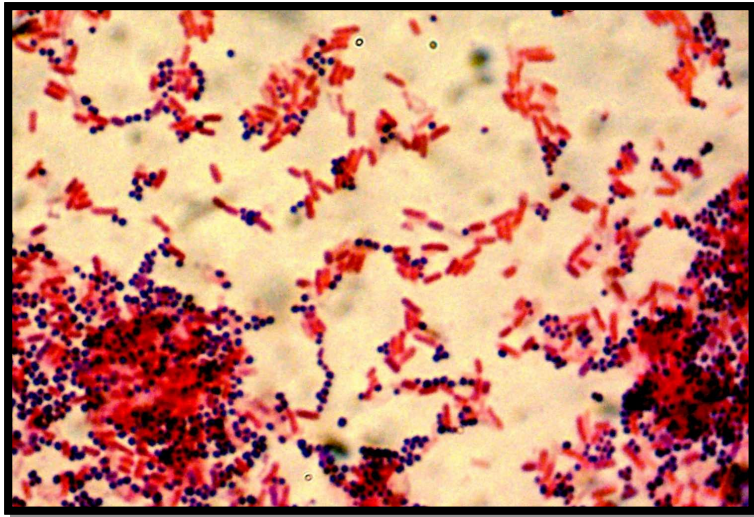


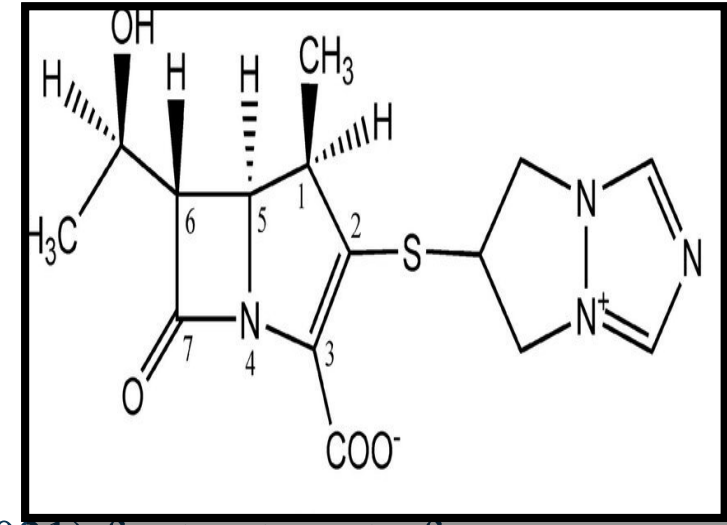
**TO STUDY IN VITRO ACTIVITY OF A
NOVEL CARBAPENEM –
BIAPENEM**



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Introduction:

- Carbapenem resistant organisms(CRO) are on a rise with a prevalence of 31.3% in Asia and 24.2% in India.
- CRO represent a critical group (WHO Bacterial Priority Pathogen list 2024).
- Biapenem, a novel parenteral carbapenem was approved by DCGI of India (2021) for treatment of cUTI , LRTI and sepsis.
- The unique stability of Biapenem to human renal dihydropeptidase (DHP-1) eliminates the need of cilastatin co – administration while the triazole structure provides excellent tissue penetration.



Aims and Objectives:

1. To estimate the prevalence of carbapenemase producing organisms in Southern Odisha.
2. To determine the minimum inhibitory concentration of Biapenem in carbapenemase producing organisms using MIC strip.

Material and Methods:

