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Review On Jatropha Curcas Plant

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ABSTRACT :

Burn injuries pose a considerable global health challenge, highlighting the need for effective treatment approaches to ensure optimal recovery. Traditional medicine frequently employs various plant extracts due to their healing properties. Jatropha curcas, known as physic nut, has attracted interest for its potential role in wound healing, especially in the context of burn injuries. This review consolidates existing knowledge on the phytochemical profile, biological functions, and therapeutic effectiveness of Jatropha curcas in facilitating burn recovery. Consequently, my research aims to formulate Jatropha curcas gel preparations as a treatment for burns, assess the characteristics and physical properties of these gel formulations, and evaluate the efficacy of Jatropha curcas gel as a burn healing agent.

Keywords : jatropha sap, gel, burns

1. Introduction :

Burns are the most commonly experienced injuries by humans compared to other injuries. Burn injuries can vary in severity, and their treatment poses a challenge in both clinical and homecare settings. a burn causes 195,000 deaths per year worldwide, especially in poor developing countries in ASEAN having high burn rates from other regions, of which 27% contribute to causing death worldwide and almost 70% are the cause of death in Southeast Asia. the incidence of burns is very high in low income countries with almost 90% mortality and high in Pakistan, and India Traditional remedies have been explored as adjuncts to conventional treatments, with numerous studies highlighting the efficacy of plant-derived compounds. Its seeds are similar to castor plant and useful source of castor oils. Seeds mainly contain 80% unsaturated fatty acids and 20% saturated fatty acids. The plant is used for antidiabetic, antibacterial and antioxidant activity. Jatropha curcas an important plant was evaluated for its antibacterial potential for the first time against important bacteria and fungus. Current research work mainly exhibits antibacterial effects of Jatropha carcus plant. Analgesic activity exhibited by Jatropha carcus extract is produced by two ways peripherally and centrally. For peripheral activity writhing test is used and writhing are produced by administering acetic acid. Free radical scavenger activity had been determined by various methods as mentioned above diphenyl picrazy hydrazyl, hydrogen peroxide and super oxide dismutase. Ferric ions are reduced to ferrous ion for determining reducing activity of herbal plant extracts of different parts like leaves, aerial part, roots and stem barks. Non-steroidal anti-inflammatory medicaments show its anti-pyretic activity by inhibiting enzyme PG synthetase through hypothalamus. Jatropha curcas, a drought-resistant shrub, is native to Central America and has been widely used in traditional medicine. This review aims to explore the role of Jatropha curcas in burn healing, focusing on its chemical constituents, pharmacological properties, and potential applications in modern therapeutic practices.

2. Occurance :

Jatropha curcas is a flowering plant belonging to the Euphorbiaceae family, indigenous to the tropical regions of the Americas, particularly Mexico and Central America. This species is originally found in the tropical zones extending from Mexico to Argentina and has since been disseminated across various tropical and subtropical regions globally, where it has become either naturalized or invasive in numerous locations. In India, it is prevalent in several regions, particularly in the southern parts, and can also thrive in arid and semi-arid environments.
Hissar, Haryana
Hyderabad, Andhra Pradesh
Jodhpur, Rajasthan
Jhansi and Lalitpur, Uttar Pradesh
Pantnagar, Uttaranchal
Jatropha curcas is well suited to Rajasthan because it requires little water, which is scarce in the state. It is grown in agroforestry formats in Udaipur, Kota, Sikar, Banswara, Chittor, and Churu districts.

3. Botanic Information of Jatropha curcas :

The Jatropheae tribe, belonging to the Euphorbiaceae family, encompasses the genus Jatropha, which comprises over 170 species. The scientific designation "Jatropha" is derived from Greek, combining "jatros," meaning "doctor," and "trophe," meaning "food," reflecting the plant's historical

