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Review

Abutilon crispum (L.) Medik: An Overlooked Medicinal Plant with Multifaceted Pharmacological Applications – A Review

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	Abstract
Published on: 18 July 2025	Medicinal plants have played a vital role in the development of traditional healing practices, particularly within Ayurvedic and ethnobotanical systems. <i>Abutilon crispum</i> (L.) Medik., a lesser-known member of the Malvaceae family, has been traditionally used for managing inflammation, metabolic disorders, and various other ailments. However, scientific evaluation of this species remains limited compared to its widely studied relatives such as <i>Abutilon indicum</i>. This review consolidates and critically analyzes the existing literature on the ethnomedicinal relevance, phytochemistry, and pharmacological potential of <i>Abutilon crispum</i>. Phytochemical investigations reveal that <i>Abutilon crispum</i> contains diverse bioactive constituents, including flavonoids (tiliroside, lespedin), sterol glycosides, fatty acids, and unique cyclopropene derivatives, many of which have demonstrated biological relevance in preliminary studies. Experimental evidence highlights the plant's antioxidant, anti-inflammatory, antidiabetic, hepatoprotective, antimicrobial, antitumor, and gastroprotective properties. In vivo studies report significant pharmacological benefits of <i>Abutilon crispum</i> extracts, particularly in models of oxidative stress, inflammation, and metabolic disorders, with minimal observed toxicity. This review provides an updated scientific perspective on <i>Abutilon crispum</i>, advocating for expanded research to validate its traditional claims, explore its pharmacological mechanisms, and assess its potential as a natural source for drug discovery.
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	Keywords: <i>Abutilon crispum</i> , Phytochemistry, Traditional medicine, Biological activity, Antioxidant, Anti-inflammatory.

INTRODUCTION

For centuries, traditional medicinal systems like Ayurveda have played a crucial role in promoting health and managing diseases through natural remedies. Rooted in ancient Indian knowledge, Ayurveda emphasizes the balance between body, mind, and environment, often relying on plant-based interventions to restore health and prevent illness. Even today, medicinal plants form the cornerstone of Ayurvedic formulations, celebrated not only for their therapeutic potential but also for their minimal side effects compared to synthetic drugs [1]. In recent decades, the global health community has witnessed a renewed interest in medicinal plants as viable alternatives

or complementary options to conventional pharmaceuticals. The limitations of modern drugs ranging from adverse effects to high production costs have driven researchers and clinicians to explore nature-derived bioactive compounds. This resurgence aligns with a growing preference for natural, sustainable healthcare solutions among populations worldwide [2]. Moreover, the commercial value of medicinal plants has surged significantly, with the global herbal medicine market expanding both in scope and economic scale. According to recent estimates, the global trade of medicinal plants and herbal products generates billions of dollars annually, underscoring their increasing demand in the pharmaceutical, nutraceutical, and cosmetic industries. This global market not only highlights the therapeutic relevance of plant-based treatments but also reflects the vast biodiversity yet to be fully explored for potential health benefits [3].

The medicinal relevance of *Abutilon crispum* is deeply rooted in traditional knowledge systems, particularly those documented in ancient Indian and ethnobotanical literature. Belonging to the Malvaceae family, *Abutilon crispum* is recognized in Ayurveda and various regional folk medicine practices for its therapeutic properties [4]. Classical Ayurvedic texts and local traditional manuscripts have referred to species of *Abutilon*, for their ability to treat conditions such as inflammation, wounds, respiratory disorders, and digestive ailments [5]. Although *Abutilon indicum* is more widely cited, related species like *Abutilon crispum* have been traditionally utilized for similar purposes, especially in rural and tribal communities where ethnomedicinal practices have been passed down orally [6]. Historical accounts and ethnobotanical surveys from regions of India, Sri Lanka, and parts of Southeast Asia indicate the use of *A. crispum* leaves, roots, and flowers in treating ailments like fever, skin infections, and urinary disorders [7]. Such traditional references highlight the importance of scientifically exploring *Abutilon crispum*, to validate and understand its medicinal potential as suggested by ancient healing systems.

