

**COMPARATIVE STUDY BETWEEN *NIGELLA SATIVA* AND
ZIZIPHUS SPINA-CHRISTI EFFECTIVENESS ON SKIN A
SUPERFICIAL BURN HEALING IN RABBITS.**

Luay A.Naeem

Basrah University, College of Veterinary Medicine, Department of Surgery and
Obstetrics, Basrah, Iraq.

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ABSTRACT

The present study to evaluate the third degree burn involved all skin layers (full-thickness burns), and that by using *ziziphus* leaf extract and *nigella* seed extract as an ointment.

Healthy twelve mature rabbits either sex, weighing 2-2.5 kg, bred locally were used. Divided in to two groups (*ziziphus* group and *nigella* group) six rabbits of rabbits each one burned experimentally by using fire source directly on skin surface and then treated with local application of ointment (*ziziphus* leaf ointment and *nigella sativa* seed ointment) each one on it is group with daily dressing by using medical gauze.

This study appeared the benefit effect of *ziziphus* ointment and *nigella* ointment in burn healing in histopathological changes, but the group treated with *ziziphus* leaf extract (ointment) was better than the other group in cellular response to inflammatory process that occur during healing by early apparition of re-epithelialization.

INTRODUCTION

It is very important for the clinician caring for a burn victim to know the depth, or degree, of burn. A first-degree burn is superficial, dry, painful to touch, and heals in less than one week. A second-degree burn is partial thickness and pink or possibly mottled red. It exhibits bulled or frank weeping on the surface. It usually is painful unless classified as deep and heals in one to three weeks. Second-degree burns commonly are caused by scald injuries and result from brief exposure to the heat source. A third-degree burn is the most serious. It appears pearly white, charred, hard, or parchmentlike. The dead skin (eschar) is white, tan, brown, black, and occasionally red. Superficial vascular

thrombosis can be observed; there also can be focal tissue loss with prolonged exposure and a soapy-looking lesion that is found in alkali burns(1).

N. sativa L. *Ranunculaceae*, commonly known as black seed or black cumin, is naturally distributed in various regions of Iran and other Middle Eastern and Asian countries (2). The seeds of *N. Sativa* (*Ranunculaceae*) are commonly used in folk (herbal) medicine all over the world for treatment and prevention of a number of skin diseases and conditions (3). Seeds contain both fixed and essential oils, proteins, alkaloids and saponins(4,5). Much of the biological activities of the seeds have been shown to be due to thymoquinone, in which the major component of the essential oils and volatile oil, that have been reported include protection against neuro and hepatotoxicity induced by either disease or chemicals (2). It would appear that the beneficial effects of the use of seeds and thymoquinone might be related to their cytoprotective and antioxidant actions, and to their effect on some mediator of inflammation(6). The genus *Ziziphus* belongs to the family *Rhamnaceae*. This genus comprises of about 100 species of deciduous or evergreen trees and shrubs distributed in the tropical and subtropical regions of the world. *Ziziphus* species can grow either as shrubs, shrubs or trees with thorny branches and are used as a hedge to form defensive fences for animals (7). The leaves are applied locally to sores, and the roots are used to cure and prevent skin diseases (8). The leaves are applied as poultices and are helpful in liver troubles, asthma and fever (9).

Z. spina-christi locally known as cidir, is a multipurpose tree species belonging to the botanical family *Rhamnaceae*. It is an important cultivated tree and one of the few truly native tree species of Saudi Arabia that is still growing along with many newly introduced exotic plants (10). Medicinal plants play a key role in the human health care. About 80% of the world population relies on the use of traditional medicine, which is predominantly based on plant material (11). Scientific studies available on a good number of medicinal plants indicate that promising phytochemicals can be developed for many health problems (12). The leaves of the plant are used in the treatment of diarrhea, wounds, abscesses, swelling and gonorrhoea (9). They are also used in the treatment of liver diseases, asthma and fever (13).

