

THE EFFECT OF OIL EXTRACT OF CUMINUM ON EXPERIMENTAL WOUND HEALING IN FEMALE RABBITS

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ABSTRACT

To declare the wound healing activity of cumin seeds on excision wound models in female rabbits. The cumin seeds obtained from local market from the plant know as *Cuminum cyminum* were subjected to solvent acetone, the oil ointment were prepared and applied topically three times a day to excision wound for 14th days post operative and compared with control. The reduction of wound was studied as a percent macroscopically and the revitalization and formation new tissue was studied histopathologically on excision wound. Its concluded the treated wound showed a faster rate of wound reduction compared with control, this was further supported with his to pathological studies.

INTRODUCTION

Wound healing is a process that is fundamentally a connective tissue response, initial of this process involves an acute inflammatory phase followed by synthesis of collagen and other intracellular macromolecules which are remodel to form ascar. [1 , 2].

Cumin is a flowering plant in the family apiaceae, native from East Mediterranean to East India. It is an herbaceous annual plant, with a slender branched stem (20-30cm) tall; the leaves are (5-10cm) long, pinnate or bipinnate, thread-like leaflets. The flowers are small, white or pink and borne in umbels[3].

Volatile oil extract from cumin is known to possess (49) compounds there are (16) hydrocarbon and (32) oxygenated compounds. The main compounds are cuminal and safranal. The other (9)compounds are monoterpenes, sesquiterpenes, aromatic aldehydes and aromatic oxides etc [1 , 2].It contains (2.5 - 4.5%) volatile oil, (10% (fixed oil and proteins. Volatile oil mainly consists of (30 - 50%) cumin aldehyde, small quantities of alpha pinene. beta pinene, phellanderene, cuminic alcohol, hydrated cuminaldehyde,

hydrocuminine and terpenes mainly monoterpenes and sesquiterpenes. The presence of sesquiterpenes in the plant material is known to possess a potent antiulcer activity. It is known to possess a potent antiulcer activity . It is known also to possess anti carcinogenic hepato-protective and antibacterial [4].

One of these main constituents of the seeds of cumin is terpenoids. The free terpenoids present in *Tridax procumbens* have been reported to pro-healing activity [5 , 6]. In view of these, has been designed the present work to study the possible effect of oil extract of cumin seeds on reduction and re- epithelialization in full thickness excision wounds.

MATERIALS AND METHODS

The seeds of cumin were collected from local market; this research was achieved between April 2009 - November 2010.

Successive Solvent Extraction:

The shade dried seeds of cumin were reduced to powder and subjected to extraction with Soxhlet with acetone solvent 250 ml (BDH England) for 24 hours. After complete extraction, extract was concentrated on rotary vacuum flash evaporator (Puchi Rota vapor, RE) at 40°C to obtain oil extract, the final dryness was done by the evaporation of remnant the solvent by leaving the residue in room temperature the result was (20 gram) oil extract kept in dark glass container at (4 °C) [7 , 8].

Oil ointment preparation:

The ointment was prepared with Vaseline base by triturating method using 2 spatulas to admix the oil extract of the plant with gradual addition of vaseline to obtain a homogenous ointment with ratio 3:1 oil vaseline [9], then ointment had been kept at (4 °C) until use time

Animal Housing:

Healthy female rabbits were used for the study, All the animals were divided into (3) groups of (6) animals in each, and (2000-2500) gram in weight

A: 3rd day post operative

B: 7th day post operative

C: 14th day post operative

Animal were depilated at the desired site before wounding, they were housed individually with free access food and water [8].

Excisions Wounds

An excision wounds model was used for studying wound healing activity. The back of the each animal was shaved and prepared after washing with alcohol spirit. An area marked was defined with a marker on the shaver back of the animals. The circular marked area was excised with its full thickness using a surgical sterile dade and scissors under Xylazin hydrochloride with ketamin hydrochloride.

The right sided excision was used as treated wound, the left one used as control. All wounds were covered with non adherent occlusive gauze. Finally a bandage was wrapped a round the trunk of animals in turn was externally strengthened with cotton vest. [8].