Within this broader context, species like *Abutilon crispum* traditionally valued in ethnomedicine warrant scientific attention for their pharmacological potential. Despite its historical use in various indigenous systems, comprehensive scientific documentation on *Abutilon crispum* remains limited. This review aims to consolidate existing knowledge on the medicinal significance, phytochemical composition, and therapeutic prospects of *Abutilon crispum*, while also identifying research gaps. By providing an evidence-based overview, this article will serve as a valuable resource for researchers exploring novel bioactive compounds, pharmaceutical industries interested in plant-based drug development, and practitioners of traditional medicine seeking to integrate scientifically validated herbs into therapeutic practice. Furthermore, it highlights the relevance of *Abutilon crispum* within the global movement towards natural, sustainable healthcare solutions.

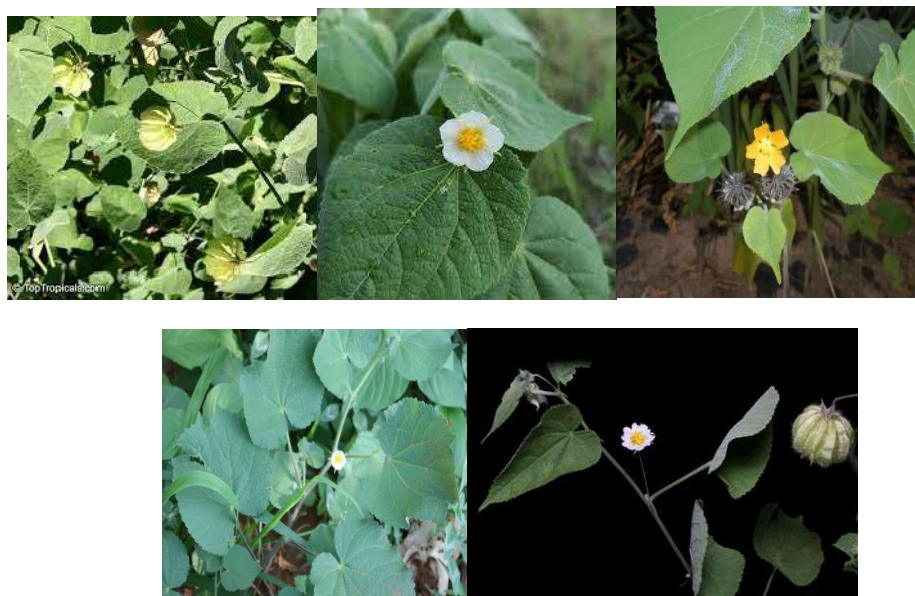


Fig 1: *Abutilon crispum* (L.) Medik plant

Taxonomical classification [7]

Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids

Order: Malvales
Family: Malvaceae
Subfamily: Malvoideae
Tribe: Malveae
Genus: Abutilon
Species: *Herissantia crispa* (L.) Medik

Morphology

Plant Part	Description
Habit	Herb or shrub with slender, prostrate to ascending stems; occasionally erect; up to 1.2 m in length.
Stem	Hirsute-velutinous; simple and sparsely stellate-puberulous hairs.
Leaves	Ovate, deeply cordate at base, long-acuminate at apex; lower leaves long-petiolate, upper leaves sessile and amplexicaul; margins crenulate to serrate; upper surface stellate-puberulous, lower surface stellate-tomentellous.
Flowers	Axillary, solitary; pedicels elongate, slender, and articulated.
Calyx	Campanulate, 5.5 mm long, stellate-tomentellous lobes.
Petals	White, obovate-cuneate, 6-7 mm long.
Androecium	4-5 mm long; membranous staminal tube with reniform anthers.
Fruit	Depressed-globose, 10-18 mm in diameter; contains 10 reniform mericarps, each inflated, thin-chartaceous, and setose.
Seeds	Cordiform-subglobose, 1.5-1.8 mm in size; finely alveolate and minutely puberulous [8, 9].