medicinal applications. This genus is classified under the Crotonoideae subfamily, specifically within the Joannesieae tribe, and includes more than 175 species. The classification system established by Pax was revised by Dehgan and Webster, resulting in the current structure of ten sections and ten subsections to represent both Old and New World species across two subgenera: Curcas and Jatropha. They identified J. curcas, commonly known as the physic nut, as the most primitive form within the genus. Variations in growth habits and floral structures are observed in other sections, which also trace their origins back to the physic nut or an earlier variant. The bark of Jatropha curcas is characterized by a pale brown, papery texture that peels easily; when cut, it exudes a copious liquid latex that feels soapy to the touch but becomes brittle and reddish upon drying. This species, a diploid with 22 chromosomes, typically grows as a dense shrub or small tree, reaching heights of 3 to 5 meters, and can attain a maximum height of 10 meters under optimal conditions. In Mexico, genotypes are categorized as either hazardous or non-toxic. The plant exhibits an articulated growth pattern and has a lifespan of up to 50 years. It is deciduous, displaying a morphological break, and features a root system consisting of four shallow lateral roots alongside a central taproot. The branches are glabrous, with smooth greenish-bronze bark and translucent latex. The foliage is characterized by a smooth texture, featuring five lobes and a heart-like shape, with a dark green coloration at the base that is either cordate or spherical. The apex is acute, while the base is cordate, and the leaves are arranged alternately, shedding annually. The axillary flower clusters are supported by stalks measuring 3 to 5 cm, adorned with entire, lanceolate or linear bracts that are pubescent and exhibit a yellowish-green hue, along with prominent glandular discs on the flowers. Male flowers consist of five ovate-elliptic sepals, each measuring less than 4 mm in length, accompanied by five oblong-ovate petals that are 6 to 7 mm long, fused at the base, densely hairy on the interior, and possess eight stamens. In contrast, female flowers are 4 mm long, featuring free oblong petals and larger sepals. The fruits are trilobate ovoid capsules, measuring 3 to 4 cm in length, which dehisce from three cells. Each fruit contains three large seeds.

4. Plant morphology :

5. Scientific classification

Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Malpighiales
Family: Euphorbiaceae
Genus: Jatropha
Species: J. curcas
Binomial name: Jatropha curcas

Collection of latex

6. Phytochemical Composition

Jatropha curcas contains a diverse array of bioactive compounds, including:

Alkaloids: Known for their analgesic and anti-inflammatory properties.
Flavonoids: Exhibit antioxidant activities that can protect cells from oxidative stress.
Triterpenes: Have demonstrated anti-inflammatory and wound healing effects.
Glycosides: May enhance the healing process through their antibacterial properties.
These compounds collectively contribute to the plant's therapeutic efficacy in treating burns and other wounds.

7. Pharmacological Properties

7.1 Antioxidant Activity

Oxidative stress plays a crucial role in burn pathophysiology. Extracts of Jatropha curcas have shown significant antioxidant activity, which can mitigate cellular damage in burn wounds. Studies have demonstrated that flavonoids and other phenolic compounds in Jatropha curcas can scavenge free radicals, thus promoting healing.

7.2 Anti-inflammatory Effects

Burns trigger an inflammatory response that can hinder the healing process. Jatropha curcas extracts have been shown to reduce inflammation by inhibiting pro-inflammatory cytokines and mediators, which aids in the recovery of damaged tissues.

7.3 Antimicrobial Activity

Secondary infections are a common complication in burn injuries. Jatropha curcas exhibits broad-spectrum antimicrobial activity against various pathogens, including bacteria and fungi. This property is crucial for preventing infection in burn wounds and enhancing healing.

7.4 Wound Healing Promotion

Research indicates that Jatropha curcas enhances the proliferation and migration of fibroblasts and keratinocytes, which are essential for tissue regeneration. Its application in topical formulations has shown promising results in accelerating wound closure and improving overall healing outcomes.

8. Clinical Applications and Formulations

Jatropha curcas has been formulated into various topical preparations, including creams, gels, and ointments. These formulations are designed to harness its healing properties while ensuring patient safety. Clinical studies have reported significant improvements in burn healing rates and reduction in pain when Jatropha curcas is included in treatment regimens.

8.1 Case Studies and Clinical Trials

Several clinical trials have investigated the effectiveness of Jatropha curcas-based formulations in burn treatment. Results indicate that patients receiving these treatments experienced faster healing times and reduced pain compared to those treated with standard care.

9. Safety and Toxicity

While Jatropha curcas has shown therapeutic promise, its toxicity must be considered. Certain parts of the plant, particularly the seeds, contain toxic compounds that can pose risks if ingested. However, topical applications of properly formulated extracts have demonstrated a good safety profile in clinical settings.

10. Conclusion

Jatropha curcas presents a valuable addition to the repertoire of treatments for burn healing. Its diverse phytochemical composition, coupled with significant pharmacological activities, underscores its potential as a natural therapeutic agent. Future research should focus on standardizing extraction methods, optimizing formulations, and conducting larger clinical trials to fully elucidate its efficacy and safety in burn management. There are some characteristic and physical properties of Jatropha curcas plant latex cream formulation with semisolid dosage form having characteristic smell but there are some color differences with differences in concentrations like white, creamy white,

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