3rd Brazil-France Symposium on Medicinal Chemistry
Maceió/AL | November 12 -14, 2024

EVALUATION OF THE HEALING ACTIVITY OF BLUE LIGHT-EMITTING DIODE ASSOCIATED WITH FARNESOL IN RODENTS

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Keywords: Phototherapy, farnesol, light-emitting diodes

ABSTRACT

BACKGROUND: On the skin, studies have been carried out on phototherapy, using LEDs (light-emitting diodes). This therapy uses low and medium power light, as they are considered therapeutic. At the same time, natural products are being used as chemical-medicinal resources, such as farnesol sesquiterpene alcohol (FAR), a natural 15-carbon organic compound produced by *Candida albicans* that can be obtained from various sources, such as corn and tomatoes, and is known for its various anti-inflammatory properties.
OBJECTIVES: To compare the effects of a certain phototherapeutic resource (low-intensity blue LED) associated with natural products, such as farnesol (FAR), in the treatment of skin wounds in mice.
METHODS: Data collection was carried out after approval by the Committee for Ethics in the Use of Animals (CEUA), respecting the ethical principles of animal experimentation. 72 adult male Swiss albino mice (Mus musculus), approximately 3 months old, divided into 4 groups (18 animals each), identified and placed in polyethylene cages, on a 12/12 hour light/dark cycle, with access to food, water, ventilation, minimal noise and a temperature of 21 ± 2 ºC. Group 1 (G1) was treated with a blue LED using a divergent beam and continuous emission, with a wavelength of 470nm, for a period of 5 minutes; Group 2 (G2), the Negative Control, was treated by combining the Blue LED with Natrosol (cream base); Group 3 (G3) was treated with the Blue LED together with Farnesol; Group 4 (G4) was treated by combining the Blue LED with Bepantol, the Positive Control. The rodents underwent a 48-hour acclimatization period before the bioassay. For surgery, they were anesthetized, according to their weight, intraperitoneally (i.p.) with 50 mg/kg of 10% ketamine and 10 mg/kg of 2% xylazine, administering 0.1 mL for every 100 g of body weight. The dorsal region was trichotomized, followed by antisepsis. After anesthesia, a skin lesion, 1 cm in diameter, was made on the shaved back area, up to the level of the aponeurotic tissue, and then cleaned with 0.9% saline solution (SF). Treatment began on the same day as surgery. Morphometric analysis was carried out, assessing the wound area, the percentage of contraction, the presence of edema, bleeding and secretion, and the condition of the crust. The largest (craniocaudal direction) and smallest (latero-lateral direction) diameters were measured using a manual caliper. The percentage of contraction (%C) of the wounds was calculated using the formula: $\%C = [(Ai - Af) / Ai] \times 100$, where Ai is the initial area (D0) and Af is the final area of the day evaluated.
RESULTS/DISCUSSION: In the comparative analysis of the lesion area in the third collection between Group 1 and Group 2, there was a statistically significant difference ($p<0.05$), with the first group showing a percentage of wound contraction of 96.22% and the second group 87.03%. Likewise, when comparing the wounds of Group 1 with Group 3, there was a significant difference with a contraction of 96.22% and 91.40%, respectively. Still on the comparative profile between the treatments, Group 4 showed better tissue repair than Group 2. Group 2 had a healing percentage of 87.03%, while Group 4 had 92.23%. Given this scenario, Zhang et al. (2018) carried out a comparative study on the performance of blue and red LEDs, and the results showed that red and blue lights promoted cell growth and wound healing.
CONCLUSION: It was therefore noted that the action of the Blue LED (Group 1) achieved greater tissue repair when compared to the combination of the Blue LED with Natrosol (Group 2) and the Blue LED combined with Farnesol (Group C). Similarly, the contractions of wounds exposed to treatment with the Blue LED associated with Bepantol (Group 4) proved to be more effective when compared to Group 2.