Synonyms

Synonym [10, 11]	Authority
<i>Herissantia crispa</i>	(L.) Brizicky
<i>Abutilon hirtum</i>	(Lam.) Sweet
<i>Sida crispa</i>	L.
<i>Malva crispa</i>	(L.) E.H.L.Krause
<i>Herissantia crispa</i> var. <i>crispa</i>	(L.) Brizicky
<i>Sida hirsuta</i>	Kunth
<i>Abutilon hirsutum</i>	(Lam.) G. Don
<i>Herissantia hirsuta</i>	(Lam.) Brizicky

Phytochemicals constituents

Compound	Category	Notes / First Reported
<i>Sitosterol 3-O-β-D-glucopyranoside</i>	Sterol glycoside	Isolated from MeOH extract
<i>Stigmasterol 3-O-β-D-glucopyranoside</i>	Sterol glycoside	Isolated from MeOH extract
<i>β-Sitosterol</i>	Phytosterol	Identified in extract
<i>Kaempferol</i> (3,5,7,4'-tetrahydroxyflavone)	Flavonoid	First reported in <i>Herissantia crispa</i>
<i>Quercetin</i> (3,5,7,3',4'-pentahydroxyflavone)	Flavonoid	First reported in <i>Herissantia crispa</i>
<i>Kaempferol 3-O-β-D-(6''-E-p-coumaroyl) glucopyranoside</i> (Tiliroside)	Flavonoid glycoside	Isolated from <i>Herissantia crispa</i>
<i>kaempferol 3,7-di-O-α-L-rhamnoside</i> (dhiramnoside)	Flavonoid glycoside	Isolated from <i>Herissantia crispa</i>
<i>kaempferol 3,7-di-O-α-L-rhamnopyranoside</i> (lespedin)	Flavonoid glycoside	Isolated from <i>Herissantia crispa</i>
<i>Myristic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Palmitic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>

<i>Stearic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Oleic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Linoleic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Arachidic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Malvalic ether</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Sterculic ether</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Dihydrosterculic acid</i>	Fatty acid	Identified in <i>Abutilon crispum</i>
<i>Epoxy derivatives</i>	Fatty acid	Identified in <i>Abutilon crispum</i>

Pharmacological activities of *Abutilon crispum*

Anti-tumor activity

Phytochemical investigations of *Herissantia crispa* have led to the isolation of several flavonoid and sterol glycosides with potential anticancer properties. Among these, kaempferol derivatives tiliroside [kaempferol 3-O-(6"-O-E-p-coumaroyl)- β -D-glucopyranoside] and dhiramnside [kaempferol 3,7-di-O- α -L-rhamnoside] as well as a mixture of sitosteryl and stigmasteryl glucosides (GM) were evaluated for cytotoxic and antitumoral effects. In vitro assays revealed that none of these compounds exhibited cytotoxicity against NCI-H292, HEP-2, or KB cell lines, suggesting selective biological action [13]. However, in vivo studies demonstrated that tiliroside and the GM mixture significantly inhibited tumor growth, particularly in sarcoma 180 models, while dhiramnside showed no notable antitumor effect. Notably, tiliroside exhibited potent growth inhibition of Ehrlich carcinoma, highlighting its therapeutic potential. Importantly, these antitumoral effects occurred without significant toxicity, suggesting that *H. crispum*-derived tiliroside represents a promising lead for safe, plant-based anticancer strategies [13]. Further mechanistic and clinical studies are warranted to validate these preliminary findings.

Anti-inflammatory and antinociceptive activity

The therapeutic relevance of *Herissantia crispa* (syn. *Abutilon crispum*) continues to gain scientific attention, particularly regarding its anti-inflammatory and antinociceptive potential. The ethanol extract of *Herissantia crispa* (EEHc) demonstrated significant peripheral antinociceptive activity in animal models. In the hot plate test, EEHc at all doses did not alter response latency up to 120 minutes, indicating minimal central analgesic action. However, in the acetic acid-induced writhing test, EEHc significantly reduced contortions at 250 mg/kg (1.22 ± 0.57), 500 mg/kg (2.2 ± 0.87), and 750 mg/kg (3.6 ± 1.42) compared to the control group (17.78 ± 1.84), confirming peripheral antinociception. Similarly, EEHc reduced paw-licking time in the formalin test, with the 750 mg/kg dose showing the most pronounced effect: 54.33 ± 4.95 seconds (phase 1) and 13.5 ± 10.68 seconds (phase 2), compared to control values of 95.3 ± 5.32 and 222.8 ± 23.39 seconds, respectively. Naloxone pretreatment failed to reverse these effects, suggesting the antinociceptive action of EEHc is not mediated via opioid pathways but may involve anti-inflammatory or alternative peripheral mechanisms [14].