MATERIALS AND METHODS

Experimental Animals:-

Mature twelve rabbits (male and female) were obtained from private farm in Basrah,Iraq. Their average weights were 1.5-2.5 kg and 9-12 months age old. They were acclimatized for one week in stainless steel cages and feed commercial diets, vegetables, crushed wheat and corn all over the whole experiment. They were divided into two experimental groups (6 animals for each one), and subdivided in to three period(1, 2, and 3 weeks). The skin of all animals were burned with direct exposure to fire. The two experimental groups were treated with prepared *Ziziphus* and *Nigella* ointment. The skin of surgical area of rabbits were shaved and prepared to exposure directly to fire were topically put carefully on the shaved skin (figure 1). Skin burned rabbits were housed separately under sterile conditions in isolated room cleaned with sterile solution.



(Figure 1) the burned area on the dorsal surface of rabbit

Two experimental groups were treated twice daily by the treatment materials. One of these groups treated by *Ziziphus* ointment, while the other by *Nigella* ointment.

Observations of Burns:

The areas of the burns were recorded daily to show the contracting ability of wounds. The granulations of tissues or rebuilt layers were observed. The contracting ability of burns was measured by drawing the wound. This was carried out by putting clean filter paper on the wound and on other paper. The wound shape was drawn as stamped upon the filter paper. The drawn wound shape was smoothly cut. The contracting ability can be defined as the ability of the wound to become narrower than the beginning; throughout the observation of the periphery around the wound.

RESULTS

Macroscopical observation:

Clinical examination of the area of burn in one week of treated animal reveal there is a transudate and vesicles formation in the two treated group.

On two weeks of present study, the clinical observation of two treated groups after two weeks show contracted wound area with granulation tissue and there is no evidence of vesicles presence in the *Ziziphus* group compared with *Nigella* group show little contraction with soft granulation tissues.

On three weeks clinical pictures of *Ziziphus* group show decrease the wound area in the size to too much contraction of wound area and there is no transudate and no presence of granulation, while in the *Nigella* group also show decreased in the wound area but little than in the *Ziziphus* group with remain the smallest area of granulations. This reveals that the healing processes is going to complete and as a result of all observations show evidence changes between two experimental groups.

Microscopical observations:

Histopathological changes:

In one week microscopical observations appear in the *Ziziphus* group thickened epidermis and severe dermal fibrosis scab formation with inflammatory cells (polymorph nucleated cells) (figure 2), to compare with *Nigella* group appear the ulceration of tissue as a result of hypoxia and ischemic the burned tissue with absent of squamous cells associated with excessive of inflammatory cells

(figure3).Twoweekhistopathological changes in skin treated with *ziziphus*, thickened epidermis and sever dermal fibrosis, have healed ulceration with little re-epithelialization(figure 4) and in the *Nigella* group showthickened epidermis with area of ulceration(figure 5).ThreeweekHistological changes of skin treated with *ziziphus*, thickened epidermis and sever dermal fibrosis, have healed ulceration and appear the hair follicles with complete epithelialization (figure 6) while in the *Nigella*group show the large hair follicles and also appear thickened the epidermis (figure 7).

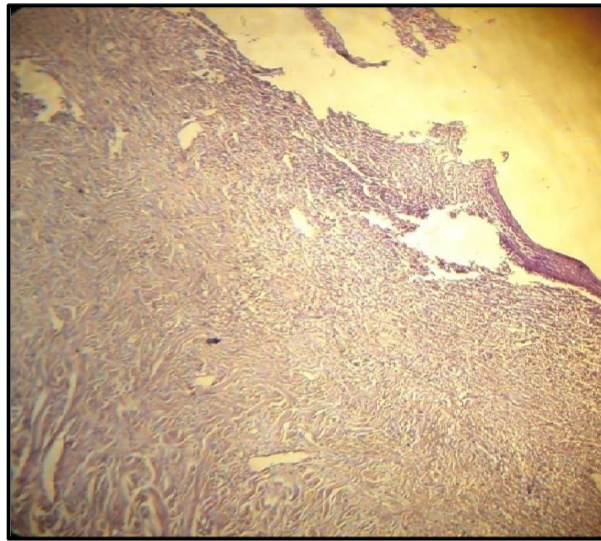


Figure: (2) histological section of skin treated with *ziziphus*, thickened epidermis and sever dermal fibrosis scab formation (↓) (one week)

