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A Systematic Review on Ethnobotany and Bioactive Compounds of the Genus *Ipomoea* (Convolvulaceae)

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Abstract

This systematic review focuses on the therapeutic properties of the *Ipomoea* genus by examining its bioactive components and ethnobotanical uses. The review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The project compiles indigenous information from many regions worldwide regarding the medicinal uses of *Ipomoea* species, serving as a basis for future research and the advancement of pharmaceutical endeavors. Among the 4297 studies identified in the study, only 152 met the criteria for inclusion. The species that was most commonly employed was *Ipomoea batatas* (L.) Lam; it was utilized for the treatment of diabetes, along with other medical ailments. The genus encompasses a diverse array of ailments, including cancer, diabetes, dermatological disorders, and gastrointestinal disorders. *Ipomoea* species possess bioactive compounds that have anti-inflammatory, antibacterial, antioxidant, and anticancer properties. Further investigation is necessary to scientifically validate the medicinal capabilities of these plants and their bioactive constituents. This study should encompass clinical trials and complete pharmacological assessments while also upholding appropriate consumption practices and respecting indigenous knowledge.

Keywords: *Systematic Review, Ethnomedicine, PRISMA, Ipomoea, Bioactive Compounds*

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1. Introduction

Recent ethnobotanical research has risen worldwide, notably in Europe, Asia, and. Plants were eaten, and certain wild-grown plants were utilized as medicine, whether the fruit, leaf, or plant itself. Medicinal plants have been used to cure many diseases since ancient times, making them essential to indigenous treatment. Traditional medicinal herbs are still used by 70–80% of the world for primary healthcare due to their efficacy and cultural preferences. Studies show that medicinal plants include a variety of chemicals that cure chronic and infectious disorders. (1-3)

Ipomoea contains lianas, trees, shrubs, and herbs of the Convolvulaceae family. It is distributed worldwide in tropical and subtropical regions, from semi-desert coastal habitats to tropical rain forests, from sea level to 4,000 meters, and in diverse temperate zones. Morning glory is essential in food crop cultivation and medicinal worldwide. The *Ipomoea batatas* (L.) Lam, or sweet potato, is a versatile, delicious, and nutritious crop. Its

anticancer, antidiabetic, and anti-inflammatory qualities make it an important medicinal plant. The Vanraji tribes of the Kumaun Himalayas of India treat venereal illnesses like syphilis with a paste produced from the whole *Ipomoea purpurea* (L.) Roth plant. (4-6)

These plants have several medicinal secondary metabolites and essential oils. Several *Ipomoea* plants can provide phytochemicals for drug development due to their significant secondary metabolite content. Many unusual structures await exploration, and some may be useful in medicine. (7-8)

Many conventional medicinal plants have been employed as source materials in biopharmaceuticals and biocosmetics in recent years. The increasing global illness burden and rising antibiotic resistance create public health concerns and highlight the need for alternative medications, notably natural ones. Traditional medicine remains a cost-effective and accessible treatment for many illnesses and diseases in indigenous communities worldwide, sparking interest in using medicinal plants to create new medications for an expanding population. (9-10)

Analyzing the genus *Ipomoea* and emphasizing ethnomedicinal uses and bioactive ingredients helps understand therapeutic benefits and safety. This comprehensive review provides valuable insights into the global traditional knowledge of *Ipomoea* therapeutic applications and ethnopharmacology to guide future study and medication development.

2. Materials and Methods

2.1 Search Strategy

The literature search was performed using the following databases: PubMed, Science Direct, and Google Scholar over the period from the beginning of the databases until March 2024. The following descriptors were used in the search: "*Ipomoea*," "Ethnobotanical," "Medicinal," "Herbal," and "Compound". We excluded conference papers, books, letters, news, protocols, pre-prints, literature reviews, & systematic reviews. The Search Strategy that was used in the study were summarized in Table 1.

2.2 Study Screening and Selection

Results were independently reviewed based on its titles and abstracts of the studies, followed by retrieving full-text articles for all eligible studies. Any irrelevant articles will be excluded, and the reasons for their exclusion will be recorded. From each included study, the researcher will gather data including the first author, publication year, plant species, plant part used, method of preparation and application, medicinal uses, and country of the indigenous group. The eligibility criteria are summarized in Table 2.

