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A Review on Medicinal Importance of Jatropha Spp. against Different Diseases

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ABSTRACT: *Jatropha sp.* has been widely investigated for its antimicrobial potential in different clinical and environmental studies. The present review summarizes the antibacterial and biological activities of various parts of *Jatropha sp.* including sap, stem, and leaf extracts, using standard methods such as agar diffusion, disc diffusion, Kirby–Bauer technique, and broth dilution assays. Most studies reported strong inhibitory effects of *Jatropha sp.* against common pathogenic bacteria such as *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Streptococcus mutans*, and *Staphylococcus epidermidis*, with several demonstrating bactericidal activity based on MIC and MBC values. Phytochemical analysis revealed the presence of polyphenols and flavonoids, which may contribute to the observed antimicrobial effects. In addition, antioxidant, anti-inflammatory, and larvicidal activities were also reported, highlighting the multifunctional nature of this plant. The studies indicated that *Jatropha sp.* is a promising natural source of antimicrobial agents with potential applications in treating infections, wound healing, dental caries, and inflammation.

KEYWORDS: *Jatropha sp.*, antimicrobial activity, bacterial pathogens, MIC, MBC

I. INTRODUCTION

Jatropha multifida (locally called ‘Ogege’ in some part of Southwest, Nigeria) belong to the family Euphorbiaceae, origin uncertain but probably indigenous to Barbados. A very attractive and widely cultivated species throughout the tropics and is commonly known as coral plant or French physic nut. *Jatropha multifida* Linn. is grown as an ornamental plant in North Australia and South East Africa. The leaves and latex of *Jatropha multifida* are used medicinally (Aransiola et al, 2014).

Indonesians have been using various types of traditional medicinal plants to cure various ailments, one of which is coral plants or *Jatropha multifida* Linn (*J. multifida*). Benefits of *Jatropha multifida* have not been well known to the common Indonesian. The parts of this plant that can be used are its leaves, sap, and seeds oil, which have been utilized to treat helminthiasis, infections in open wounds, and various inflammatory conditions of the skin (Ivan et al., 2019).

Many pharmacological studies have been conducted to investigate the properties of *Jatropha multifida*, a multi-purpose medicinal agent. The leaves, the latex and the fruits of this plant are used in the treatment of infected wounds, skin infection and as a cicatrizing, ulcers, oral thrush, constipation and fever. Roots and stem contained lathyranes (diterpenoid), responsible of anticancer, cytotoxic, antitumor, antimalarial, antileishmanial, antimicrobial, insecticidal and molluscoid activities of *Jatropha multifida* (Anani et al., 2016).

Jatropha multifida stem bark extract was studied for its antimalarial, antileishmanial, and antimicrobial activities. The solvent used for the extraction is methanol and chromatography and HPLC method was used to extract bioactive metabolites. After that antimalarial and antimicrobial assay was performed. The result showed that the diterpenoid compounds exhibited significant inhibitory activity against *Plasmodium falciparum*, *Leishmania donovani*, and several bacteria and fungi. Two compounds showed strong activity against *Cryptococcus neoformans*. Thus, *Jatropha multifida* has medicinal properties and supports its traditional use in treating infectious and parasitic diseases (Falodun et al., 2014).

Staphylococcus aureus and *Pseudomonas aeruginosa* causes open wound infections. An infusion of *Jatropha multifida* leaves was prepared and tested using the Kirby-Bauer disc diffusion method. Different concentration was used, and inhibition zones were measured to evaluate antibacterial activity. The result showed that 75% and 100% concentrations exhibited inhibitory effects against both bacteria, indicating bacteriostatic activity, while lower concentration showed no effect. MIC and MBC could not be determined. Therefore, *Jatropha multifida* leaf infusion used as a natural antibacterial agent for wound infections (Ivan et al.,2019). The study explored the phytochemical composition and biological activities of *Jatropha multifida* leaf extract. Novel biflavone diglycosides (jatrophenols I-III) and known polyphenols were identified using chromatographic and spectroscopic techniques and in experimental animal models. The findings suggested that *Jatropha multifida* leaves can serve as a promising natural source for bioactive compounds with potential medicinal applications (Marzouk et al.,2012). Broth microdilution method was used to evaluate the antibacterial activity of *Jatropha multifida* leaf extract against wound infections caused by *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Carrageenan induced paw oedema method was followed for anti-inflammatory activity. The extra showed strong antibacterial effect, especially against *Staphylococcus aureus* and significant anti-inflammatory activity. Hence, *Jatropha multifida* can be recommended for wound healing (Anani et al., 2016).

