

## Combinations of Riboflavin with Antiseptics for Tackling *Staphylococcus aureus* Methicillin Resistant Infections by Photodynamic Inactivation

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### INTRODUCTION & AIM

✓ **Chronic wound infections** caused by pathogens like **methicillin resistant *Staphylococcus aureus*** represent a growing healthcare challenge.

✓ **Antibacterial photodynamic therapy (aPDT)** offers a resistance-independent alternative, using light-activated **photosensitizers (PS)** to generate reactive oxygen species (ROS).

✓ **Riboflavin 5-Phosphate (RB)**, a natural non-toxic vitamin, is a PS capable of inducing bacterial damage via singlet oxygen and ROS generation when irradiated by light.

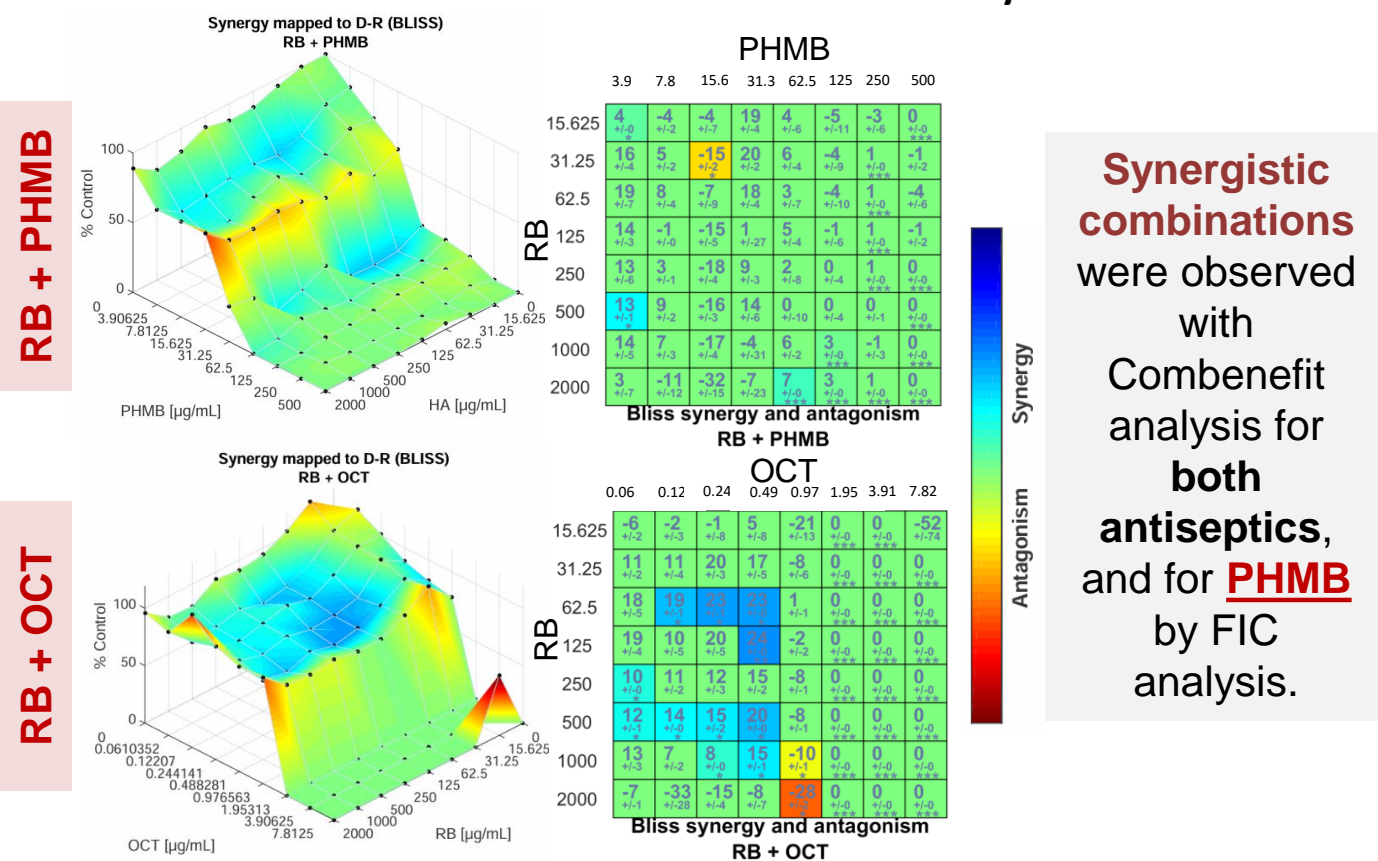
### METHOD

### RESULTS & DISCUSSION

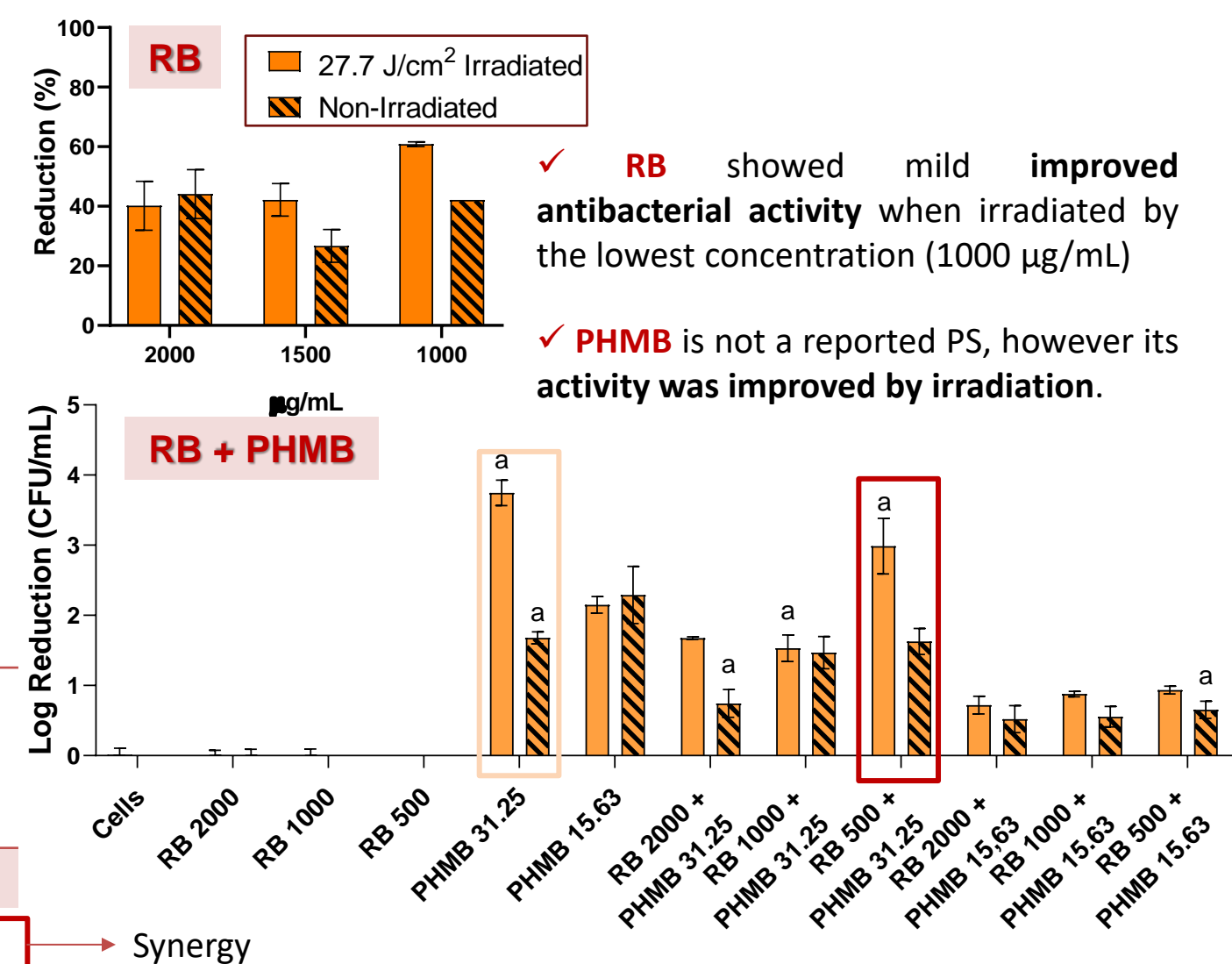
#### Antibacterial Activity of RB and Antiseptics

Phytochemical/Antiseptic	MIC (µg/mL)	MBC (µg/mL)
RB	>2000	>2000
OCT	3.91	3.91
PHMB	250	500

#### RB did not show antibacterial activity.



#### Antibacterial Photodynamic Activity of RB and Antiseptics



RB + A	MIC (µg/mL)				MBC (µg/mL)				FIC <sub>i</sub>	C
	Alone		Combination		Alone		Combination			
A	A	P	A	P	A	P	A	P		
OCT	1.95	>2000	1.95	15.63	1.95	>2000	3.91	15.63	1.0	I
PHMB	62.5	>2000	31.25	15.63	62.5	>2000	31.25	15.63	0.5	S

### CONCLUSION

- ✓ Compounds showed antibacterial activity alone that was improved when combinations were made.
- ✓ **RB and antiseptics showed synergy** when in combination: PHMB in FIC analysis, and PHMB and OCT in Combeneft analysis.
- ✓ **RB aPDT alone** was improved by combination with PHMB.

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