- **Study type:** Prospective study

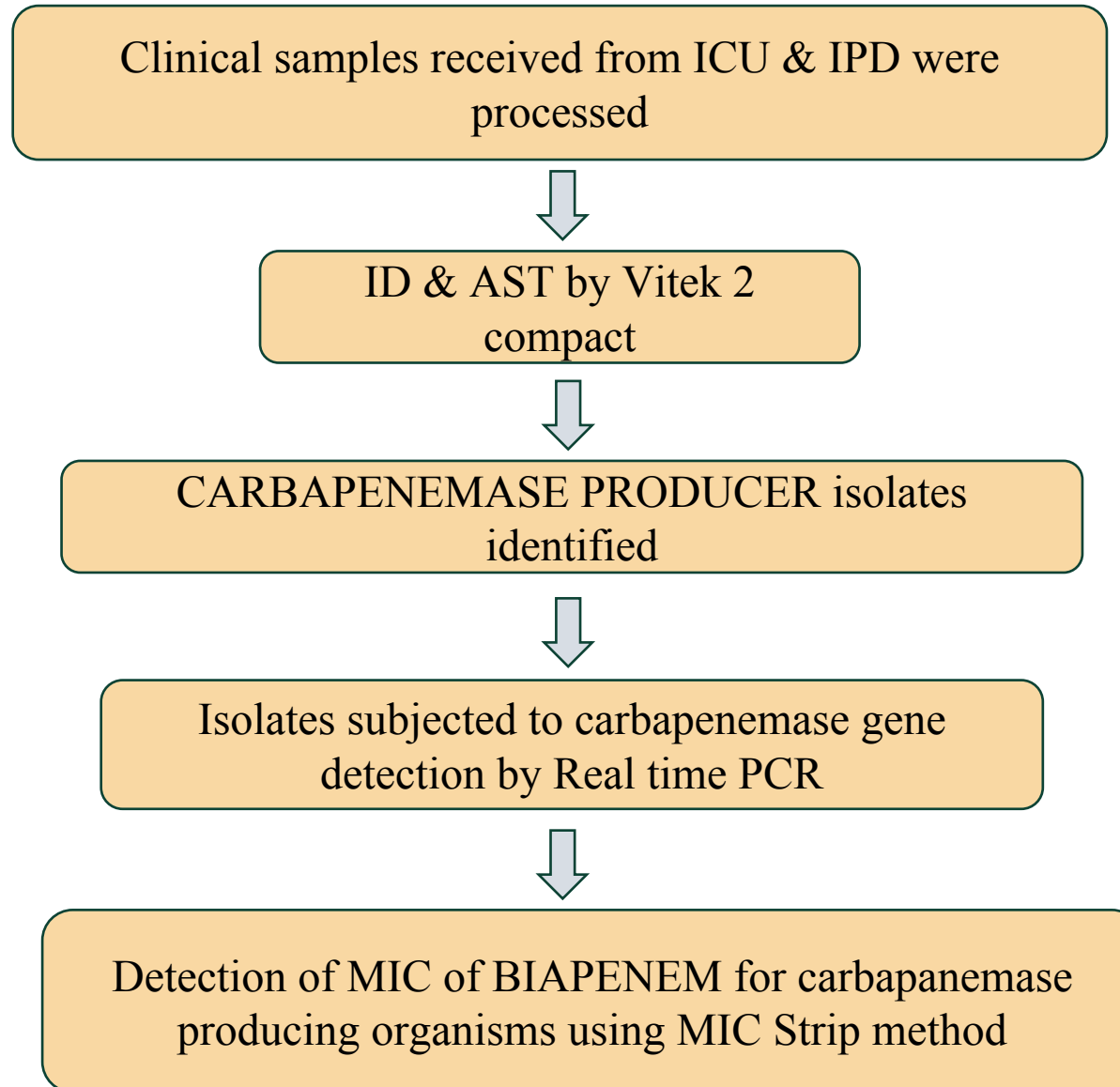
- **Study period:** 6 months

- **Study place:** Department of Microbiology in a tertiary care hospital of Odisha

- **Inclusion criteria:**
 - All samples received from ICU and IPD.

- **Exclusion criteria:**
 - Samples received from OPD.

Methodology:



Observation:

Fig. 1. Department wise distribution of CRO

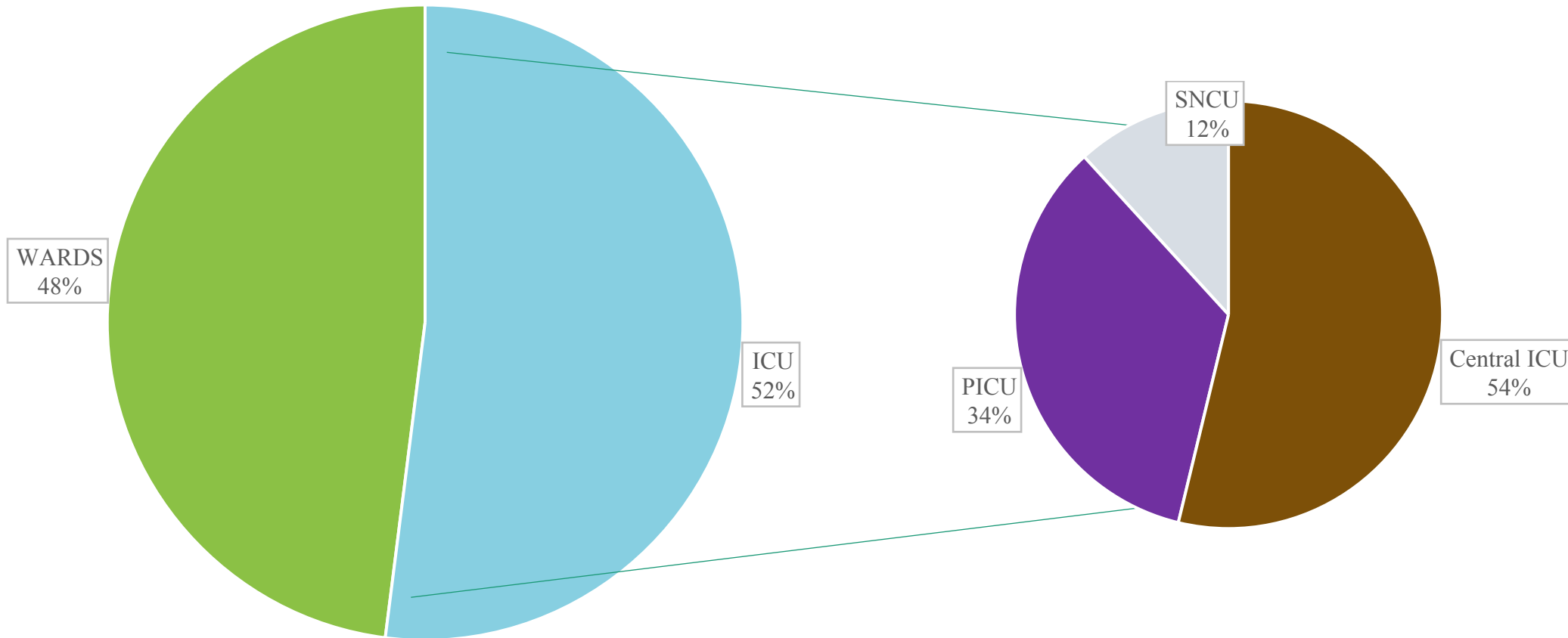


Fig. 2. CRO From Clinical Samples