2.3 Data Extraction

All of the results from the search query from different databases were then imported to the Zotero Software as this tool helps collect, organize, cite authors, and also share those obtained resources efficiently. (11)

Following the collection of the scientific names for the plants, Plants of the World Online was utilized to convert each name into its accepted name. This is because accepted names are used by scientists as a universal means of avoiding misunderstanding and as reliable identifiers in databases, making it easier to locate and examine data about particular organisms. (12) After using the Zotero Software, all of the included articles were then transferred to Microsoft Excel for tabulation and data management.

3. Results & Discussion

A total of 4297 studies were collected from the specified databases. Out of these, 1120 papers were eliminated as they were duplicates, 2700 studies were discarded because they were not relevant to the study, 45 studies were not accessible, and finally, 262 studies did not match the inclusion requirements. In all, we received 152 distinct papers that fit the criteria for inclusion (Figure 1.). A total of 37 nations have been discovered as having a record of employing the plant from the genus *Ipomoea* for medicinal purposes, as shown in Table 3. India stands out as the most prominent country, with a total of 27 article citations. Due to the fact that most of India's unique tribes are primarily engaged in agriculture and possess a significant amount of indigenous traditional knowledge, the country is a desirable destination for anthropologists and ethnobotanists. As a result, numerous research papers and a few books have been published on this subject. (13) Other significant nations are Nigeria, (10) South Africa, (7) Brazil, (5) Indonesia, (5) and Uganda, (5) Bangladesh, Pakistan, the Philippines, and Mexico, each with a score of 4.

Table 1. Search Strategy

Database	Search Query
Science Direct	(*Ipomoea*) and (Ethnobotanical OR Medicinal OR Herbal) and (Compounds)
1787 Articles	
Google Scholar	ethnobot*, OR screening, OR medicinal, OR compound, OR Herbal, "*Ipomoea*"
2290 Articles	
PubMed	((Ethnobot*[Title/Abstract])) OR (medicinal[Title/Abstract])) OR
218 Articles	(compound[Title/Abstract]) OR (Herbal[Title/Abstract]) AND (*Ipomoea*))

Table 2. Eligibility Criteria

Inclusion	• Studies that focus on genus *Ipomoea* on its ethnomedicinal uses and bioactive compounds. • Ethnomedicinal studies that includes part of the plant used, mode of preparation, mode of application, and uses. • Studies that mention bioactive compounds present in the *Ipomoea* plant and their specific medicinal property • Published papers and thesis from the earliest records until 2023 • Primary Studies • Free access articles
Exclusion	• Articles that focus on other unrelated topics that are outside the scope of the study • Conference Papers, Books, Letters, News, Protocols, Pre-prints, Literature Review, & Systematic Reviews. • Papers that are not in English language