On the other hand ethyl acetate fraction of *H. crispum* (FAEHc) have provided compelling evidence supporting its traditional use in inflammatory and pain-related conditions. The edema inhibition was most prominent at a dose of 500 mg/kg, where FAEHc reduced paw edema by 60% at the second hour and maintained a reduction of over 54% through the third hour. Even after 24 hours, FAEHc exhibited sustained antiedematogenic effects, with 500 mg/kg producing 71.4% inhibition of edema, surpassing the 50% reduction achieved by dexamethasone a standard corticosteroid anti-inflammatory agent—under the same conditions. Interestingly, the anti-inflammatory effects of FAEHc at higher doses (750 mg/kg) plateaued, showing similar or slightly reduced efficacy compared to the 500 mg/kg dose, suggesting a saturation effect or possible biphasic response at escalated concentrations.

In addition to its anti-inflammatory activity, FAEHc displayed potent antinociceptive properties, as evidenced by the formalin-induced paw licking test. At 750 mg/kg, FAEHc reduced paw-licking time by 84%, indicating a substantial decrease in nociceptive behavior. This analgesic effect was particularly notable given that the second phase of the formalin test is associated with inflammatory pain, implying that FAEHc may modulate both peripheral inflammation and central pain processing [15]. In a controlled animal study, aqueous leaf extract of *A. crispum*, prepared through decoction a method consistent with traditional preparation practices demonstrated significant anti-inflammatory activity in the carrageenan-induced paw edema model. This model is a well-established standard for evaluating acute inflammation, characterized by the biphasic release of inflammatory

mediators such as histamine, serotonin, kinins, and prostaglandins. The results showed a clear dose-dependent inhibition of paw edema, with the aqueous extract providing 62.03% inhibition at 100 mg/kg and a substantial 89.12% inhibition at 200 mg/kg after 6 hours. Notably, the higher dose exhibited comparable efficacy to the standard anti-inflammatory drug, Indomethacin, which achieved 89.40% inhibition under the same experimental conditions. These findings suggest that *A. crispum* possesses potent anti-inflammatory properties that may rival conventional NSAIDs at suitable doses. Moreover, acute toxicity assessments indicated that the aqueous extract did not induce mortality or severe adverse effects, even after 72 hours of observation. While increased urination and marked analgesia were noted, these effects may reflect secondary pharmacological properties of the extract rather than toxicity, further underscoring its relative safety at the tested dose levels. The observed anti-inflammatory effects of *A. crispum* are consistent with the reported presence of bioactive phytochemicals such as flavonoids, sterols, and phenolic compounds in the species, which have been widely implicated in modulating inflammatory pathways, particularly through inhibition of cyclooxygenase (COX) enzymes, reduction of prostaglandin synthesis, and antioxidant mechanisms [16].

In a comprehensive in vitro study, the methanol extract of *Abutilon crispum* (Ac-ME) demonstrated a notable inhibitory effect on inflammation-associated mediators without inducing cytotoxicity, reinforcing its therapeutic safety profile. The extract effectively suppressed nitric oxide (NO) production in RAW264.7 macrophages stimulated with lipopolysaccharide (LPS) and Pam3CSK4, both well-established inflammatory triggers. This finding aligns with traditional uses, given that excessive NO production is a hallmark of inflammatory responses, contributing to oxidative stress and tissue damage. Further, Ac-ME was found to downregulate the gene expression of inducible nitric oxide synthase (iNOS) and pro-inflammatory cytokines, including interleukin (IL)-1 β and IL-6, which are central to the amplification of inflammation and immune response. These molecular alterations suggest that *A. crispum* exerts a multi-targeted modulation of inflammatory cascades rather than a single pathway effect. Mechanistically, Ac-ME inhibited the activation of the nuclear factor kappa-light-chain-enhancer of activated B cells (NF- κ B) pathway, a pivotal transcriptional regulator of inflammation. This was demonstrated by luciferase reporter assays showing decreased NF- κ B transcriptional activity under conditions of MyD88 and TRIF overexpression—two key adaptors in Toll-like receptor (TLR) signaling. In addition, immunoblotting results indicated that Ac-ME reduced the phosphorylation of upstream regulators, including I κ B α , IKK α / β , and p85, the latter being a regulatory subunit of phosphatidylinositol 3-kinase (PI3K) [17].