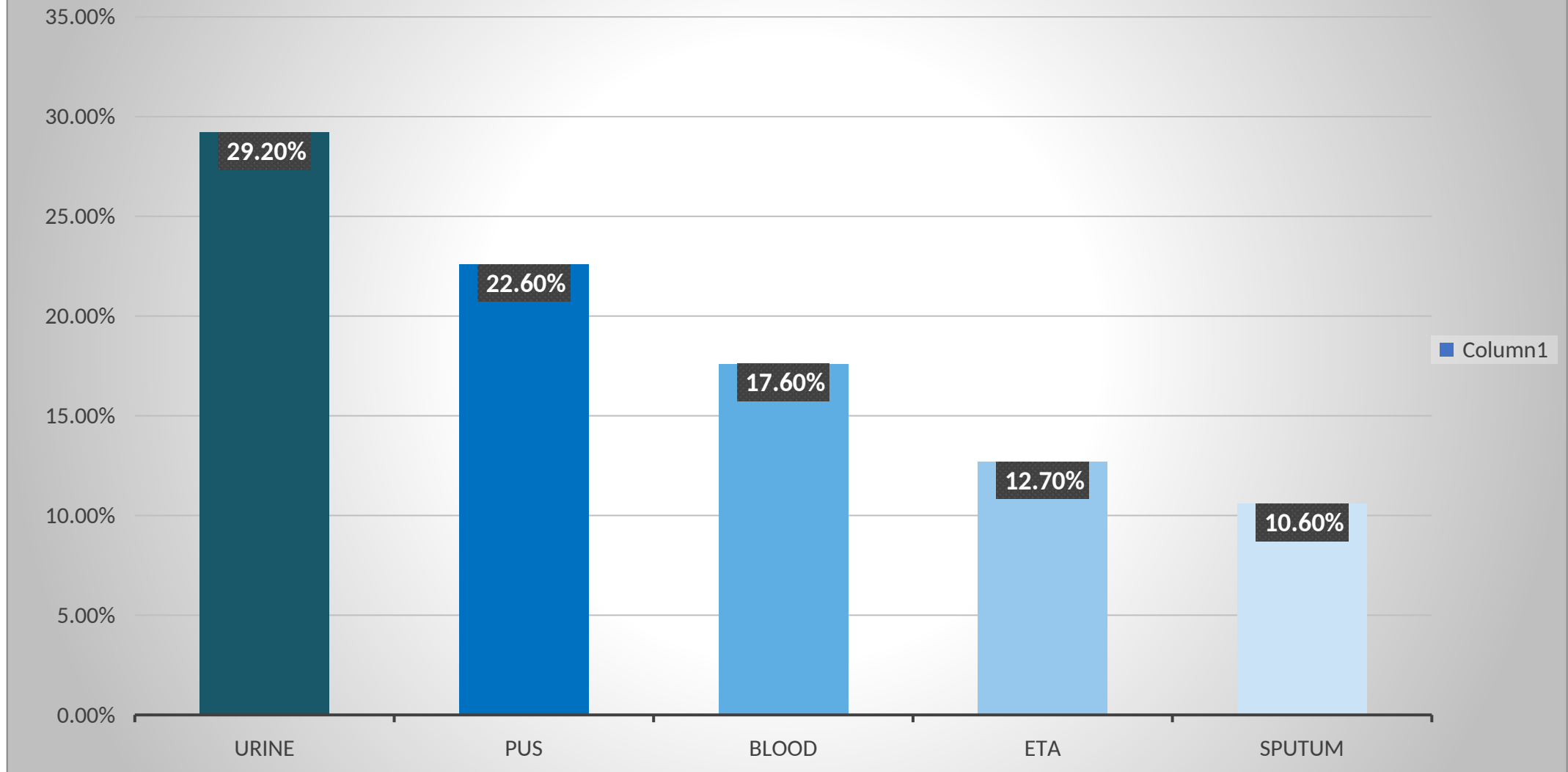
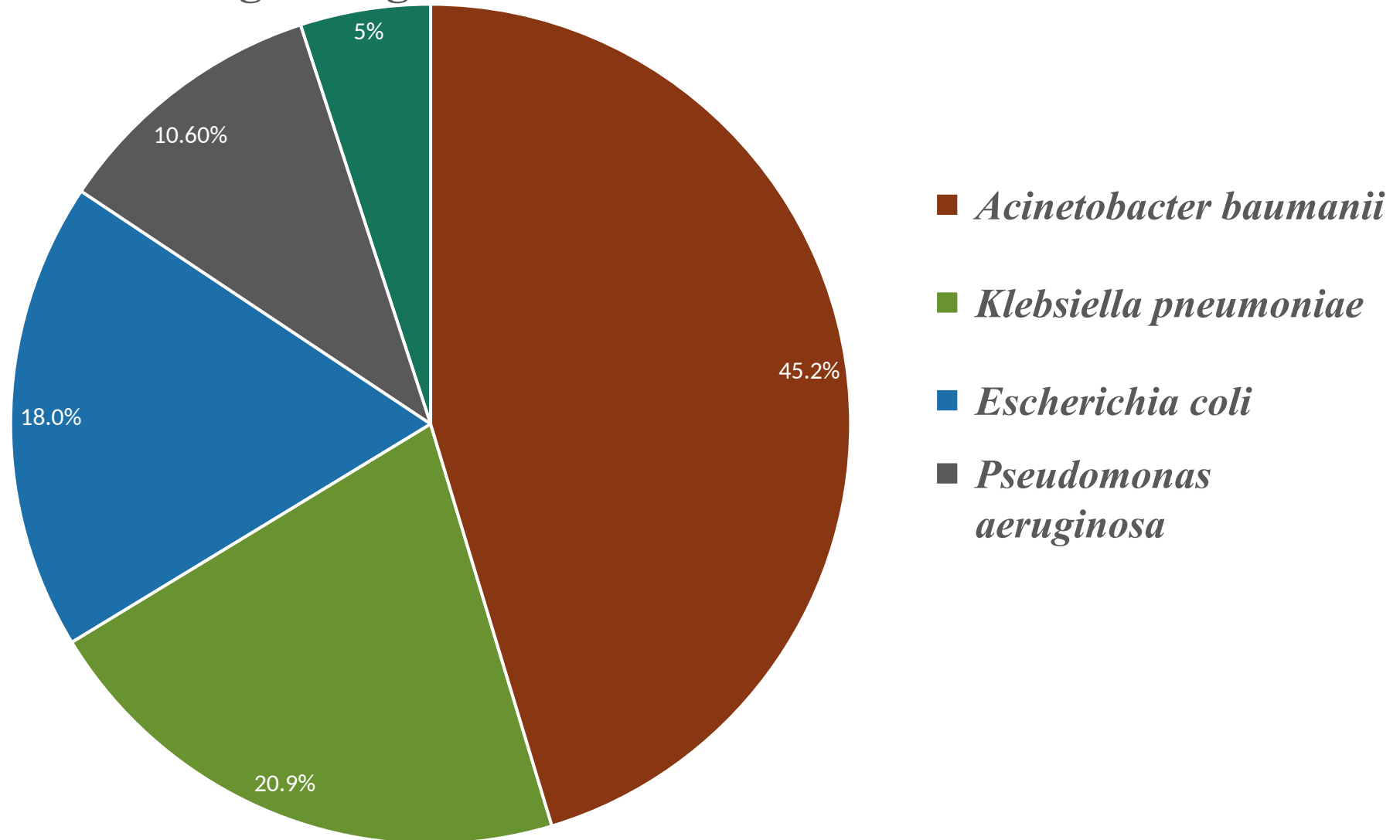
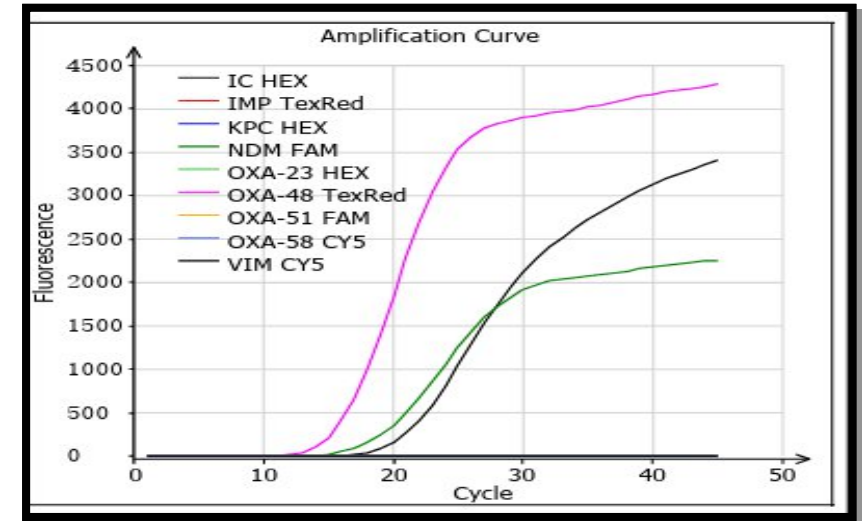


