

## ANTIBIOGRAM ANALYSIS OF MODIFIED DRUGS AGAINST PATHOGENIC MICROORGANISMS

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### ABSTRACT

Medicines or drugs are the chemical substances which causes the change in organism's physiology by consuming it. People are facing lots of problems by consuming it as side effects, and the disease causing agents are also showing the resistivity against respective drugs. Ampicillin and Paracetamol are not able show antimicrobial activity but after modifications it was found that the Ampicillin and Paracetamol of 4:1 ratio showing the best results. After changing the pH, pH 7 enhances the activity of drug. The modified drug inhibits the maximum growth when the formulation is done at 37°C

**Keywords:** Synthetic drug, Antimicrobial activity, Chlamydia, Mycobacteria, Paracetamol, Herbal drug.

## INTRODUCTION

The host cells are attacked by the intracellular microorganisms in order to reproduce themselves [1]. Either they are protected from entering cells or can be identified and eradicated once they have done so [2]. There are number of pathogenic microbes which can freely replicate in the cells for examples the mycobacteria which replicate in cellular vesicles, viruses, some bacterial species which belongs to Chlamydia and Rickettsia as well as Listeria species [3]. The entry of virus in the cells can be prevented by using antibodies for neutralization, because the production depends on the TH2 cells [4]. Specific cytotoxic T-cell recognizes and kills the cell [5]. Pathogen specific TH1 cells are used to eliminate the macrophages [5]. Many microbial pathogens secrete the toxins which neutralize the antibodies and cause diseases [6].

Medicines are used for the treatment of various diseases and infections to improve our health. Medicines or drugs are the chemical substances which causes the change in organisms physiology by consuming it [7,8]. While taking medicines there are several risks of unwanted side effects, reactions with foods, alcohols or other medicines which may

be taking with it [9]. Few medicines are not safe for consumption during pregnancy [10]. Regular taking medicines for the respective disease, the disease causing agents become resistive, by which further no better results of medicines or drugs will be obtained [11]. For this different drugs are required [12]. At present era the microorganisms are also capable for survive in the presence of various antimicrobial agents by gaining resistivity, hence the medication by these drugs are all wastage of money, time, efforts etc. [11,13].

For reducing the risks of medicines and increasing the effects of medicines or drugs, there are several modifications on respective drugs are performing [14,15]. These modifications are done by adding different substitute's n formulation or by making different compositions of drugs with herbal or synthetic drugs.

## METHODOLOGY

### Sample collections:

Marketed medicines were purchased from the medical shops near MRD LifeSciences Pvt. Ltd. Lucknow.

**Preparation of microbial strains:**

We used bacterial strains *Pseudomonas aeruginosa* (Pa), *Styphyllococcus aureus* (Sa), *Klebsiella pneumoniae* (Kp), available at the MRD LifeSciences as my test pathogens. Initially we use the pre-cultured plates of pathogens, streaked them in Agar plates and revive them. The revived culture worked as a source for the pathogens broth.

**Preparation of modified drugs:**

It was prepared by mixing two different medicines in various compositions [16]. The pH (4, 7, 9, 11) and temperature (room temperature, 37°C, 4°C, 60°C) was changed for the modification to enhancing the antibacterial properties [17].

**Antibacterial susceptibility test:**

The test is performed by using agar well diffusion method [18], where sterilized nutrient agar plates were prepared and then 50 µl pathogens were spread to it. After spreading the medicines, modified drugs were loaded to the wells and incubated at 37°C for 24 hours.

**Minimum inhibitory concentration (MIC) test:**

The drug was serially diluted in sterilized nutrient broth [19] by taking 10mg concentration and then the test pathogens were inoculated to the broth. The optical density was checked at 620 nm after the incubation of 24 hours at 37°C [20].

**RESULTS****Sample collections and preparations:**

The medicine samples were collected from medical shop near to the MRD LifeSciences and then dissolved in the sterilized distilled water by making 100 mg / ml stock solution. Then these stock solutions were used for further analysis by making dilutions.