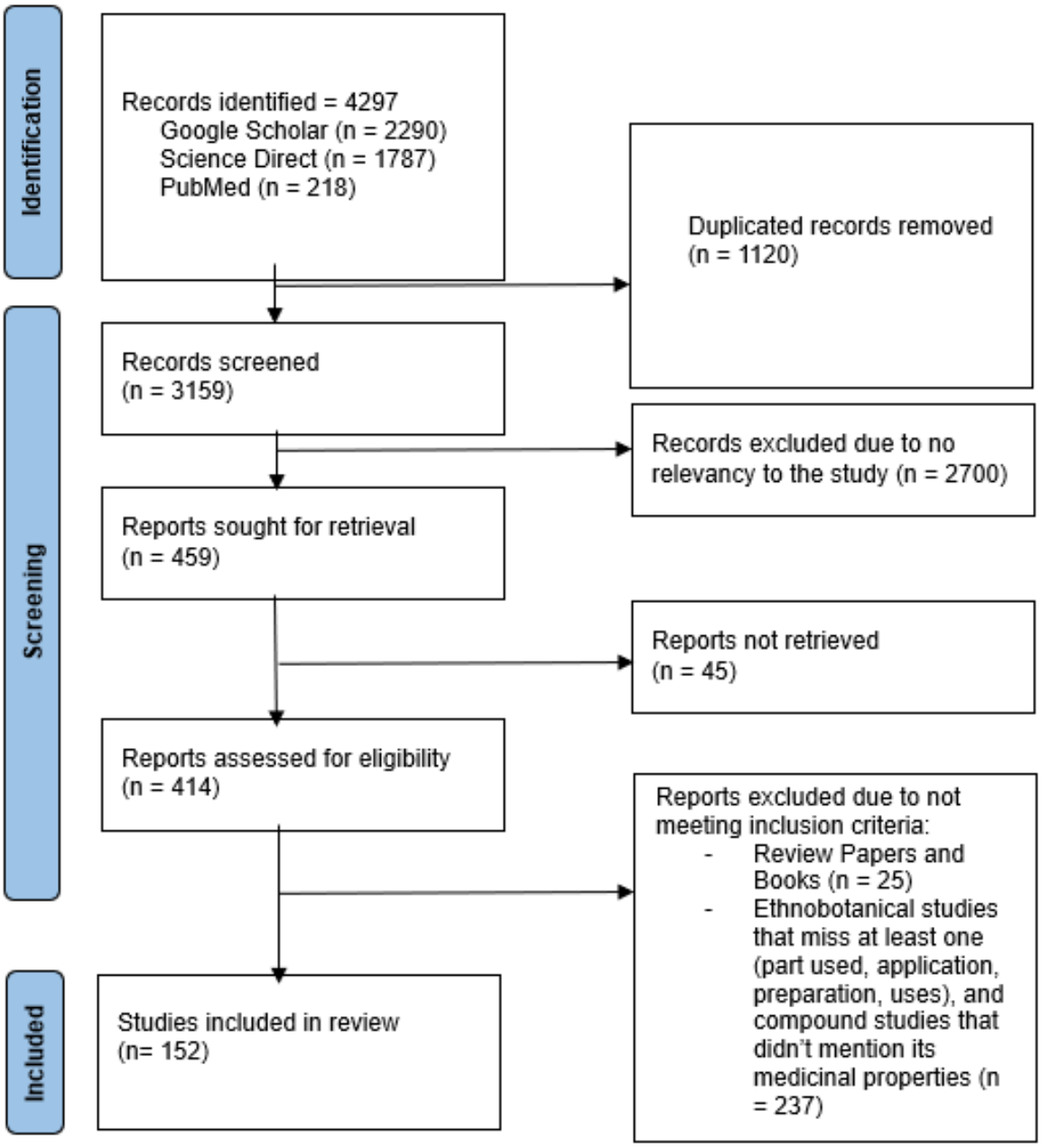

Figure 1. Flow diagram based to the Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

3.1 Ethnobotanical Studies

The *Ipomoea* genus of plants possesses several unexplored indications and components, rendering them very promising subjects for investigation in the field of therapeutics. In this study, a total of 40 plants have been identified. Among them, the most notable plants with the highest number of uses are *Ipomoea* batatas (L.) Lam, *Ipomoea* aquatica Forssk. (16), *Ipomoea* carnea subsp. fistulosa (Mart. ex Choisy) D.F. Austin (9), *Ipomoea* carnea Jacq., (8) and *Ipomoea* pes-caprae (L.) R.Br. (8) This study demonstrates the extensive utilization of *Ipomoea* batatas (L.) Lam for the treatment of diabetes. The anti-diabetic properties of sweet potatoes are attributed to compounds such as flavonols, anthocyanidins, phenolic acids, and flavanones. These compounds work by reducing the activity of the lipogenic pathway, which leads to lower levels of glucose, triglycerides, and total cholesterol in the blood. Additionally, they gradually increase the levels of HDL cholesterol, resulting in an overall decrease in blood glucose levels. (14-15) *Ipomoea* aquatica Forssk. has also been reported to have therapeutic effects on Jaundice. One possible reason for this is that I. aquatica has shown its ability to decrease liver damage caused by TAA. This is achieved by regulating detoxifying enzymes and by scavenging free radicals and acting as an antioxidant. These actions may play a role in protecting the liver from TAA-induced damage. (16)