Fig.3. Organism wise distribution of CRO

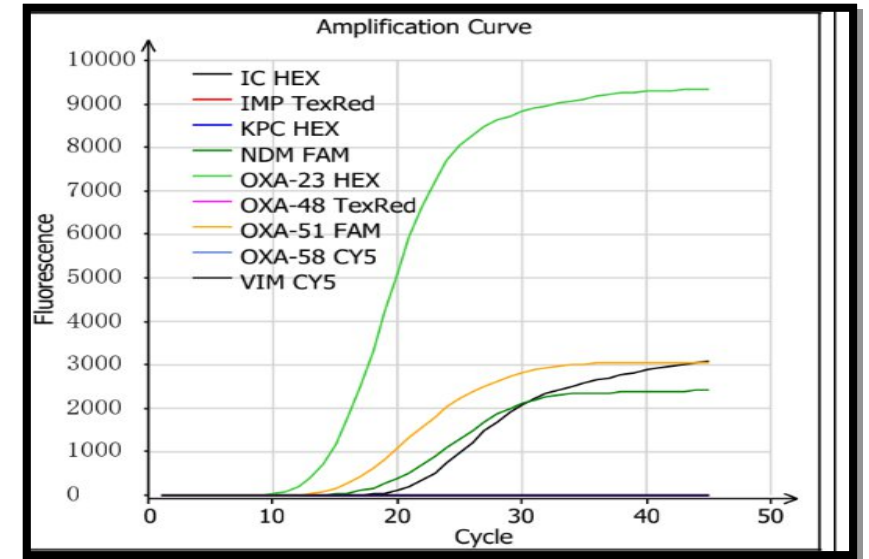


Distribution of Carbapenemase gene from different bacteria:

	<i>Klebsiella pneumoniae</i> (n= 18)	<i>Escherichia coli</i> (n=15)	<i>Proteus vulgaris</i> (n= 7)	<i>Pseudomonas aeruginosa</i> (n=9)	<i>Acinetobacter baumanii</i> (n= 38)
NDM	16	7	3	6	Nil
NDM+ OXA-48	Nil	6	2	2	Nil
OXA 51	Nil	Nil	Nil	Nil	12
OXA 23+ OXA-51	Nil	Nil	Nil	Nil	7
NDM+ OXA-51+ OXA-23	Nil	Nil	Nil	Nil	16
Others	2	2	2	2	3