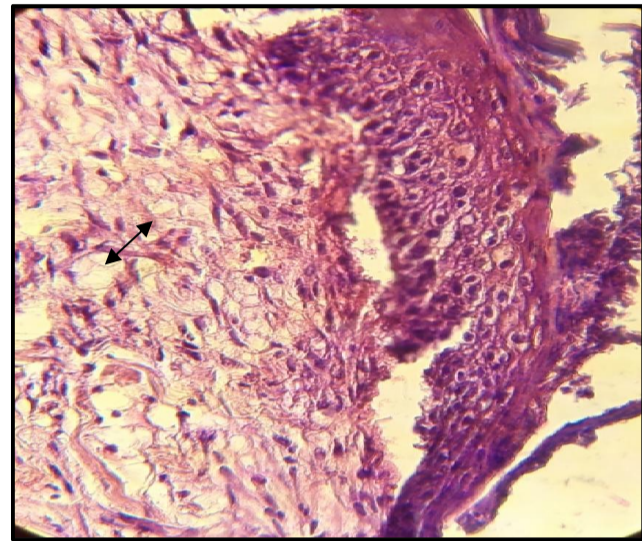


Figure: (3) histological section of skin treated with *N.sativa*ulceration(↔) associated with heavy number of mix inflammatory cells (↓) (one week) x10





Figure: (4) histological section of skin treated with *zizphus*, thickened epidermis and sever dermal fibrosis (↔) with epithelialization (↗) (two week) x10

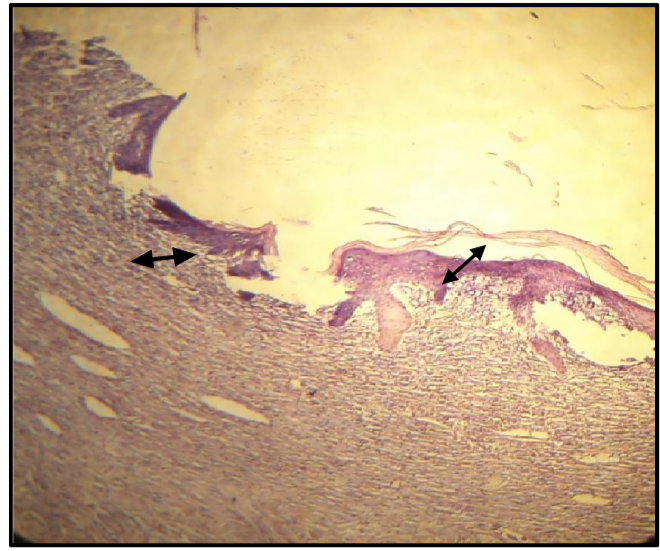


Figure: (5) histological section of skin treated with *N.sativa*, thickened epidermis (↗) with area of ulceration(↔)(two week) x10

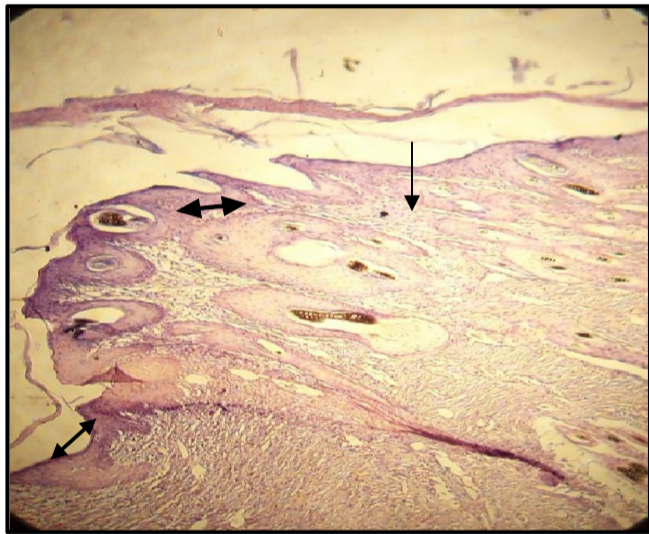


Figure (6)Histological section of skin treated with *zizphus*, thickened epidermis and sever dermal fibrosis (↔), appear the hair follicles (↓),and complete epithelialization (↗)