**Table 1:** The collected medicines

S no	Medicine name
1.	Ceptax
2.	Ampicillin
3.	Penicillin
4.	Zefu
5.	Azasite
6.	Ciprofloxacin
7.	Paracetamol
8.	Naproxen
9.	Amoxicillin
10.	Diclofenac

11.	Aceclofenac
12.	Aciloc
13.	Ibrufen



**Figure 1:** Collection of the medicines from the medical shop near to MRD LifeSciences.

**Antibacterial susceptibility test:**

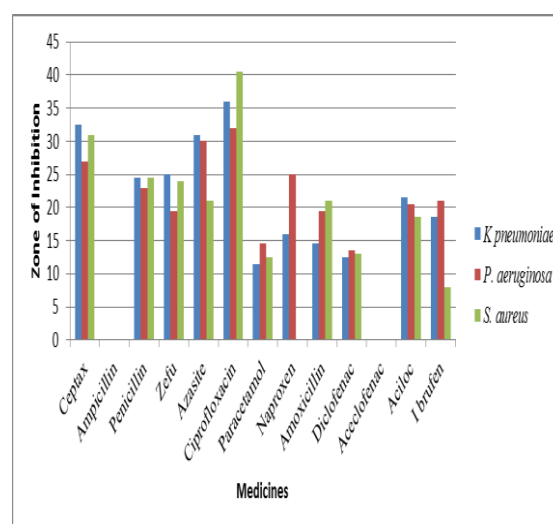
The antibacterial property of the medicines were checked against the *Pseudomonas aeruginosa*(Pa), *Styphyllococcus aureus* (Sa) and *Klebsiella pneumoniae*(Kp),

**Table 2:** Antibacterial susceptibility test of the medicines against the test pathogens.

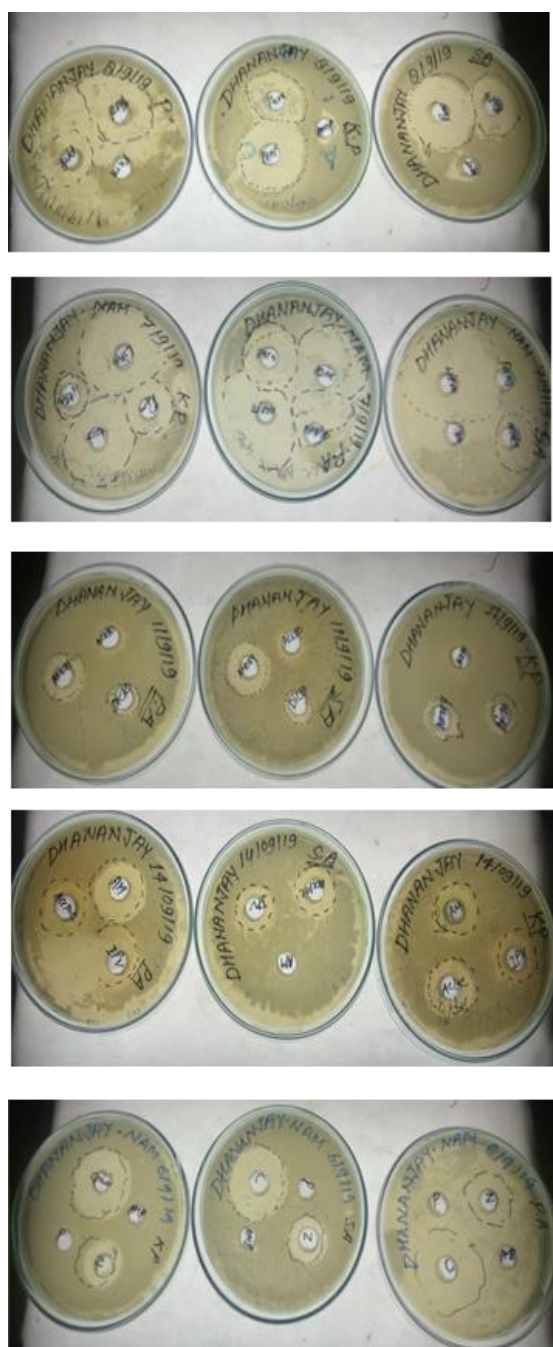
Medicines	Zone of inhibition (mm)		
	Kp	Pa	Sa
Ceptax	32.5	27	31
Ampicillin	0	0	0
Penicillin	24.5	23	24.5
Zefu	25	19.5	24

Azasite	31	30	21
Ciprofloxacin	36	32	40.5
Paracetamol	11.5	14.5	12.5
Naproxen	16	25	0
Amoxicillin	14.5	19.5	21
Diclofenac	12.5	13.5	13
Aceclofenac	0	0	0
Aciloc	21.5	20.5	18.5
Ibrufen	18.5	21	8

Where, Kp= *K pneumoniae*, Pa= *P. aeruginosa*, Sa= *S. aureus*



**Figure 2:** Above graph represent the result of analysis of medicines in which shown different result of all extracts against three different pathogens.