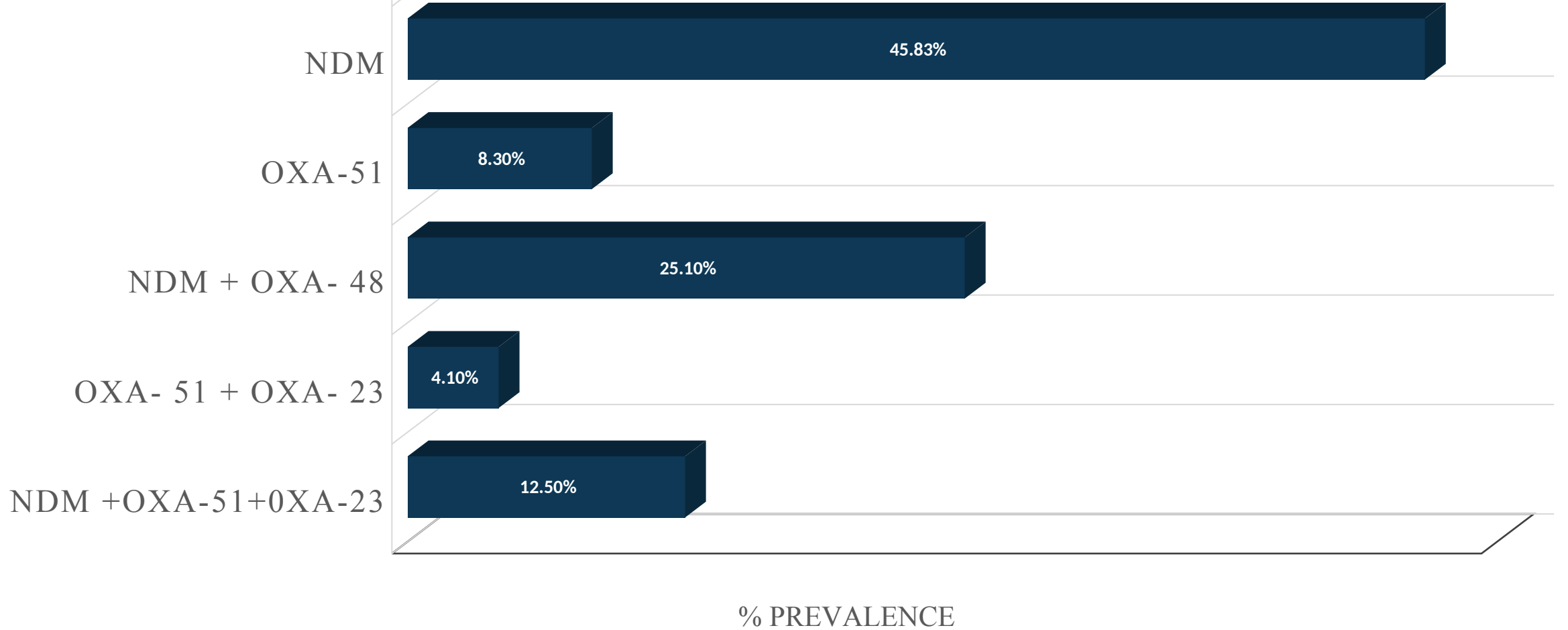


Escherichia coli



Acinetobacter baumanii

FIG.4. PREVALENCE OF CARBAPENEMASE GENE



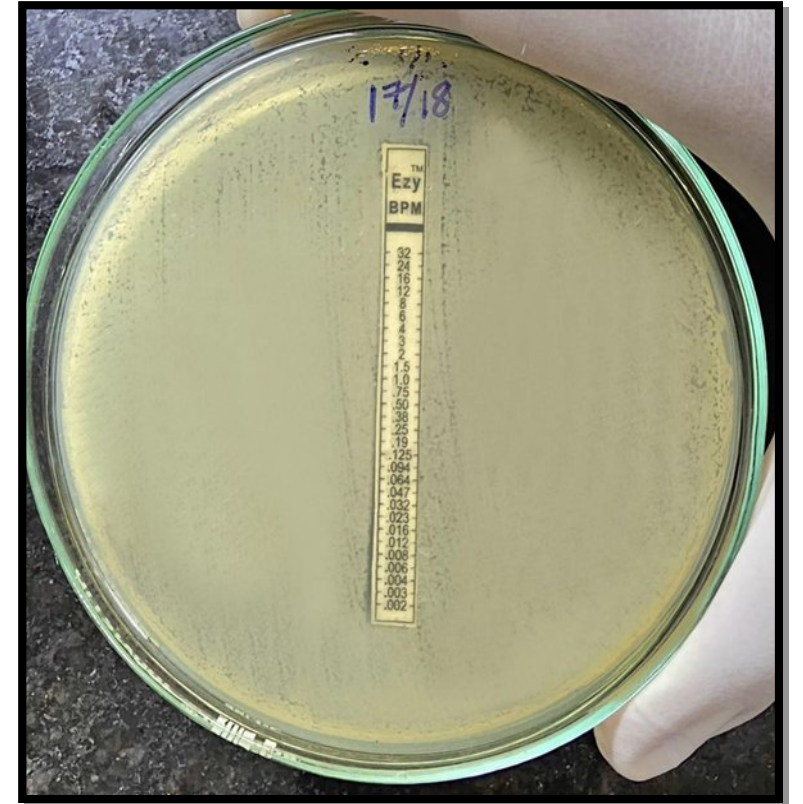
MIC test strip of BIAPENEM:



Klebsiella pneumoniae



Pseudomonas aeruginosa



Acinetobacter baumannii

*All isolates with MIC < 1 μ g/ml were regarded as sensitive(Japanese Society of Chemotherapy)

MIC range of Biapenem:

Organism	MIC ($\mu\text{g/ml}$)
<i>Klebsiella pneumoniae</i>	0.047-0.960
<i>Escherichia coli</i>	0.032-0.470
<i>Proteus vulgaris</i>	0.086-1
<i>Pseudomonas aeruginosa</i>	0.064-1

