**Republic of Iraq**
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**College of Dentistry**

# Evaluation of the Role of Topical Application of flavanoids extract of Hibiscus Sabdariffa in Promoting Bone Healing In Rabbit (Histological and Immunohistochemical Study)

A Thesis
Submitted to Council of the College of Dentistry/ University of Baghdad in Partial Fulfillment of the Requirements for the Degree of Master of Science in Oral Histology and Biology

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# Abstract

**Background:**

Wound healing agents support the natural healing process, reduce trauma and likelihood of secondary infections and hasten wound closure .The aim of wound care, which must occur in a physiologic environment conducive to tissue repair and regeneration, is to promote healing in the shortest time possible, exclude secondary infections and minimize pain, discomfort and scarring. Agents with wound healing potential, which are obtained from natural and synthetic bioactive materials have the propensity for antioxidant, chelation and antimicrobial activities.

The exponential growth in the popularity of natural plant remedies has stirred up an enormous surge in need for information regarding the properties and uses of medicinal plants. Based on fact that plants like Hibiscus sabdariffa L. (Malvaceae) is used both in food and beverage was given special attention as regards medicinal plant research is concerned.

**Aim of the study**

Evaluation of the effect of topical application of flavanoids extract of hibiscus sabdariffa in promoting healing of induced bone defect by histological, histomorphometric & immunohistochemical analysis.

**Materials and methods**

Twenty four New Zealand rabbits were used in this study .Two bony holes were induced for each rabbit on the right and left tibiae approximately (3mm) in depth. The hole in the right tibia was filled with flavonoid (experimental), while the hole in the left tibia was left for normal healing (control). The rabbits were divided and sacrificed at (3days, 1, 2and 4 weeks) intervals post operatively.

Histological examination was performed under light microscope for all bone section stained with Haematoxylin and Eosin with assessment of

histomorphometric analysis include counting of bone cells (osteoblasts, osteocytes and osteoclasts)trabecular number, trabecular area and bone marrow area. Also immunohistochemical test for the expression of TNF-α was performed on bone specimens of the studied groups.

**Results**

Histological findings of the present study showed that topical flavonoid application induced earlier bone formation, mineralization and maturation as increase in median value measured as mean count difference of cell number between control and experimental groups at 3days and 1week durations was recorded and little or no difference was recorded at 2 and 4 weeks durations, however, non significant difference in mean values of inflammatory cells for studied groups. Statistically significant difference of osteoblast was detected at 1 week and 2 week, and non significant difference for osteocyte and osteoclast for studied groups in different durations. Trabeculae number, and trabeculae area showed increase in mean count difference with statistical difference at 2 and 4 weeks, while bone marrow space showed decrease in mean count difference which was statistically significant. The results of immunohistochemical analysis showed that there was decrease in percentage of positively stained cells between experimental and control groups with statically significant analysis in (3days, 1, and 2weeks) durations; while, in 4 weeks duration there was no obvious difference and its statistically non-significant. Positive expression of TNF-α by osteoblasts and osteocytes was statistically significant at 1week, non significant at 4 weeks, however at 2weeks statically significant analysis was recorded with osteocytes and osteoclasts.

**Conclusion**

Results obtained in this study have shown that flavonoid extract from hibiscus sabdariffa had potential activity in promoting healing process of bone defects.