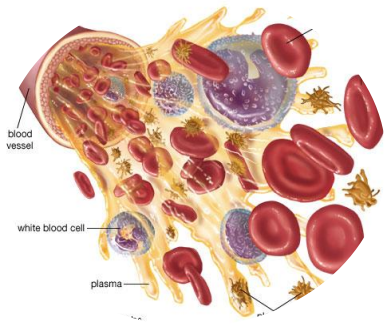
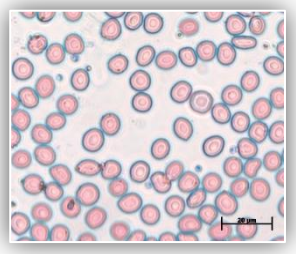
Blood Decontamination using Photodynamic Therapy

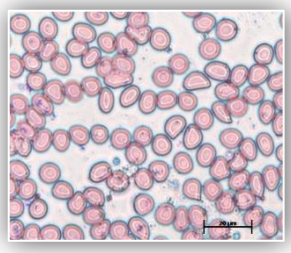
The bloodstream infection, also known as sepsis, is a health problem that is partly due to the difficulty to detect bacteria, identify them and treat patients with appropriate antibiotics in the early stage of infection. The main objectives of this study were decontaminate the blood using photodynamic therapy (PDT) as antimicrobial technique and evaluate the effects of this therapy on the blood cells.

IN VITRO EFFECTS OF PORPHYRIN, LIGHT AND PDT

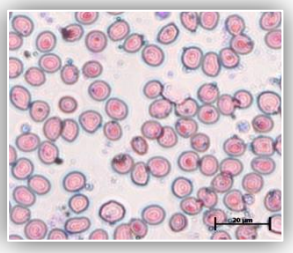




λ630nm
20J/cm²

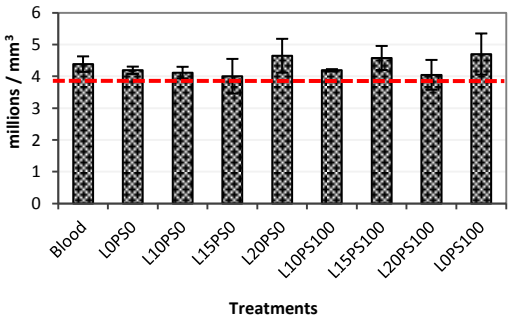


Photogem
100μg/mL



PDT - 20J/cm²
100μg/mL

RESULTS



Values of red blood cells in control, light control, PS control and photodynamic therapy. Bars represent the mean values. The dotted line shows the lower limit of reference value in the blood test. Photogem® 100mg/mL. Light doses: 10, 15 and 20 J/cm². PS represents photosensitizer; L represents light dose.

CONCLUSIONS

According to these results, it was found that the PS, in the presence of blood and microorganism, showed the highest affinity for the blood, reducing thus the inactivation of S. aureus in this environment. The challenge of this research has been decontaminate the blood inactivating the bacteria present in it, and preserve the functions of blood cells. For that, other PS were also tested in order to obtain higher levels of microbial inactivation.