Fig.5. Biapenem susceptibility by organisms

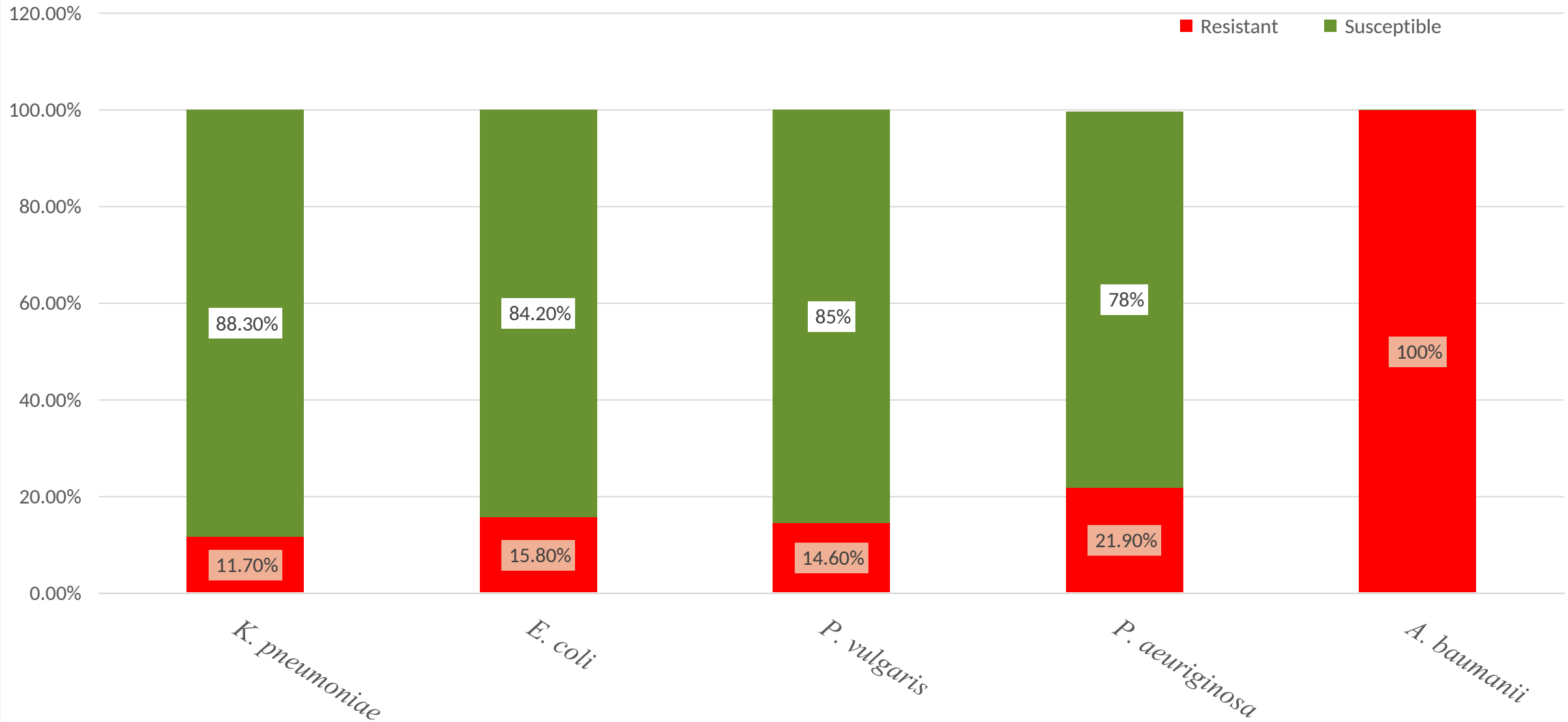
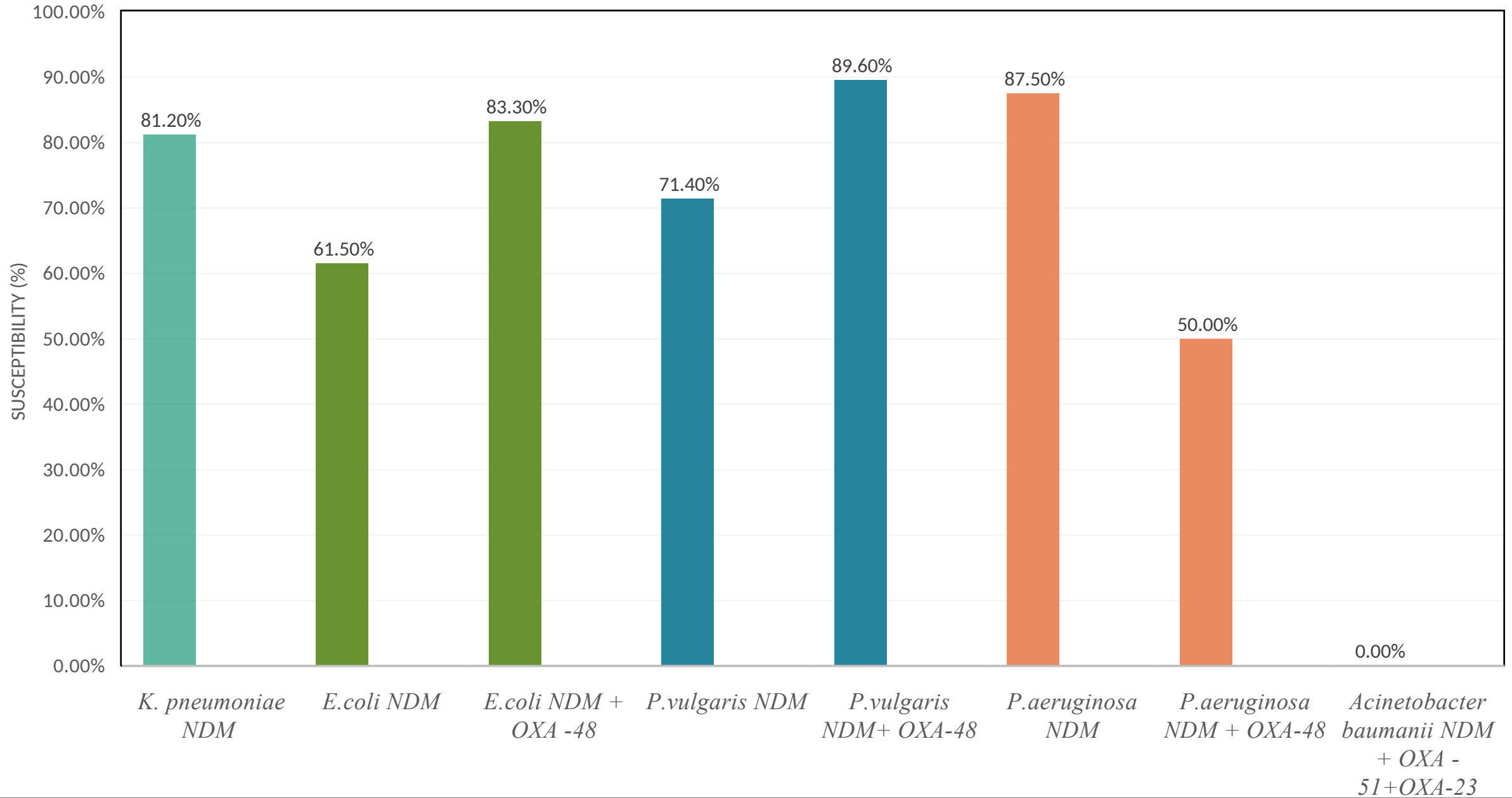
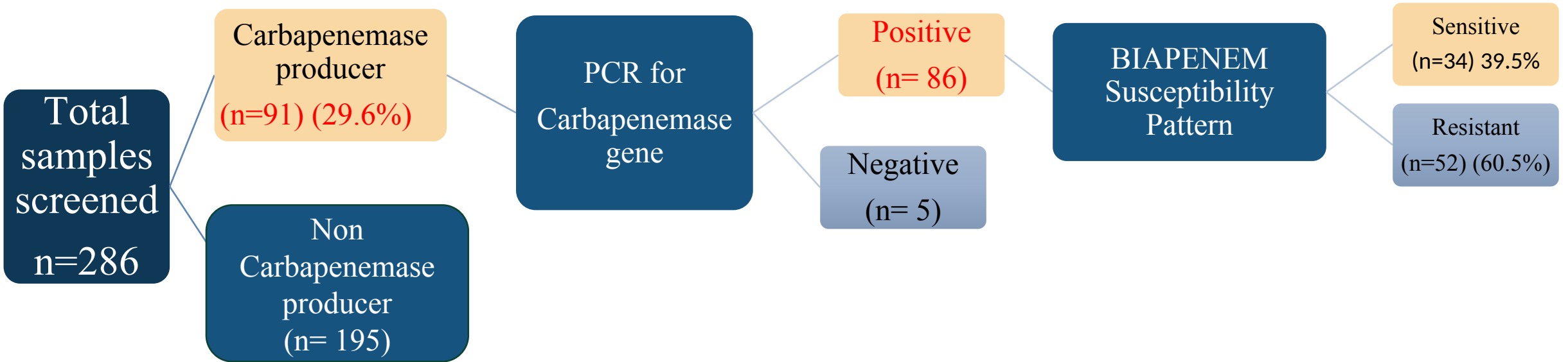