The study was conducted to evaluate the antioxidant, anti-inflammatory, and antimicrobial activities of *Jatropha multifida* leaf extracts. Polyphenols and flavonoids in the plant was identified using LC-MS-ESI method. Agar diffusion method was followed to test antimicrobial activity against bacteria like *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans*. For analysis the antioxidant activity, DPPH, ABTS, FRAP, and lipid peroxidation methods were performed. Albumin denaturation method was used for anti-inflammatory activity. The ethanolic and methanolic extracts showed strong biological activity. Hence, *Jatropha multifida* can be recommended as a potential medicinal plant for treating infections and inflammation (Dah-Nouvlessounon et al., 2023). Using agar well diffusion and broth dilution methods the antimicrobial activity of *Jatropha multifida* sap was tested against different bacteria and fungi. The sap showed good activity, especially against *Staphylococcus aureus*. Therefore, *Jatropha multifida* can be considered a natural antimicrobial agent (Aransiola et al., 2014).

The phytochemical, antimicrobial and larvicidal properties of *Jatropha multifida* leaf extracts were studied. Methanol and ethyl acetate solvents were used. Disc diffusion and microdilution methods were performed to test antimicrobial activity against different bacteria and fungi. Tetracycline was used as a positive control and zone of inhibition was measured. The extracts showed strong activity against *Staphylococcus epidermidis* and *Bacillus algicola*. Larvicidal activity was tested against *Bactrocera zonata* and *Bactrocera cucurbitae*. With ethyl acetate extract high mortality was observed. Hence, *Jatropha multifida* can be recommended as a natural antimicrobial and insecticidal agent (Rampadarath et al., 2014). The antibacterial activity of *Jatropha multifida* stem sap was tested against *Pseudomonas aeruginosa*. Kirby-Bauer diffusion method was performed. Gentamicin was used as positive control and DMSO as negative control. To determine effectiveness the inhibition zone was measured using a calliper. The results showed that 50% concentration produced the highest inhibition zone. Therefore, *Jatropha multifida* stem sap can be recommended as a natural antibacterial agent against *Pseudomonas aeruginosa* (Rusdy and Damanik, 2024). The antibacterial activity of *Jatropha multifida* sap was evaluated against *Staphylococcus aureus* and *MRSA* using the well-diffusion method. Different concentrations of sap were tested. Erythromycin and vancomycin were used as positive controls. The inhibition zone was measured to determine antibacterial effectiveness. Clear inhibitory activity showed against both bacteria, with stronger activity observed against *MRSA*. Based on the results, *Jatropha multifida* sap can be considered a potential natural antibacterial agent (Putri et al., 2021). The antibacterial activity of *Jatropha multifida* sap and *Artemisia annua* leaf extract was tested against clinical bacteria causing urinary tract infections using agar diffusion and broth dilution methods. MIC and MBC were determined to check effectiveness. The sap of *Jatropha multifida* showed strong bactericidal activity against most strains, while *Artemisia annua* extract showed no activity. Therefore, *Jatropha multifida* sap can be considered a natural alternative for treating urinary tract infections (Dounnon et al., 2019). The antibacterial activity of *Jatropha multifida* and *Euphorbia hirta* extracts was evaluated against pathogenic *Escherichia coli*. The disc diffusion method was performed. Ethanolic extracts of each plant and their mixture were prepared and tested. The inhibition zone was measured to determine antimicrobial effectiveness. The mixture of both plants showed the highest inhibitory activity, followed by *Euphorbia hirta*, while *Jatropha multifida* showed lower activity when used alone. Based on the results, the combined extract can be considered more effective for controlling pathogenic bacterial growth (Gerald & Alfonse, 2023).