Anti-oxidant activity

Oxidative stress plays a critical role in the pathogenesis of diabetes and its complications, thus highlighting the need for agents capable of targeting both hyperglycemia and oxidative imbalance. The antioxidant potential of *Herissantia crispa*, a member of the Malvaceae family, has been investigated using standard assays including DPPH radical scavenging, total phenolic content, and Trolox equivalent antioxidant capacity (TEAC). Among the different fractions tested, the ethyl acetate phase (EaF) of *H. crispa* exhibited the strongest antioxidant activity, consistent with its higher polyphenolic content. Interestingly, although total phenolic levels generally correlate with antioxidant activity in other Malvaceae species, such as *Sidastrum micranthum*, this correlation was less evident in *H. crispa*, suggesting the role of specific compounds over total phenolics. Further phytochemical analysis identified two key flavonoids: lespedin (kaempferol 3,7-di-O- α -L-rhamnopyranoside) and tiliroside (kaempferol 3-O- β -D-(6"-E-p-coumaroyl) glucopyranoside). Lespedin displayed weak antioxidant activity (IC₅₀ for DPPH: 1,019.92 $\pm$ 68.99 mg/mL; TEAC: 52.70 $\pm$ 0.47 mg/mL), indicating it is unlikely to contribute significantly to the observed effects. In contrast, tiliroside, isolated from *H. crispa*, demonstrated potent antioxidant activity with a low IC₅₀ value of 1.63 $\pm$ 0.86 mg/mL in the TEAC assay, comparable to ascorbic acid. These findings highlight the role of tiliroside as a major contributor to the antioxidant potential of *H. crispa*, supporting its traditional use in oxidative stress-related conditions [18].

The ethanolic leaf extract of *A. crispum* also demonstrated notable free radical scavenging activity in standard in vitro assays, including hydroxyl, DPPH, and nitric oxide radical scavenging tests. The observed concentration-dependent increase in radical scavenging suggests the presence of bioactive compounds with substantial antioxidant potential. This aligns with the known phytochemical profile of *Abutilon crispum*, which includes flavonoids, glycosides, and phenolic compounds—phytoconstituents widely recognized for their antioxidant activities [19].

Anti-diabetic activity

In addition to antioxidant activity, *Abutilon crispum* showed promising antidiabetic effects in streptozotocin (STZ)-induced diabetic Wistar rats, a well-established experimental model for evaluating potential antihyperglycemic agents. Oral administration of *Abutilon crispum* extract at 200 mg/kg and 400 mg/kg doses over 28 days resulted in a significant, dose-dependent reduction in blood glucose levels, with the higher dose exhibiting effects comparable to the standard drug, glibenclamide. These findings indicate that *Abutilon crispum* not only lowers hyperglycemia but may also modulate glucose homeostasis in diabetic conditions. Furthermore,

biochemical analyses revealed improvements in hepatic function following *Abutilon crispum* treatment, evidenced by reduced serum levels of SGOT, SGPT, and alkaline phosphatase markers typically elevated in diabetic-induced liver dysfunction. The extract also mitigated oxidative stress markers by decreasing lipid peroxidation and enhancing the activity of endogenous antioxidant enzymes, such as catalase and glutathione peroxidase [19].

Emerging experimental evidence highlights the efficacy of methanol extracts from the whole plant of *Abutilon crispum* in controlling hyperglycemia, particularly in streptozotocin (STZ)-induced diabetic models. STZ-induced diabetes is widely employed to mimic the pathological features of insulin-dependent diabetes mellitus by causing selective destruction of pancreatic β -cells. In this context, the significant reduction in blood glucose levels observed with *Abutilon crispum* extract at doses of 250 mg/kg and 500 mg/kg body weight suggests the presence of bioactive compounds with hypoglycemic potential. The improvement in oral glucose tolerance (OGTT) further indicates that *Abutilon crispum* may influence glucose uptake or insulin action, although the precise mechanisms remain to be elucidated. Such effects are consistent with the reported pharmacological actions of known phytoconstituents isolated from *Abutilon crispum*, including flavonoids like kaempferol, quercetin, and glycosidic sterols such as β -sitosterol and stigmasterol derivatives. These compounds have been associated with antidiabetic mechanisms in other plant species, acting through pathways involving insulin sensitization, antioxidant defense, or inhibition of carbohydrate-hydrolyzing enzymes [20].

