



# Wound Healing Effect of *Acacia nilotica* and *Curcuma longa* Mixture



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## Introduction

In the last few decades the Chemistry of Natural Products has touched a new horizon and developed as a separate discipline in itself. The importance of this field is that on one hand it is Organic Chemistry associated with plants, animals and marine products and on the other hand it is associated with plant biochemistry and utility in pharmaceutical industry.

Natural products and their related moieties have historically been incredible as a source of therapeutic agents [1]. In last few decades, research into natural products in the pharmaceutical industry has showed incredible results. Current strategies of natural products followed by pharmacological testing have led to a renewed interest in natural products in drug discovery. The current paper is an evidence based result for positive wound healing effects for a mixture of two plants *Acacia nilotica* and *Curcuma longa* (AC) based on animal study in the laboratory.

## *Acacia nilotica*

*Acacia nilotica* (L.) Del. syn. *Acacia arabica* (Lam.) Willd. (Mimosaceae) is an imperative multipurpose plant [2]. indigenously known as 'Babul' or 'Kikar' is a proverbial, medium sized tree and is broadly scattered in tropical and subtropical countries. It has an inspiring range of medicinal uses with potential anti-oxidant activity. *A. nilotica* is recognized by the following names: Acacia, Acacia Arabica, Babu-Hindi and Napalese, Babla-Bengali, Babool-Unani, Babool Baum-German, Babhoola-Sanskrit, Babul, Babul Tree, Huanlong Kyain-Burmese, Kikar, Mughilan-Arabian Indogom-Japanese and Ummughiiion-Persian. *A. nilotica* is an imperative multipurpose plant that has been used broadly for the treatment of various diseases [3].

## Chemical constituents

*A. nilotica* is a medicinal plant acknowledged to be rich in phenolics, consisting of condensed tannin and phlobatannin, gallic acid, protocatechuic acid, pyrocatechol, (+)catechin (-) epigallocatechin-7-gallate and (-) epigallocatechin-5, 7-digallate. Different parts of this plant such as the leaves, roots, seeds, bark, fruits, flowers, gum and immature pods act as anti-cancer, antimutagenic, spasmogenic, vasoconstrictor, anti-pyretic, anti-

asthmatic, cytotoxic, anti-diabetic, anti-platelet agregatory, anti-plasmodial, molluscicidal, anti-fungal, inhibitory activity against Hepatitis C virus (HCV) and human immunodeficiency virus (HIV)-I and antioxidant activities, anti-bacterial, anti-hypertensive and anti-spasmodic activities, and are also engaged for the treatment of different ailments in the indigenous system of medicine [4].

## Medicinal uses pharmacological effects

*A. nilotica* also has numerous medicinal uses. The medicinal traits and pharmacological activities endorsed to various parts of *A. nilotica* are detailed as follows: Anti-hypertensive and antispasmodic activities; antibacterial and antifungal activities, antiplasmodial activities, antioxidant activity, acetylcholinesterase inhibitory activities, anti-diabetic activities, Chemo preventive, cytotoxic and anti-mutagenic activities, besides other multiplicities.

## Traditional uses

Acacia used externally in traditional medicine to treat skin wounds such as burns, cuts, leprosy and internally to treat digestive issues, gonorrhoea, dysentery, cough and colds.

***Curcuma longa*: *Curcuma longa*.** Synonymous with *Curcuma domestica* Val. (*Zingiberaceae*). Common names: Curcuma, Indian saffron, and haldi.

**Traditional/Ethnobotanical uses:** Turmeric has a warm, bitter taste and is used extensively as a food flavoring and colorant, it is a primary component of curry powders and some mustards. The spice has a long tradition in Asian medicine to treat problems ranging from flatulence to hemorrhage [5]. Use to treat ringworm, as a poultice, for pain, and in the management of jaundice and hepatitis has been documented [6,7]

Turmeric is used as a dietary spice, coloring agent in foods and textiles, and a treatment for a wide variety of ailments. It is widely used in traditional Indian medicine to cure biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism and sinusitis. Turmeric paste in slaked lime is a popular home remedy for the treatment of inflammation and wounds.

