

**TITLE:** APPLICATION OF PHOTODYNAMIC ANTIMICROBIAL THERAPY ON *Staphylococcus aureus* ISOLATED FROM A VENOUS LESION

**AUTHORS:** TOMALAK, C.; BASTOS, D.; WYNIK, A. P.; SANTOS, F. S.; SCHREINER, I. C.; ZANELLA, G. N.; BABINKSI, T. P.; HERRERIAS, T.; SOARES, K. C. N.; TOMINAGA, T. T.

**INSTITUTION:** UNIVERSIDADE ESTADUAL DO CENTRO OESTE, GUARAPUAVA, PARANÁ (ALAMEDA ÉLIO ANTÔNIO DALLA VECCHIA, 838, CEP 85040-167, GUARAPUAVA – PR, BRASIL); CENTRO UNIVERSITÁRIO UNIGUIAIRACÁ, GUARAPUAVA, PARANÁ (XV DE NOVEMBRO, 7050, CEP 85010-000, GUARAPUAVA – PR, BRASIL)

**ABSTRACT:**

Chronic wounds are defined as any interruption in the continuity of a body tissue taking more than six weeks to be healed. Chronic wounds are a global public health problem that have serious implications for patients and contribute major costs to healthcare systems and societies. Infections caused by multi-drug resistant bacteria is one of the leading impediments for wound healing. In this sense, Antimicrobial Photodynamic Therapy (aPDT) may be an effective alternative or adjuvant treatment to control bacterial infections. In this work, aPDT efficiency on a multi-drug clinical strain of *Staphylococcus aureus* collected from a patient with a chronic wound under treatment at Policlínica Uniguairacá, Guarapuava city (Paraná State), has been investigated. Antimicrobial susceptibility test performed by a disk diffusion technique, as recommended by BrCAST, demonstrated that such strains are resistant to Azithromycin, Oxacillin, Penicillin, Imipenem, Ciprofloxacin, Amoxicillin + Clavulanate, Cephalothin, Cefepime and Cefoxitin. Methylene Blue (MB) at different concentrations (0.5% and 1%), different incubation time (10 e 30 min) and different doses ( $7.52 \text{ J/cm}^2$  and  $3.76 \text{ J/cm}^2$ ) were evaluated. Statistical analysis demonstrated aPDT was effective and significant differences among treatments were detected when compared to controls. The results presented that MB higher concentration was only effective after 10min of incubation time at  $7.52 \text{ J/cm}^2$  of light dose. Light doses were the most important parameter to decrease bacterial viability process. Thus, the most efficient combination of parameters to *Staphylococcus aureus* inactivation was an incubation time of 30 min, at  $7.52 \text{ J/cm}^2$  of light dose and as well as 0.5% or 1% concentrations.

**Keywords:** Wounds, *Staphylococcus aureus*, Wounds Infections, Low-Level Light Therapy, Methylene Blue.

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