Determination of Wound reduction

The reduction in the wound size was calculated by the formula

$$\text{Wound reduction \%} = \left[\frac{(\text{A day}_0 - \text{A day}_x)}{\text{A day}_0} \right] \times 100$$

Where:-

X = 3,7,14 post operation day.

A= wound surface area

This formula to explain the wound contraction as a percent [9].

Histopathological studies

On each period of experimental day (3rd, 7th and 4th postoperative day). The regenerated tissue from the healing wounds collected and placed in 10% formalin for histopathological studies and dehydrated by several dilutions of ethanol alcohol dealcoholization with xylol, then embedded with paraffin wax blocked (3-5) mm thickness sections were obtained by microtome. The sections were put on glass slides deparaffinised

with xylol, rehydrated by alcohol and stained by hematoxyline and eosin, the sections were examined for re-epthelization, inflammation, collagen and a fibroblast presence.

RESULTS

The result of wound reduction studies indicate that ointment of oil extract of cumin enhanced wound healing in open excision wound.

The rate of wound reduction was found to reach a maximum on the 12th day postoperative in treated group.table (1).

Table 1: the effect of cumin oil extract on wound contraction

Time days	Reduction	
	Treated	Control
3 rd	46%	13%
7 th	89%	25%
14 th	12 th : 100%	78%



(Fig1) A: Treated wound
3rd Day: Length= 1.1 cm



(Fig1) B: Control wound
3rd Day: Length= 1.4 cm



(Fig2) A: Treated wound
7th Day: Length= 0.5 cm



(Fig2) B: Control wound
7th Day: Length= 1.3 cm



(Fig3) A: Treated wound
12th Day: Length= zero cm



(Fig3) B: Control wound
14th Day: Length= 0.5 cm

Histopathological Studies

Microscopic examination of sections prepared from the wounds of treated and control groups exhibited the following characteristics.

Treated group

Tissue showed fibrous connective tissue with scattered inflammatory cells and fibroblasts. There was a progressive collagenation with few thin blood vessels and the ephthelization of tissue observed the progression with the time experiment in the treated group compared with the control group. These observations were consistence with macroscopic results.

Control group

The control wounds showed densely in flamed connective tissue with chronic inflammatory cells between the collagen fiber and showed in complete wound healing till the end of experiment

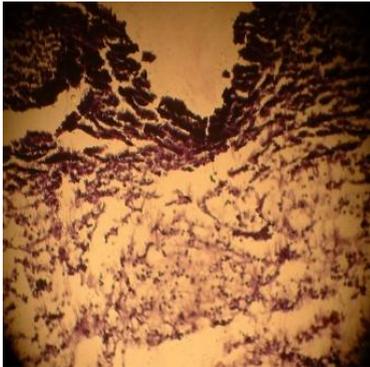


Fig 1: A: treated wound
:(3rd day) few inflammatory cells . 10 x
H&E stain.



Fig 1: B: control wound (3rd day)
: high inflammatory cells .10x. H&E stain



Fig 2: A: treated wound
(7th day) more macrophages with
Few neutrophils and clear re-epithelisation
10 x. H&E stain

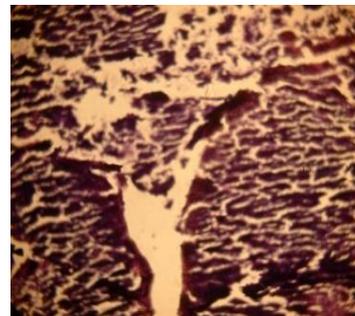


Fig 2: B: control wound
(7th day) less macrophages with
more neutrophils and less obvious
re-epithelisation .10x H&E stain

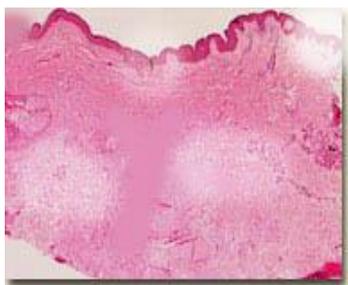


Fig 3: A: treated wound (12th day) complete re-epitheliasation 10x. H&E stain

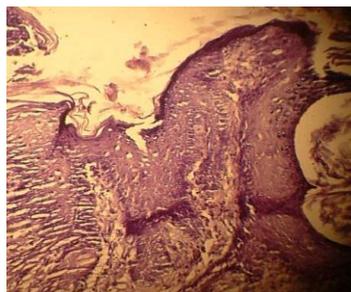


Fig 3: B: control wound (14th day) non- complete re- epitheliasation 10 x. H&E stain