**Chemical composition of turmeric:** Turmeric contains protein (6.3%), fat (5.1%), minerals (3.5%), carbohydrates (69.4%) and moisture (13.1%). The essential oil (5.8%) obtained by steam distillation of rhizomes has *a-phellandrene* (1%), *sabinene* (0.6%), *cineol* (1%), *borneol* (0.5%), *zingiberene* (25%) and *sesquiterpines* (53%)<sup>5</sup>. *Curcumin*, the most active component of turmeric is *curcumin*, which makes up 2 to 5% of the spice. The characteristic yellow color of turmeric is due to the *curcuminoids*, first isolated by Vogel in 1842. *Curcumin* is an orange-yellow crystalline powder practically insoluble in water [8-10].

**Miscellaneous uses:** Turmeric is being investigated in clinical trials for the treatment and prevention of cancers, particularly of the gastrointestinal tract, and for treatment of colitis and Alzheimer and Huntington diseases. *Curcuma* used as mouth gargle for the inflammation of the oral mucosa and externally against the skin allergies, infected wounds, cosmetic and internally against hepatic, gastrointestinal disorders, and for anti-inflammatory diseases.

**Source:** *Acacia nilotica* fruits were collected fresh from ZCHRTM garden, Abu Dhabi, washed, dried and grind to make fine powder. *Curcuma longa* powder (Quality for medical use) purchased from Wadi Az Zafran, Khalifa Street, Souk Central Market, Abu Dhabi.

### Preparation

A combination of *Acacia* and *Curcuma* (AC) was made by mixing them 3:1 respectively in gel medium.

### Animals

Sprague Dawley (SD) strain rats (250-300 g.BW) housed as an outbred closed colony in ZHC animal facility kept in Makrolon Polycarbonate cages (41×28×24cm) with a high top wire lid and water bottle; sawdust bedding material changed twice a week.

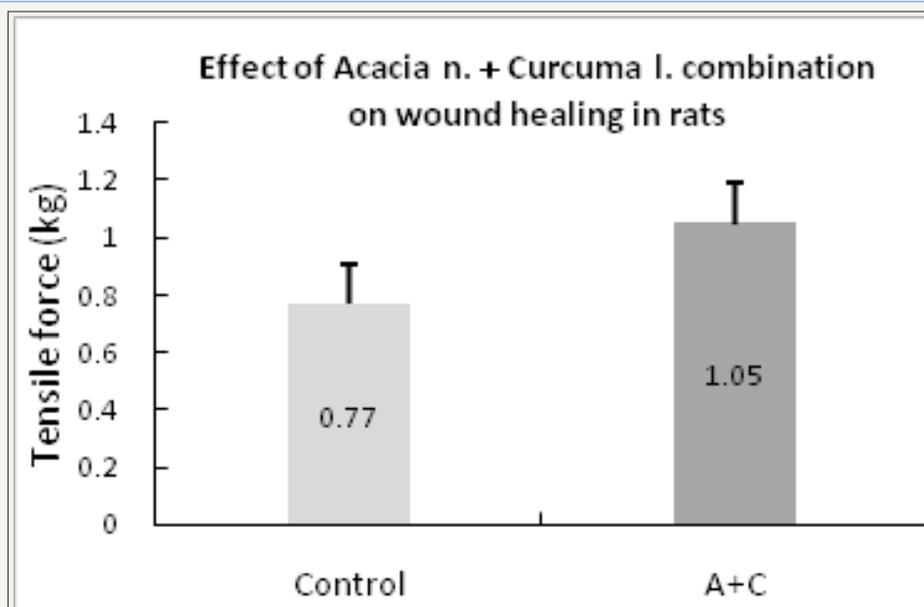
Maintaining standard condition of 22±2 oC room temperature, 12hrs. light/dark cycle, 60% humidity and 15-20 times air change per hour. Fed on standard chow (Animal Feed & Flour production and marketing Co. L.L.C.) and water supplied *ad libitum*.

