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.

Chemical constituents

*Acacia 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, spasmodic, vasoconstrictor, anti-platelet aggregatory, anti-plasmoidal, molluscicidal, anti-fungal, inhibitory activity against Hepatitis C virus (HCV) and human immunodeficiency virus (HIV)-1 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

*Anilotica* also has numerous medicinal uses. The medicinal traits and pharmacological activities endorsed to various parts of *Anilotica* are detailed as follows: Anti-hypertensive and antispasmodic activities; antibacterial and antifungal activities, antiluminal activities, antioxidant activity, acetylcholinesterase inhibitory activities, antidiabetic 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, gonorrhea, dysentery, cough and colds.

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

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-pherllandrene (1%), sabinene (0.6%), cineol (1%), borneol (0.5%), zingiberene (25%) and sesquiterpines (53%)5. 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 curcinoids, 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±0.071 vs 1.05±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.
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