DISCUSSION

The Present study clearly demonstrated that oil extract have possessed a definite prohealing action in treated wounds as compared with control wounds, and this observed by increase in the rate of wound reduction, increase angiogenesis and tensile strength. Triterpense are the main responsible constituent for wound healing [10]. One of the main constituent of the seeds of cumin is terpenoids. [12] show in research that free terpenoide in cumin extract show pro healing activity.

The treated wound showed complete epithelization on 12th day post operative day and increase in tensile strength as compared with control groups. From the results obtained in the study, it can be stated that terpenoids in the extract of cumin were responsible for wound healing activity [5].

تأثير الخلاصة الزيتية لبذور الكمون على التئام الجروح في إناث الأرانب

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الخلاصة

لبيان فاعلية بذور الكمون على التئام الجروح في أنثى الأرانب. تم استخدام بذور الكمون والتي تم الحصول عليها من السوق المحلية من نبات يعرف باسم *Cuminum cyminum* والذي تم تعريضها للمذيبات، تم تحضير المرهم والذي استخدم موضعياً ثلاث مرات يومياً على الجرح لمدة 14 يوماً آخر من أحداث الجرح وتم مقارنته مع مجموعة حيوانات السيطرة. ثم تمت دراسة تقلص الجرح كنسبة مئوية عيانيا وملاحظة تنشيطها لتكوين النسيج مجدداً، وذلك بالمتابعة بالفحص النسيجي لمراحل الالتئام للجروح. وعليه أظهرت النتائج معدلات تقلص الجروح المعالجة أكبر مما هي عليه لجروح حيوانات السيطرة.

REFERENCES

1. Hiruma-Lima, C.A., J.S. Giacioso and E.J.B. Bighett, 2001. Effect of essential oil btained from corton canjucara beath on gastric ulcer healing and protective factores of the gastricmucosa. J. phytomedicine, 9:523-529.
2. Faver, L., S. Alejinaudra and O.M. Maria, 2005. Ant. Alcerogenic activity of *Xanthanolide sesq uiterpencss* from *Xanthum cavanillesi* in rats. J. ethanopharmatol, 95: 213-213.
3. Ishikawa, T., T. Takayanagi and J. Kitajima, 2002 water- soluble constituents of cumin monoterpenoid glycosides. Chem. Pharm. Bull Tokyo, 50 (11): 1971-1978.
4. Iacobellis, N.S. and Contore, 2005 antibacterial effect of *Caminum cyminum* L. Agric. Food Chem., 53:57-57.
5. Bairy, K.L. and Rao, C.M., 2001. Wound healing profile of gimko biloba. J. Nat. Rem., 1:25-27.
6. Dhandapani, S., 2002. Hypolrdedemic effect of *Cuminum cyminum* L. on alloxan diabetic rats. Pharmacol, Res., 11:251-251.
7. Jawad, A.A.H. (1982). Hygienic evaluation of commercially processed pouhry on Iraq. Thesis, Collage of Veterinary Medicine University of Baghdad, Iraq.
8. AL- Rubae, M.A. (2005). Study on the effect of *Loranthus europeus* L. seeds on pyogenic in flammtion and skin wound healing in rabbits. M.S.c. Thesis collage of Veterinary Medicine, University of Basrah, Iraq.
9. Rashed, H.A. (1982). The pharmacy .1st part, 2nd, ed, Baghdad (Arabic).
10. Agreen, M.S.; Martz, P.M. and Franzen, L. (1997). A comparative study of there occlusive dressing in the treatment of full thickness wounds in pigs. J. Am. Ach. Dermatal.; 36:53-58.

- 11 .Aljancic, I., S. Macura, N. Juranic, S. Andjelkovic, N. Randjelkovic and S. Milosavljevic, 1996.
Diteroense from *Achillea clyopetala* phytochemistry, 43:169-171.
- 12.Bairy, K.L., 2002. Wound healing potentials of plant products. *J. Nat. Rem.*
2: 11-20.