### Procedure

Eight male SD rats were used in this incisional experiment 4 treated and 4 control groups, using ether to calm the subjects, all animals' tail numbered and dorsally clean shaved. Using a scalpel, a longitudinal incision (wound) of whole skin thickness of about 4 cm was made on the shaved area of each rat's dorsum, they kept separate one animal per cage. The AC preparation applied topically using spatula one time per day to the treated group wound, which left open, the control group wound wiped only with dry cotton. The treatment continued daily for five consecutive days. After twelve days, the animals sacrificed. A square of about 4x4cm of the wounded skin taken from each subject of the two groups control and treated, then evaluated for wound-breaking strength by measuring the tensile force using Chatillon Digital Force Gouge (DFIS2) after modification by using two teeth shaped clamps. One of the clamps connected to the (DFIS2), and the other connected to a plastic water container by a wire and the skin square fixed to each clamp parallel to the incision, between the tensile strength measuring device and the water container as weight. Then the water gradually added into the plastic container to contract the skin. When the skin started to break and separate, the stop button is pressed and the reading is collected from the device LCD screen, recorded, entered and statistically analyzed using T-test ( $p < 0.05$ ), (Mean±SE =  $0.77 \pm 0.071$  vs  $1.05 \pm 0.022$ ,  $P = < 0.01$ ) [11-16].

### Conclusion

The combination of two plant mixture (AC) preparation was found very significant in wound healing as compared with the control group Figure 1-3.



**Figure 1:** Effect of *Acacia n.* + *Curcuma l.* combination on wound healing in rats.



**Figure 2:** (A+C) Treated group on day 1.



**Figure 3:** (A+C) Treated group after 9 days.

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### References

- Siddiqui AA, Iram F, Siddiqui S, Sahu K (2014) Role of natural products in drug discovery process. International Journal of Drug Development and Research.
- Kaur K, Michael H, Arora S, Harkonen P, Kumar S (2005) In vitro bioactivity-guided fractionation characterization of polyphenolic inhibitory fractions from *Acacia nilotica* (L) Willd. ex Del. J Ethnopharmacol 99(3): 353-630.
- Singh BN, Singh BR, Sarma BK, Singh HB (2009) Potential chemoprevention of N-Nitrosodiethylamine-induced hepatocarcinogenesis by polyphenolics from *Acacia nilotica* bark. Chem Biol Interact 181(1): 20-28.
- Ali A, Akhtar N, Ali Khan B, Shoaib Khan M, Rasul A, et al. (2012) *Acacia nilotica* A plant of multipurpose medicinal uses. Journal of medicinal plant research 6(9): 1492-1496.
- (2009) Turmeric-Review of Natural Products. Facts & Comparisons 4.0. Wolters Kluwer Health, St. Louis, MO, USA.
- Pari L, Tewas D, Eckel J (2008) Role of curcumin in health and disease. Arch Physiol Biochem 114(2): 127-149.
- Strimpakos AS, Sharma RA (2008) Curcumin preventive and therapeutic properties in laboratory studies and clinical trials. Antioxid Redox Signal 10(3): 511-545.
- Bitto A, Irrera N, Minutoli L, Calò M, Lo Cascio P, et al. (2013) Relaxin improves multiple markers of wound healing and ameliorates the disturbed healing pattern of genetically diabetic mice. Clin Sci (Lond) 125(12): 575-585.
- Bouzabata A, Boukhari A (2014) Variation in the traditional knowledge of *Curcuma longa* L. in North-Eastern Algeria. Pp. 1-5.
- <https://www.healthline.com/health/7-uses-for-acacia>
- Ghazanfar SA (1994) Handbook of Arabian Medicinal Plants. Boca Raton, CRC Press, USA.
- PDR for Herbal Medicines, (1<sup>st</sup> edn), Medical Economics Company, Montvale, New Jersey, USA.
- Encyclopedia of Medicinal Plants of the UAE-Part-II (under progress).
- British Herbal Pharmacopeia (1983) British herbal medicine association. p. 35.
- Poonam M, Shradha B (2012) *Ferula asafetida*: Traditional uses and Pharmacological activity. Pharmacogn Rev 6(12): 141-146.
- <http://www.drugs.com/npp/asafetida.html>



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