Fig.6.Susceptibility(%) of Biapenem against different Carbapenemase classes



Result:



Discussion:

	Current study	Bin Cai et al , 2017	Srujana Prabhala et al , 2023	Lathakumari et al , 2025
Study place	Odisha	USA	Western India	Southern India
Prevalence of CRO	29.5%	33.1%	26.5%	30.6%
Most common CRO	<i>Acinetobacter baumannii</i> (45.2%)	<i>Acinetobacter baumannii</i> (80.2%)	<i>Klebsiella pneumoniae</i> (58.9%)	<i>Acinetobacter baumannii</i> (48%)
Most prevalent carbapenemase producing gene	NDM (45.83%)	OXA-23 (37.8%)	NDM (33.68%)	NDM + OXA-48+VIM (46%)
Most common clinical sample	Urine (29.2%)	Respiratory sample (52.4%)	Urine 28.4%	Exudates (49.6%)
Department prevalence	ICU	ICU	ICU	Surgery ward

	Current study	Kozlov , R.S. et al , 2021	Yamuna devi et al , 2024	Worapong et al, 2024
Biapenem susceptibility of Enterobacterales & <i>Pseudomonas spp</i>	39.5%	62.7%	42.6%	28.6%
Biapenem susceptibility to carbapnemase gene	NDM + OXA-48 (83.2%)	OXA-48 (63.9%)	With ESBL producers	NDM

Conclusion:

- The prevalence of CRO was **29.6%** , with predominance of **NDM (45.83%)**.
- The most common CRO being *Acinetobacter baumannii* (45.2%).
- 39.5% carbapenem resistant Enterobacterales and *Pseudomonas aeruginosa* were susceptible to Biapenem
- All *Acinetobacter baumannii* were resistant to Biapenem.
- Biapenem represents a promising novel carbapenem alternative for the management of CRO especially for Enterobacterales and *Pseudomonas aeruginosa*.

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Thank you