Hepatoprotective activity

The hepatoprotective potential of *Abutilon crispum* has recently been explored to substantiate its traditional use in liver-related disorders. Hepatic damage, often induced experimentally by hepatotoxins such as carbon tetrachloride (CCl₄), results in elevated levels of serum biomarkers including serum glutamic-oxaloacetic transaminase (SGOT), serum glutamic-pyruvate transaminase (SGPT), alkaline phosphatase (ALP), and bilirubin—widely recognized indicators of liver injury. In a comparative study, administration of *Abutilon crispum* aqueous leaf extract significantly attenuated the rise in these liver enzymes in rats exposed to CCl₄. The enzyme levels in untreated CCl₄-induced groups were markedly elevated, reflecting severe hepatic insult. However, treatment with *Abutilon crispum* extract at both tested doses (100 mg/kg and 200 mg/kg) resulted in a statistically significant ($p < 0.05$) reduction in these elevated enzyme levels, indicating a hepatoprotective effect. Interestingly, the hepatoprotective activity of *Abutilon crispum* extract demonstrated a dose-dependent trend, with the higher dose (200 mg/kg) showing greater efficacy, though the increase in activity was not directly proportional. This pattern suggests that while the extract offers protective benefits at multiple dose levels, there may be a saturation point or involvement of complex pharmacodynamic interactions that moderate the extent of hepatoprotection at escalating doses [21].

Anti-microbial and anti-diarrheal activity

The methanolic extract of *Herissantia crispa* (EMeOH), rich in flavonoids, has demonstrated multiple pharmacological properties with promising therapeutic relevance. Acute toxicity assessments revealed that EMeOH at high oral (5,000 mg/kg) and intraperitoneal (2,000 mg/kg) doses produced no significant alterations in behavior or mortality in mice, suggesting a favorable safety profile. Antimicrobial evaluations showed that EMeOH effectively inhibited the growth of several pathogenic bacteria, including *Escherichia coli*, *Listeria monocytogenes*, *Yersinia enterocolitica*, *Shigella sonnei*, *Shigella exineri*, and *Salmonella* spp., supporting its ethnobotanical use for gastrointestinal infections. Further, EMeOH exhibited notable anti-diarrheal activity at 750 mg/kg and significantly reduced gastric lesions induced by acidified ethanol in mice at doses of 250, 500, and 750 mg/kg. These findings highlight the extract's anti-ulcerogenic potential, likely mediated by mucosal protection or modulation of inflammatory pathways [22].

Toxicity studies

Abutilon crispum has been traditionally used for its anti-inflammatory and antidiabetic properties, scientific data on its toxicological profile have remained limited. However, recent investigations have provided encouraging insights into the safety of this species, specifically regarding its acute and chronic toxicity. In controlled experimental models, methanol extracts of *Abutilon crispum* whole plant were assessed for both acute and sub-chronic toxicity in rats. A single oral dose of 2000 mg/kg body weight was administered during the acute toxicity study, with no mortality or observable signs of toxicity recorded over a 14-day monitoring period. These findings suggest a high margin of safety for *Abutilon crispum*, exceeding the conventional threshold that categorizes substances with an LD₅₀ above 2000 mg/kg as practically non-toxic. Furthermore, chronic toxicity studies involving daily oral administration of *Abutilon crispum* methanol extract at doses of 250, 500, and 1000 mg/kg body weight for 90 consecutive days revealed no significant adverse effects on general health indicators. Parameters such as body weight progression, hematological profiles, and key biochemical markers remained within normal physiological ranges, indicating that prolonged exposure to the extract does not compromise systemic homeostasis. Importantly, histopathological evaluations of vital organs, including the liver and kidneys, revealed normal tissue architecture, further supporting the non-toxic nature of *Abutilon crispum* even at higher

doses during chronic exposure. Given the central role of hepatic and renal systems in detoxification and excretion, the absence of morphological damage to these organs reinforces the plant's safety profile [23].

