The Effects of Euterpe oleracea Mart. (Açaí) Extract on the Survival of Random-Pattern Skin Flaps in Rats

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Disclosure/Financial Support: None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

INTRODUCTION: Flap necrosis remains a major complication of reconstructive surgery. Euterpe oleracea Mart., popularly known as “açaí,” is cultivated in the Amazon region of Brazil. It contains hydroxybenzoic acids, antioxidant polyphenolics, flavan-3-ols, and anthocyanins. Açaí exhibits anti-inflammatory action through the inhibition of cyclooxygenases 1 and 2, vasodilation, inhibition of nitric oxide production, inducible nitric oxide synthase activity and expression, and antioxidant properties. Current study demonstrates that polyphenolics increase cutaneous angiogenesis. This study evaluated whether açaí could improve the survival of random-pattern skin flaps in an experimental rat model.

MATERIALS AND METHODS: Thirty male Sprague-Dawley rats were randomly divided into two groups: the açaí treatment group (n=15), and the control group (n=15). In açaí and control groups, 3x9cm dorsal skin flaps including the panniculus carnosus were elevated and sutured back into place (Figure 1). To block the new blood supply from the bed, a silicone sheet was placed under the flaps. In açaí treatment group, 100 mg/kg/day of açaí stone extract was administered in drinking water for 7 days. Control group received saline. Seven days postprocedure, flap survival was measured and histologic specimens were harvested from the flap midline. Histologic examination, inflammatory mediator detection, and immunohistochemical analysis were performed.

RESULTS: The percentage of flap survival was higher in açaí treatment group (80.21±9.05%) than in control group (60.08±8.53%) (P<0.05). Açaí treatment group had more VEGF-positive cells than control group on immunohistochemistry (P<0.05). CD31-positive microvascular densities were significantly higher in açaí treatment group than in control group (P<0.05). Anti-α-smooth muscle actin antibody expression was also significantly higher in açaí treatment group than in control group (16.47±4.32/HPF vs. 7.40±2.69/HPF, respectively; P<0.05). Western blot analysis of the expression of anti-VEGF in lysates revealed significantly greater VEGF protein expression in açaí treatment group compared with control group (1.11±0.17 vs. 0.39±0.09, respectively; P<0.05) (Figure 2).

CONCLUSION: This study found that açaí intake increased neovascularization and mitigated tissue damage and inflammatory responses; açaí treatment was also associated with a higher percentage of random-pattern skin flap area survival.

REFERENCES:

FIGURE LEGEND:
Figure 1. The caudally based random pattern skin flap (3 x 9 cm) was elevated on the dorsum of rat.
Figure 2. Açaí stone extract increases the expression of VEGF determined by Western blot analysis in flap midline specimens from Sprague-Dawley rats. Results are represented as mean±SEM; n=10 for each group, *P<0.05