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## INTRODUCTION

Photodynamic therapy is a technique that uses a light source, a photosensitizer (PS), and molecular oxygen to produce reactive oxygen species, which promote fatal cell/tissue damage. The association of metallic nano systems to PS species may enhance their energetic output by surface plasmonic effects. This process is related to the collective oscillation of electrons on the surface of the metallic nanoparticles, which depends on their size and shape, and on the spectral arrangement accomplished. Here we applied silver nanoprisms (~35 nm) to enhance PS activity of Methylene Blue (MB), a known PS (as schematized in Fig.1).

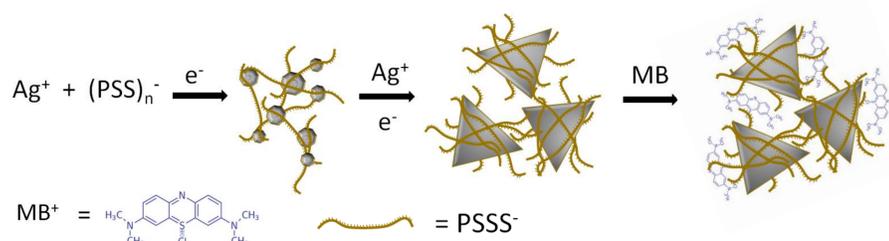
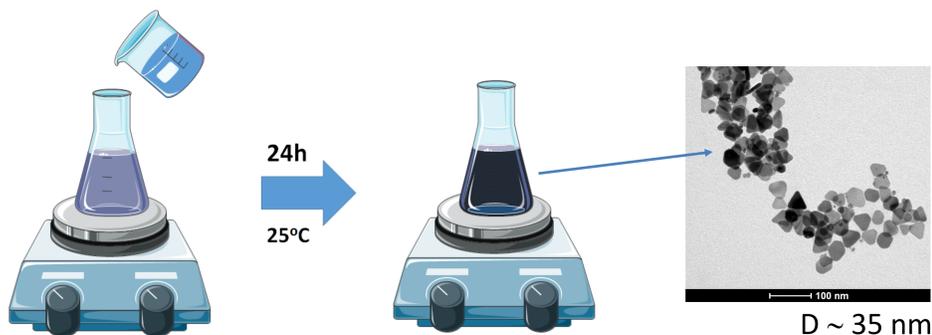


Figure 1. Short scheme depicting silver nanoprismatic platelets grown from (Ag)<sub>n</sub> seeds and stabilized by poly (4-styrenesulfonate) sodium anionic (PSS) polymers in aqueous medium and their association to positive methylene blue for plasmonic enhanced photodynamic action (RODRIGUES et al, 2021).

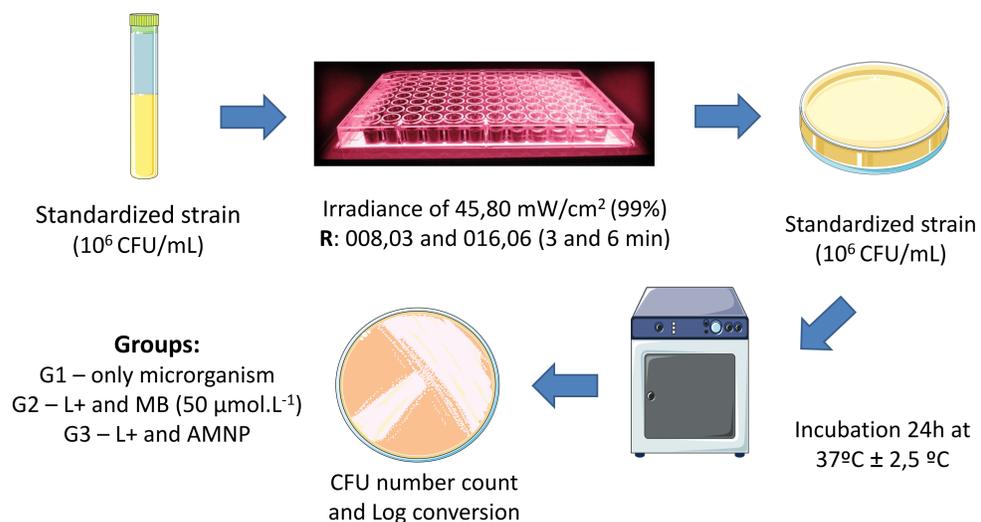
## METHODOLOGY

Stage 1: Conjugation of methylene blue to silver nanoprisms (AgNPs) synthesized by seed mediated growth method (RODRIGUES et al, 2021).