CONCLUSION

The resurgence of interest in medicinal plants for therapeutic development is a reflection of the global shift towards safer, affordable, and culturally accepted alternatives to synthetic drugs. *Abutilon crispum* (syn. *Herissantia crispa*), belonging to the family Malvaceae, stands as a promising yet underexplored species within this domain. Traditionally used in various folk systems, particularly in Indian and South American ethnomedicine, this plant has been reported to possess diverse pharmacological properties, substantiated by both preliminary scientific investigations and phytochemical evidence. A significant body of research highlights the rich secondary metabolite profile of *Abutilon crispum*, which includes fatty acids, flavonoids, sterol glycosides, and cyclopropene derivatives. Compounds such as tiliroside, lespedin, quercetin, and kaempferol derivatives, along with fatty acids like linoleic, oleic, and sterculic acids, contribute to its biological activities. Importantly, these bioactive constituents are known for their antioxidant, anti-inflammatory, antimicrobial, hepatoprotective, antidiabetic, antitumor, and gastroprotective properties, providing scientific rationale for its traditional uses. Despite these encouraging findings, comprehensive research gaps persist. There is a need for advanced pharmacokinetic studies, isolation of novel bioactive compounds, in-depth mechanistic investigations, and well-designed clinical trials to validate these preliminary results. Furthermore, differentiating *Abutilon crispum* from its close relative *Abutilon indicum*, which dominates commercial formulations, is crucial for species-specific therapeutic development. In conclusion, *Abutilon crispum* emerges as a promising medicinal plant with diverse pharmacological potential. Future research should aim to bridge the existing gaps, translating traditional knowledge into scientifically validated, safe, and effective plant-based interventions for modern healthcare challenges.

REFERENCES

1. Semwal DK, Chauhan A, Kumar A, Aswal S, Semwal RB, Kumar A. Status of Indian medicinal plants in the International Union for Conservation of Nature and the future of Ayurvedic drugs: Shouldn't think about Ayurvedic fundamentals?. *Journal of integrative medicine*. 2019 Jul 1;17(4):238-43.
2. Pirintsos S, Panagiotopoulos A, Bariotakis M, Daskalakis V, Lionis C, Sourvinos G, Karakasilis I, Kampa M, Castanas E. From traditional ethnopharmacology to modern natural drug discovery: A methodology discussion and specific examples. *Molecules*. 2022 Jun 24;27(13):4060.
3. Vasisht K, Sharma N, Karan M. Current perspective in the international trade of medicinal plants material: an update. *Current pharmaceutical design*. 2016 Aug 1;22(27):4288-336.
4. Abat JK, Kumar S, Mohanty A. Ethnomedicinal, phytochemical and ethnopharmacological aspects of four medicinal plants of Malvaceae used in Indian traditional medicines: A review. *Medicines*. 2017 Oct 18;4(4):75.
5. Khadabadi SS, Bhajipale NS. A review on some important medicinal plants of *Abutilon* spp.
6. Sekhar PC, Kumar YV, Grace JR, Kumar OA, Murty PP. Some ethno medicinal plants used for the treatment of piles by the kondadora tribe of Northern Andhra Pradesh, AP, India 803-809.
7. Thiruvengkatasubramaniam R, Sangameswaran B, Visan M, Vinothkumar S, Yogesh M. A Review on Pharmacological Activities of *Abutilon crispum* (Linn). *International Journal of Scientific Research and Technology*. 2025 Mar 3.
8. WFO (2025): *Abutilon crispum* (L.) Medik. Published on the Internet; <http://www.worldfloraonline.org/taxon/wfo-0000511832>. Accessed on: 26 Mar 2025
9. Sankara Rao, K., Raja K Swamy, Deepak Kumar, Arun Singh R. and K. Gopalakrishna Bhat (2019). Flora of Peninsular India. [http://peninsula.ces.iisc.ac.in/plants.php?name=Abutilon crispum](http://peninsula.ces.iisc.ac.in/plants.php?name=Abutilon%20crispum). Downloaded on 26 March 2025
10. India Biodiversity Portal. (n.d.). *Abutilon crispum* (L.) Medik. Retrieved June 25, 2025, from <https://indiabiodiversity.org/species/show/263539>
11. India Flora - Centre for Ecological Sciences, IISc. (n.d.). *Abutilon crispum* (L.) Medik. Retrieved June 25, 2025, from <https://indiaflora-ces.iisc.ac.in/FloraPeninsular/herbsheet.php?id=5589&cat=7>
12. Rao KS, Lakshminarayana G. Characteristics and composition of six malvaceae seeds and the oils. *Journal of the American Oil Chemists' Society*. 1984 Aug;61(8):1345-6.
13. Carvalho PR, Aguiar JS, Matias WN, Gomes RA, Teles YC, Souza MD, Medeiros PL, Silva EC, Silva TG, Carneiro do Nascimento S. In vitro and in vivo antitumor effects of the flavonol glycosides isolated of *Herissantia crispa* (L.) Brizicky. *Latin American Journal of Pharmacy*. 2011;30.
14. Pereira CK, Oliveira AM, Penha AR, Teles YC, Matias WN, Souza MF, Almeida RN, Assis TS. Antinociceptive effect of the ethanol crude extract of *Herissantia crispa* (L.) Brizicky. *J Med Plants Res*. 2012 Dec 10;6(47):5813-8