The *in-vitro* antimicrobial activity of *Jatropha variegata* leaf and stem extracts was evaluated against pathogenic microbes. Ethanolic extracts were prepared and tested against bacteria and *Candida* species. The inhibition zone was measured to assess antimicrobial effectiveness, and MIC and MBC were determined. The leaf extract showed strong activity against *Staphylococcus aureus*, *Escherichia coli*, *Salmonella spp.*, and *Pseudomonas aeruginosa*, while the combined leaf and stem extract showed enhanced antimicrobial activity. Phytochemical screening revealed the presence of tannins, sterols, flavonoids, saponins, and terpenoids. Based on the results, *Jatropha variegata* can be considered a potential natural antimicrobial agent (Esmail et al., 2025). The antibacterial activity of *Jatropha multifida* sap and aqueous leaf extract was evaluated against hospital strains. Maceration and *in vitro* antimicrobial tests were performed. Strong bactericidal activity was observed against *Staphylococcus aureus* and *Streptococcus D*, while the leaf extract showed partial activity. Toxicity studies in Wistar rats were conducted. It confirmed that the leaf extract was safe and non-toxic (Senou et al., 2022). The antibacterial activity of *Jatropha* latex was tested against multidrug-resistant bacteria such as MRSA and carbapenem-resistant *Pseudomonas aeruginosa*. Agar well diffusion, MIC, and MBC methods were conducted. The inhibition zone was measured to assess effectiveness. All three species showed good activity, and *Jatropha multifida* showed the lowest MIC and MBC values. Phytochemical screening revealed flavonoids, indicating that *Jatropha* latex has strong potential as a natural antibacterial agent against resistant strains (Prastiyanto et al., 2020). Another study evaluated the antimicrobial activity of *Jatropha curcas* latex against pathogens isolated from burn and wound infections. Agar well diffusion and MIC methods were performed. It was compared with standard antibiotics. The latex showed strong activity against *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Candida albicans*. The highest inhibition was observed against *S. aureus*. Phytochemical analysis revealed flavonoids, tannins, alkaloids, saponins, and terpenoids. The results indicate that *Jatropha curcas* latex is an effective natural antimicrobial and may be useful for treating burn wound infections (Ali Salman Al-Shami, Mokhtar Alzomor.,2025).

The antibacterial activity of *Jatropha curcas* leaf ethanol extract and ethyl acetate fraction was evaluated against *Staphylococcus aureus*. Disc diffusion method was mainly performed. Gentamicin was used as a positive control and inhibition zones were measured. Both extracts showed strong antibacterial activity, with the ethanol extract at 100% concentration showing the highest inhibition. The study confirms that *Jatropha curcas* leaves have good potential as a natural antibacterial agent (Wulandari et al., 2021). Endophytic fungi isolated from *Jatropha multifida* were evaluated for antibacterial activity against *Staphylococcus aureus*, MRSA, and *Escherichia coli*. Agar diffusion method was performed. The solvent used is ethyl acetate extracts. The inhibition zone was measured to assess effectiveness. Two isolates, JMB4 and JMD3, showed strong activity, and were identified as *Fusarium incarnatum* and *Fusarium oxysporum*. LC-MS/MS analysis revealed equisetin as the major compound, indicating that endophytic fungi from *Jatropha multifida* have strong potential as natural antibacterial agents (Masri et al., 2025). The anti-inflammatory and analgesic activity of *Jatropha multifida* root bark methanol extract was evaluated using Wistar rats and Swiss albino mice. Carrageenan-induced paw oedema and acetic acid-induced writhing methods were conducted. Indomethacin and aspirin kept as positive controls. The extract showed significant dose-dependent activity, especially at 400 mg/kg. Phytochemical screening revealed alkaloids, tannins, saponins, glycosides, and flavonoids, indicating that *Jatropha multifida* has strong potential as a natural anti-inflammatory and analgesic agent (Falodun et al., 2013).

The anti-hyperglycemic activity of *Jatropha multifida* leaf and its hexane fraction was evaluated in high-fat diet and streptozotocin-induced diabetic rats. Ethanol is used here as a solvent. Phytochemical screening using TLC and HPTLC were performed. It showed the presence of flavonoids, phenolic acids, saponins, and alkaloids. The extract and fraction significantly reduced blood glucose levels, improved lipid profile, and restored liver function parameters. Histopathological studies of pancreas and liver also supported the results. The hexane fraction at 200 mg/kg showed the maximum effect, indicating that *Jatropha multifida* leaves have strong potential as a natural anti-diabetic agent (Tripathi et al., 2023). Jean evaluated the hemostatic effect of *Jatropha multifida* sap in normal rats and rats with coagulation disorders induced by warfarin. Superficial and deep cuts were made on them and the sap was applied locally, with saline as control. The results showed that the sap significantly reduced bleeding time in all types of wounds, both in normal and anticoagulated rats. Even in warfarin-treated rats, the sap rapidly stopped bleeding, indicating that its mechanism is independent of classical coagulation factors. The study supports the traditional use of *J. multifida* sap as a natural hemostatic agent and suggested its potential clinical application in managing haemorrhage (Jean et al.,2017). The anthelmintic activity of *Jatropha multifida* leaf aqueous extract was evaluated. *Eisenia fetida* by an *in-vitro* method was mainly performed. The extract showed significant dose-dependent activity, with the highest effect at 250 mg/ml, comparable to albendazole. Phytochemical screening revealed the presence of alkaloids,