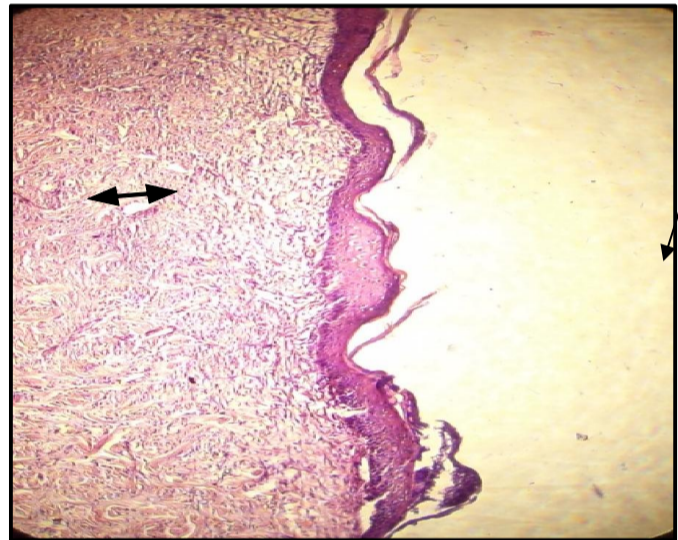


Figure (7)histological section of skin treated with *Nigella* show complete epithelialization(↓) and thickened of the epidermis(↔)

DISCUSSION

This study was undertaken to evaluate the effect of plant extract (*Nigella sativa* and *ziziphusspina-christi*) on burned wound from contraction and histopathological changes by topical application on burned area twice daily. Wound healing is a complex and dynamic process of restoring cellular structure and tissue layers in damaged tissue as closely as possible to its normal state. Wound contracture is a process that occurs throughout the healing process, commencing the fibroblastic stage whereby the area of the wound undergoes shrinkage. The wound undergoes contraction resulting in a smaller amount of apparent scar tissue. Granulation tissue formed in the proliferative phase is primarily composed of fibroblasts, collagen, edema and new small blood vessels. These observations show clearly in *Ziziphus* group after one week and this agrees with (14) in study of wound healing potential of *ziziphusjujube* extract on albino rats. In present study shown that *ziziphus* leaf extract promotes wound healing process mainly due to their astringent and antimicrobial properties which appear to be responsible for wound contractions and increased rate of re-epithelialization and these agree with (15) in present study of protective effect of *ziziphusmauritiana* leaf extract on liver injury. In recent study (16) of effect of *NigellaSativa* extract on tracheal responsiveness and lung inflammation in ovalbumin-sensitized guinea pigs, in this study shown the total white blood cells and eosinophil counts in the lung lavage fluid of treated group were significantly higher than those of control group, this agrees with in present study when shown in first week of *Nigella* group excessive of inflammatory cells as a result of injury response. The results showed that both *Ziziphus* and *Nigella* promoted wound contraction and shortened epithelialization period. However, the *Ziziphus* seemed to be more effective (17) as seen in some wounds from the current study.

دراسه مقارنه لتاثير مستخلص نبات السدر وبذور الحبه السوداء على التئام الحروق السطحيه للجلد في الارانب

لؤي احمد نعيم

فرع الجراحه والتوليد،كلية الطب البيطري،جامعه البصره،البصره ،العراق.

الخلاصه

فرع الجراحة والتوليد-كلية الطب البيطري-جامعة البصره-البصره-العراق

أجريت هذه الدراسه لتقييم الحروق من الدرجه الثالثه التي شملت كافة طبقات الجلد، وذلك من خلال استخدام مستخلص اوراق السدر وبذور الحبه السوداء على شكل مرهم.

شملت الدراسه ١٢ أرنب (من كلا الجنسين) بالغه، تزن ٢-٢.٥ كغم قسمت الى مجموعتين (مجموعه السدر ومجموعه الحبه السوداء) كل مجموعه شملت ٦ أرانب، من خلال إحداث حروق تجريبية بأستخدام مصدر حراري الى درجه الاتقاد مباشرة على سطح الجلد. ثم استخدمت هاتان المادتان كل على مجموعته وذلك اضافة الى التضميد من خلال استخدام الشاش الطبي على موقع الحرق موضعياً.

ومن خلال الدراسه النسيجه المرضيه اظهرت كلا المجموعتين نتائج ايجابيه، الا انه المجموعه المعامله بمستخلص أوراق السدر كانت أفضل من خلال الاستجابة الخلوية للعملية الالتهابية التي حدثت أثناء عملية الالتئام من خلال الظهور المبكر لعملية التظهر.

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