



Wound Healing Effect of Aqueous Extracts of Quercus Ilex

KEYWORDS

Wound, Quercus Ilex, Antioxidant

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ABSTRACT

In the Texmelucan Valley of Puebla México, infusion of bark Quercus ilex is used as Anti-bacterial, Anti-halitosis, Anti-hemorrhagic, Anti-inflammatory, Anti-perspirant, Antiseptic, Anti-tumor, Antiviral, Astringent, emetic, expectorant, Hemostatic, Immuno stimulant, Litolitic, worming and vulnerary, given their anti-hemorrhagic and immunostimulant properties, this study determined the effect of aqueous extracts of the bark of Quercus ilex, on the recovery of wounds made wistar rats. We apply aqueous extracts of bark every 24 h. We observed a 40% increase in healing time compared to the control was left to heal naturally and 20% compared to the commercial product Dermatix® group. In subsequent work will determine the dose response in wounds with different depths.

INTRODUCTION

Quercus ilex

People of woodlands in Texmelucan Valley in the state of Puebla Mexico, give you multiple uses of oak bark (1), particularly bark by the use of it when they have tooth mobility, redness, bleeding and inflammation of gums and halitosis, clear signs of periodontal disease, so we do a job using mouthwash 40% oak bark to gerontological patients, and found that the use of it changes the pH and salivary proteins (2).

The oak is related to the life of the inhabitants of the valley Texmelucan, in fact the name Texmelucan is of Nahuatl origin Tetzmollocan, tetzmulli evergreen pine or oak Tetzmolli (pl. forest green) and Tetzmollocan oaks (possessive) place that has forests oak (3). This region is called oak and oak or no oak, as the Spanish name Quercus ilex, has been derived from ilicina lecina (Latin Quercus ilex) (4).

As previously stated in the valley of Texmelucan is attributed to the oak a large number of properties in particular caught our attention the fact that we comment on that "This infusión helps stop the bleeding and helps you to heal faster" considering their immunostimulatory and anti-hemorrhagic properties, this work experimentally determined the effect of aqueous extracts in the recovery of injuries incisions in the skin of Wistar rats.

Wounds

When a wound or incision is made, the surgeon expects the tissue healed with minimal oedema without local infection or runny, as healing by first intention, which makes it in a minimum time, without separation of the edges of the

wound, and with minimal scar formation (5, 6).

Assessment of the healing process

There are many variables that have been used throughout history to assess the healing process, most of which are part of the normal properties of the skin, which is why they have been used as indicators of normal skin (7). Hence, the literature related to the indicators of the healing process (8, 9).

Wound characteristics

Many measurement instruments healing process include assessment of multiple attributes of the wounds, the choice of any of these features to be included in any scale / instrument / measurement rate, depends to some extent on the purpose you have the instrument (predicted healing, assessment of skin condition, evaluate treatment, etc.).

Methodology

Wound size

The wounds were measured by measuring the way cephalocaudal length by the width and multiplying these two measurements to obtain a result in cm² (10).

Area = length x width

Path tracing using contactless or photographs

In all cases the wounds were photographed using a camera equipped with a macro lens, the photographs were measured using the CellProfiler ® program that, after calibration, can obtain reliable surface and perimeter of the wound.

Quercus ilex recollection

The bark of Quercus ilex was obtained from trees of the

botanical garden and herbal Autonomous University of Puebla and transported within a period of time less than 24 h keeping refrigerated and protected from light.

Preparation of aqueous extract of *Quercus ilex*. Dried powder (5 g) of bark was extracted with 100 ml of sterile distilled water kept on rotary shaker for 24 h, centrifuged at 5000 g for 15 min. The supernatant was filtered through Millipore filter. Stored at 4 ° C in sterile flasks.

Surgery

THE animal care and handling of them was carried out according to the guidelines established by WHO, Geneva, and NOM-062-ZOO-1999. Albino rats of the Wistar strain between 8 and 10 weeks old were used, weighing between 120-150 g, were maintained in a controlled temperature (23 ± 2 C), humidity (50 ± 5%) and periods light / dark 12:12 respectively.

