 (4): 2867-2871.
4. Gupta, A. and Jadon, S.P.S; (2012). *Int. J. Chem. Sci.*, 10(1): 159-165.
5. Gupta, A. and Jadon, S.P.S; (2012). *RJPBCS*, 3(4): 11-19.
6. Gupta, A. and Jadon, S.P.S; (2014) *Am. Int. J. Formal Appl. Sci.*, 8(1): 81-88.
7. Jadon, S.P.S; (2003). *Asian J. Chem.*, 15: 151; (2005). 17: 1312.