The genus *Ipomoea* is known for its efficacy in treating several conditions, including gastrointestinal problems, skin disease, diabetes, joint problems, wound healing, inflammation, malaria, sexually transmitted diseases (STDs), facilitation in child birth, and cancer. Indigenous cultures often suffer from gastrointestinal problems. This may be ascribed to a multitude of reasons, including their customary manner of existence, exceedingly destitute social and ecological circumstances, and exposure to the environment. These groups are at a heightened risk of contracting intestinal illnesses caused by bacteria, protozoan parasites, and/or helminth species. (17) Indigenous communities continue to have challenges in obtaining healthcare services, particularly in the field of dermatology. They often have a similar high occurrence of prevalent skin conditions, such as boils and fungal infections. These conditions are exacerbated by environmental factors such as poverty and concerns over access to clean water. (18) Sexually Transmitted Diseases (STDs), such as gonorrhea and syphilis, are also common in this research. The prevalence of HIV/AIDS and other sexually transmitted diseases (STDs) is increasing and is becoming a significant public health issue among indigenous societies. (19) Therefore, this indicates an opportunity to introduce pioneering, research-supported, and culturally aware-focused sexual health initiatives in order to counteract the ongoing increase in sexually transmitted diseases among indigenous communities. Table 4 provides a comprehensive summary of the further ethnomedicinal applications of the *Ipomoea* genus.

3.2 Bioactive Compounds

Phytochemical research has revealed the presence of many chemicals in the genus *Ipomoea*. The active components of this plant have been isolated, extracted, and extensively examined by several researchers for various biological activities. The study reveals that the genus contains bioactive substances that possess various beneficial properties such as antioxidant, anti-inflammatory, antimicrobial, anti-cancer, cytotoxic, anti-tumor, analgesic, anti-diabetic, antiviral, and hallucinogenic effects. Additionally, other pharmacological activities have also been observed and documented (Table 5.). In this study, it was shown that *Ipomoea batatas* (L.) Lam. has the highest number of documented bioactive chemicals, followed by *Ipomoea aquatica* Forssk (16) and *Ipomoea carnea* subsp. fistulosa (Mart. ex Choisy) D.F. Austin. (9) Antioxidants counteract hazardous molecules known as free radicals. Studying the use of antioxidants in pharmacology, cosmetics, and medicine will become more critical due to the harmful effects of free radicals. Free radicals are unstable molecules with unpaired electrons that damage cells by taking electrons from other molecules.

Typically, the morning glory family is associated with plants that possess hallucinogenic qualities. Seeds of *Ipomoea violaceae* contain a poisonous substance called lysergic acid amide (ergine), which has a harmful effect that occurs before the psychedelic effects by inducing nausea, vomiting, and abdominal pain. (20) *Ipomoea ommaneyi* Rendle includes alkaloids such as ergine, lysergol, and different clavines. These alkaloids can be ingested orally in the form of a decoction to treat convulsions. Additionally, an infusion of these alkaloids can be taken orally as an aphrodisiac. (21) Further investigation into these chemical compounds with hallucinogenic effects has the potential to yield a comprehensive comprehension. Psychedelic chemicals have promise in the treatment of several illnesses, including addiction, depression, and anxiety. (22) Aquaterins, Actigenin, Trans-2,3-dibenzylbutyrolactone, Murucoidins 4, Calonyctins E, Calonyctins J, and Muricatic acid C methyl ester have been found to exhibit cytotoxic effects on certain cancer cells. (23-26) By doing more study and enhancing our comprehension of this molecule, we can take another significant stride in the fight against cancer.

It is important to note that while the genus may possess medicinal properties, it is necessary to examine toxicity assessments. The primary goals of toxicity testing are to initially evaluate the impact of newly identified compounds on laboratory specimens and their direct toxicity to humans. Additionally, it aims to assess potential risks to humans by subjecting laboratory specimens to high doses of the compounds in order to determine any possible risks to humans exposed to significantly lower doses. (27) This prompts us to thoroughly evaluate their adverse impacts on the environment and public health by collecting data on their harmful action.