The procedure was performed under strict sterile. The anesthetics used were ketamine and xylazine. The hair on the back of each animal was removed and skin is a picture frame (1 X 1 cm). The skin excision was performed in an aseptic environment using sterile scissors and forceps. While recovering the animals were placed in individual sterile polypropylene cages. The wound was covered with sterile gauze to prevent the animal licking and / or hurt. Three equidistant cuts were performed. In cephalocaudal order in the first cut we apply the aqueous extract of *Quercus ilex*, in the second was applied Dermatrix ultra ge ® and finally the third cut was used as control, 100 ml of aqueous extract or 100 ml of gel was applied topically for 20 days every 24 h.

The progression of wound healing was assessed and photographed daily until complete healing.



Figure 1. Disposition of cuts made in Wistar rat and applied product.

Results

Wound size

The period of wound healing presented treated with the aqueous extract of *Quercus ilex* was reduced by 40 % compared to control. The second treated wound with Dermatrix ® had a recovery time of 20 % lower than the control and 20 % higher relative to the wound treated with the *Quercus* extract, as shown in Table 1 and Figure 2.

Group/Day	0	1	3	6	7	8	9	10	12	14	15
<i>Quercus ilex</i>	1000	889	667	330	220	110	0	0	0	0	0
Dermatrix	1000	917	750	500	417	334	250	167	0.6	0	0
Control	1000	933	798	597	530	462	395	328	193.6	60	0

Table 1. This table shows the area of the wounds are reported in mm². The wound which was applied *Quercus*, healed between the 8th and 9th day, the wound was applied to dermatrix around 12th day and the control at 15 days.

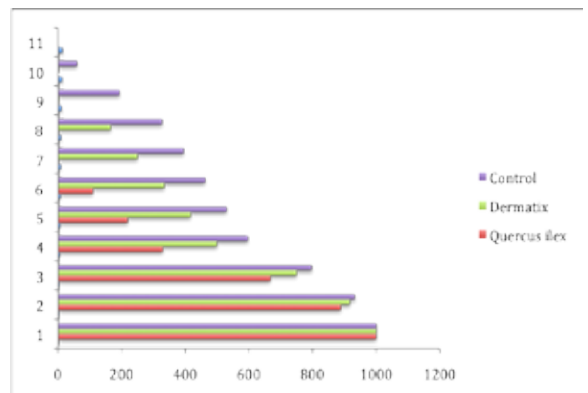


Figure 2. This graph presents the decrease observed in the wound area. x-axis area in mm², y-axis days.

Discussion

After surgery both the physician and the patient expect the scar is almost "invisible" in the results presented here using the aqueous extract of *Quercus ilex*. The incisions treated with extracts of *Quercus ilex* showed a 40% faster healing in wound area compared with the control. These data indicate that extracts of *Quercus ilex* promote wound healing in an animal model and to be a safe and natural extract can be used to treat different types of wounds in humans as well. The results presented in this report are preliminary and at this stage it is difficult to say which components of the extracts are responsible for increased wound healing. However, further phytochemical studies are needed to isolate the active principles responsible. It is noteworthy that the recovery of hair also increase.

REFERENCE

- Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO). 2011. La Biodiversidad en Puebla: Estudio de Estado. México, Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, Gobierno del Estado de Puebla, Benemérita Universidad Autónoma de Puebla. ISBN: 978-607-7607-54-0
- Perea-González GP, Cárdenas-García M, Campos-Méndez M, Estrada-Esquivel B, Vega-Galina J and Quilit-Reyes L (2013) *Quercus ilex* mouthwash effect on pH, flow and salivary proteins of geriatric patients. J. App. Res. 3 (9) 426-429.
- Peñafiel A (1895) Primera parte. Nomenclatura geográfica y etimológica de México. Oficina tipográfica de la Secretaría de Fomento, México.
- Rodríguez-Acosta M, Coombes A, Vega K and Marin L (2011) Mexican *Quercus* species in the Botanic Garden at Puebla University. Int. Oak J. 21, 11-14.
- Shai A and Maibach H I (2005) Wound Healing and ulcers of the skin. Germany, Springer.
- Jeschke M G, Kamolz L-P and Shahrkhi Sh (2013) Burn care and treatment. A practical guide. Germany, Springer.
- Majeske C. (1992). Reliability of wound surface area measurement. Physical Therapy 72(2), 138-141.
- Hegggers JP. (1998). Defining infection in chronic wounds: methodology. J Wound Care, 7, 452.
- Sussman C & Bates-Jensen B, 2007 | 9. Sussman C and Bates-Jensen B (2007). Wound care: A collaborative practice manual for health professionals (3 ed.). Philadelphia: Lippincott Williams & Wilkins.