Scheme 1. Electrostatic coupling of methylene blue in silver nanoprisms, for a final concentration of 50 μmol.L<sup>-1</sup>, called MBNP. TEM image of the AgNPs.



Stage 2: Photodynamic inactivation of *Candida albicans* ATCC 90028



## RESULTS AND DISCUSSION

Chlorhexidine promoted the death of the microorganisms under all study conditions. The application of MB alone was not able to promote fungal death in any of the time periods tested (reduction of ca 2 logs to 6 minutes). When using the conjugate, we observed total inactivation applying 6 min irradiation time and a reduction of 3 fungal logs in applying 3 min (as presented in Fig.2). When compared to other studies described in the literature, we have applied a lower dose of MB which we suggest results from plasmonic enhancement.

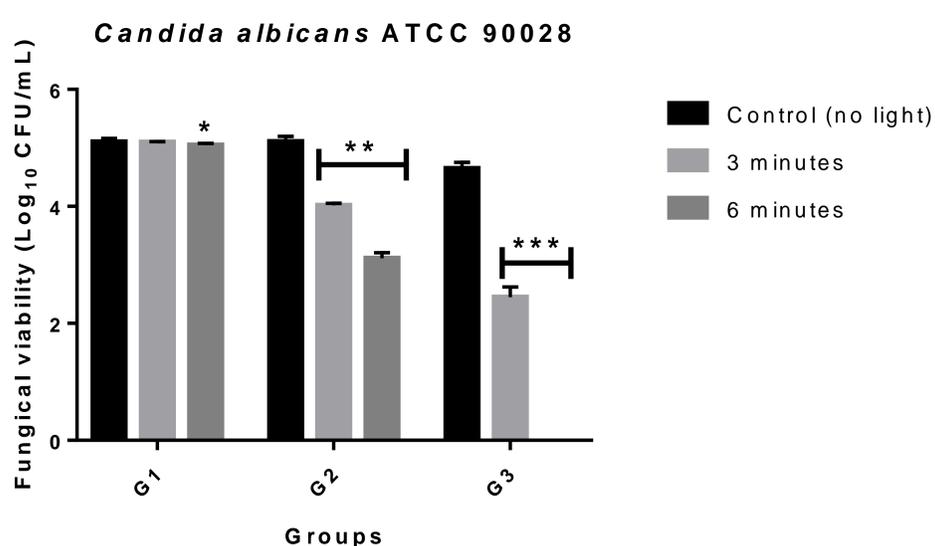


Figure 2. *Candida albicans* inactivation using red light (45.87 mW/cm<sup>2</sup>) with control groups, 3 and 6 minutes of irradiation, where G<sup>1</sup> - only microorganism, G<sup>2</sup> - MB solution and G<sup>3</sup> - MBNP. \* p > 0.05 vs each control group.

## CONCLUSION

MB conjugated to nanoprisms enhanced *in vitro* inactivation of *C. albicans*, with a relatively short irradiation time and we suggest that this PS-metallic combination enhances antifungal therapeutic.

## REFERENCES

C.H. Rodrigues, E.A.G. Araújo, R.P. Almeida, et al, Silver nanoprisms as plasmonic enhancers applied in the photodynamic inactivation of *Staphylococcus aureus* isolated from bubaline mastitis, *Photodiagnosis Photodyn. Ther.* 34 (2021) 102315.

## ACKNOWLEDGMENTS



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