**Figure 3:** Antibiogram analysis of medicines against *K pneumonia*, *P. aeruginosa* and *S. aureus*

**Table 3:** Antibiogram analysis of modified drugs

Ratios	Zone of inhibition (mm)		
	<i>Kp</i>	<i>Pa</i>	<i>Sa</i>
<b>Combination of Ampicillin and Paracetamol</b>			
<b>1:1 ratio</b>	0	15	0
<b>1:4 ratio</b>	17	12	0
<b>4:1 ratio</b>	22	26.5	25
<b>Effects of pH on 4:1 ratio combination of Ampicillin and Paracetamol</b>			
<b>pH 4</b>	0	0	0
<b>pH 7</b>	23	28.5	25
<b>pH 9</b>	11.3	13.2	14.3
<b>pH 11</b>	16.9	12.5	18
<b>Effects of temperature on 4:1 ratio combination of Ampicillin and Paracetamol</b>			
<b>37° C</b>	21	27.1	19.9
<b>4° C</b>	23	21.3	25.1
<b>50° C</b>	11	21.4	22.1
<b>25° C</b>	31	32.1	27.9

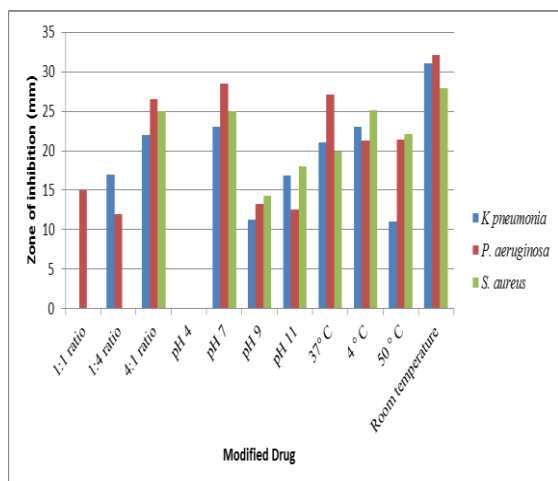


Figure 4: Graphical representation of the modified drugs against the test pathogens.

**Minimum inhibitory concentration test:**

Table 4: Minimum inhibitory concentration test of the modified drug.

Modified drug	MIC value (mg / ml)
<i>K pneumonia</i>	17
<i>P. aeruginosa</i>	13
<i>S. aureus</i>	18.5

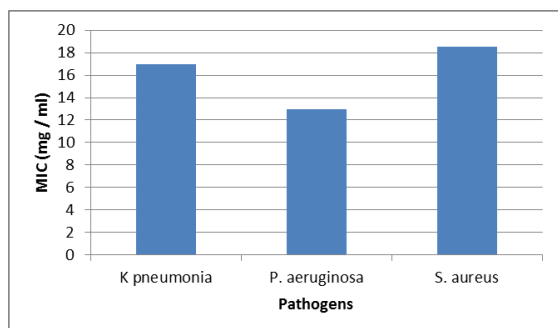


Figure 5: graphical representation of the minimum inhibition concentration of the modified drug against the pathogens



Figure 6: Minimum inhibition concentration test of modified drugs against *K pneumonia*, *P. aeruginosa* and *S. aureus*.

**DISCUSSION**

The medicines were purchased and collected from the medical shops near to MRD LifeSciences Pvt. Ltd. Luknow. Then these medicines were dissolved in the sterilized water or buffer by making 100mg / ml concentration of it. Antimicrobial activity of these drugs was done against the test bacterial pathogens such as *K pneumonia*, *P. aeruginosa* and *S. aureus* by using agar well diffusion method.

As a result it was found that the ampicillin is not able to inhibit the growth of pathogens and paracetamol was also inhibiting the growth in lowest amount which was defined by the measurement of zone of inhibition of respective medicines against the pathogens. For enhancing the activities of these medicines further modification was performed by making the combinations in different ratios, then changing the pH and temperature for the best combination. As a result it was found that the Ampicillin and paracetamol of 4:1 ratio showing the best results. After changing the pH , pH 7 enhances the activity of drug. The modified drug inhibits the maximum growth when the formulation is done at 37°C.

## CONCLUSION

It was concluded that the new modified drug was able to inhibit the test microbial growth. Further the herbal products can also be added to the modified drug for enhancing the activity without showing any side effects.

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