flavonoids, tannins, glycosides, and saponins, indicating that *Jatropha multifida* has strong potential as a natural anthelmintic agent (Alif et al., 2024). The burn wound healing activity of *Jatropha multifida* leaf extract was evaluated using albino rats. (Pascua & Alcones, 2024).

The anti-influenza activity of stem extracts of *Jatropha multifida* was evaluated. MDCK cells infected with influenza A (H1N1) virus was mainly performed. Cell survival and viral inhibition were measured using MTT assay, immunofluorescence staining, and viral growth assay, with ribavirin as positive control. The water extract showed the strongest inhibition of viral infection, while the chloroform extract showed maximum inhibition of viral growth. Statistical analysis (ANOVA) confirmed significant results. Based on the findings, *Jatropha multifida* stems can be considered a potential natural source for anti-influenza drug development (Shoji et al., 2017). Dental carries characterized by the mineralisation of enamel and dentitis which caused by *Streptococcus mutans*. Disc diffusion method was followed and used Clindamycin as a positive control. the inhibition zone was measured to check the effectiveness of the extract against bacteria. ANOVA test was carried out to determine the differences between treatment groups. From the tested samples 75 and 100 percentage and strong inhibitory power and *Janotrpha multifida* can be recommended to treat dental carries (Listyaning et al, 2021).

The bactericidal and antibiofilm activity of *Jatropha multifida* stem extract was tested against MRSA. Time-kill assay and spectrophotometric methods were mainly performed. The extract showed effective bacterial killing and moderate biofilm inhibition. Hence, *Jatropha multifida* can be considered a potential topical agent for chronic wound infections (Fitria et al., 2017). The phytochemical, antimicrobial and insecticidal properties of *Jatropha* species and *Ricinus communis* were evaluated using solvent extraction methods. Disc diffusion and MIC methods were conducted to assess antibacterial activity. Insecticidal effects were tested on larvae. The results showed that *Jatropha multifida* exhibited strong antibacterial activity and concluded that these plants possess significant medicinal and biopesticide potential (Rampadarath et al., 2014). The antioxidant activity of different parts of *Jatropha curcas* such as roots, stem, leaves and nodes was evaluated . ethanol is used as a solvent. DPPH assay was conducted to determine free radical scavenging activity, and the results showed that roots and stem exhibited the highest antioxidant potential, while nodes showed the least. The presence of phenolic compounds like gallic acid and tannins was confirmed using HPLC and MS analysis. (El Diwani et al., 2009). The phytochemical content and antimicrobial activity of *Jatropha gossypifolia* leaves were evaluated using different solvent extracts. Disc diffusion method was carried out. Tetracycline was taken as positive control. The inhibition zone was measured to assess antibacterial activity against *Escherichia coli* and *Bacillus subtilis*. The results showed the presence of compounds like flavonoids, tannins, saponins and terpenoids, and benzene extract exhibited strong antibacterial activity. (Seth et al., 2010).

II. CONCLUSION

In overall, many findings showed that *Jatropha multifida* is the medicinal plant with antibacterial and antioxidants properties against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Bacillus subtilis*. Different parts of plant such as leaves, stem, roots have shown effective results by conducting disc diffusion, agar well diffusion and in broth dilution method. Phytochemicals such as flavonoids, tannins, and polyphenols contributes to its antimicrobial, antioxidant, anti-inflammatory, and wound healing properties. Many studies confirmed both bacteriostatic and bactericidal effects, even against resistant strains like MRSA. The plant also showed larvicidal, anti-diabetic, antiviral, and haemostatic effects.

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Volume 15, Issue 3, March 2026**|DOI: 10.15680/IJRSET.2026.1503409|**

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