15. Souto Pereira CK, De Farias Nóbrega FF, Da Fonsêca DV, Da Silva Stiebbe Salvadori MG, Fernandes Oliveira AM, Soares Penha AR, Matias WN, De Souza MD, De Almeida RN, De Assis TS. Anti-inflammatory activity and participation of the glutamatergic system on the antinociceptive activity of ethyl acetate phase of *Herissantia crispa* (L.) Brizicky. InBMC Proceedings 2014 Oct (Vol. 8, pp. 1-1). BioMed Central.
16. Mohan R, Ganapaty S. Anti-inflammatory and toxicity studies of the leaves of *Abutilon crispum*. International Journal for Pharmaceutical Research Scholars. 2015;4:108-11.
17. Hunto ST, Shin KK, Kim HG, Park SH, Oh J, Sung GH, Hossain MA, Rho HS, Lee J, Kim JH, Cho JY. Phosphatidylinositol 3-Kinase Contributes to the Anti-Inflammatory Effect of *Abutilon crispum* L. Medik Methanol Extract. Evidence-Based Complementary and Alternative Medicine. 2018;2018(1):1935902.
18. de Oliveira AM, Pinheiro LS, Pereira CK, Matias WN, Gomes RA, Chaves OS, de Souza MD, de Almeida RN, de Assis TS. Total phenolic content and antioxidant activity of some Malvaceae family species. Antioxidants. 2012 Oct 26;1(1):33-43.
19. S.Rajasekar, R.Thiruvengkatasubramaniam, B.Sangameswaran, & S.Kannan. (2024). Pharmacognostical, preliminary phytochemical and in vivo anti diabetic activity and biochemical parameters of *Abutilon crispum*. *International Journal of Research in Pharmacology & Pharmacotherapeutics*, 13(4), 522-535
20. Manjeera K, Sundararajan R. Evaluation of Antidiabetic Activity of *Abutilon crispum* on Normal and Streptozotocin-induced Diabetic Albino Wistar Rats. Journal of Pharmacology and Pharmacotherapeutics. 2025 Mar 1:0976500X241287041.
21. Mohan MR, Reddy KS, Ganapaty S. Hepatoprotective activity of the leaves of *Abutilon crispum* (Linn) Medicus 774-779.
22. Lima IO, Costa VB, Matias WN, Costa DA, Antas e Silva D, Agra MD, Souza MD, Lima ED, Batista LM. Biological activity of *Herissantia crispa* (L.) Brizicky. Revista Brasileira de Farmacognosia. 2009;19:249-54
23. Manjeera K, Sundararajan R. Toxicity Studies of *Abutilon crispum* and *Indigofera prostrata* Whole Plants on Wistar Rats. Tropical Journal of Natural Product Research. 2024 Nov 1;8(11).