Table 3. Preparation and mode of application of *Ipomoea* genus medicinal plants from various indigenous groups. (28-194)

Scientific Name	Local Name	Plant Parts	Preparation and Application	Specific Use	Country	References
Ipomoea asarifolia (Desr.) Roem. & Schult.	Duman rafi	Leaves	Decoction, Drink	Dermatitis, scabies, syphilis, skin ulcers, wounds	Nigeria	(28)
	Duman kada	Whole Plant	Decoction, Bath	After Care Birth (General Well Being)	Nigeria	(29)
	Salsa-da-praia	Whole Plant	Decoction, Bath	Shingles, body itching	Brazil	(30)
	Salsa-da-praia	Branch	Decoction, Bath	ears itching, head eczema	Brazil	(31)
	Turuturu	Leaves	Squeeze (Juice), Drink	Cancer	Nigeria	(32)
Ipomoea alba L.	-	Leaves	Raw, Poultice	Snakebite	Panama	(33)
	-	Whole Plant	Decoction, Bath	Inflammation due to Snakebite	Panama	(34)
	-	Leaves	Paste, Eaten	Improve Apetite	India	(35)
Ipomoea albivenia (Lindl.) Sweet	Mošope	Roots	Decoction, Eaten	Tuberculosis	South Africa	(36)
Ipomoea aquatica Forssk.	Phak bung daeng	Whole plant	Decoction, Drink	Kidney Stone	Thailand	(37)
	Kalmi shak	Leaves	Raw, Eaten	Headache, Constipation, and Hemorrhoids	Bangladesh	(38)
	Tror kun sɔr	Whole Plant	Decoction, Inhale Steam	Postpartum Care	Cambodia	(39)
	Tror kun sɔr	Whole Plant	Infusion, Inhale Steam	STD	Cambodia	(40)
	Kamli	Stem, Leaf	Decoction, Eaten	Jaundice	India	(41)
	Daman	Whole Plant	Decoction, Drink	Malaria	Nigeria	(42)
	Kalmi saag	Leaves	Decoction, Drink	Diabetes	Nepal	(43)
	Panikolmow	Shoot	Raw, Eaten	Diabetes and as Galactagogue to Nursing Mothers.	India	(44)
	Kalmi	Leaves	Decoction, Drink	Jaundice	India	(45)
	Kangkung	Leaves	Pounded with salt, Topical	Abscess	Malaysia	(46)
Ipomoea aquatica Forssk.	Kangkung	Leaves	Mashed with water, Topical	Rough Hair	Malaysia	(47)
	Kangkung	Whole Plant	Juice Extract, Drink	Food Poisoning	Malaysia	(48)
	Humen	Leaf and young shoots	Cooked, Eaten	Oral hypoglycaemic activity, Used against diabetic patient	India	(49)
	Vellaikeerai	Whole Plant	Decoction, Drink	Emetic and purgative. Used as an antidote to arsenical or opium poisoning.	India	(50)
	Kangkung	Leaves	Pounded till pasty, Topical	boils to speed up the expulsion of pus and healing.	Malaysia	(51)
	Kolmi	Whole Plant	Decoction, Eaten	Gastrointestinal disorders	India	(52)
	Khalmi	Stem	Necklace prepared from small pieces of stem. Worn around the neck	Jaundice	India	(53)
	Kolmou	Shoots	Crushed, Drink	Blood Sugar Level	India	(54)

Ipomoea batatas (L.) Lam	Sakkaravalli Kilangu	Tuber	Cooked, Eaten	Diabetes, Increases Body Strength	India	(55)
	Patate	Roots	Infusion, Topical	Eye Problems, Cataract, Poor eyesight	Mauritius	(56)
	Aborodwobaa	Leaves	Decoction, Drink	Type 2 Diabetes	Ghana	(57)
	Wosso	Leaves	Decoction, Eaten	Malaria	Mali	(58)
	-	Leaves, Stem	Decoction, Eaten	Facilitates Child Birth	Cameroon	(59)
	-	Whole Plant	Decoction, Eaten	Abdominal pains, Swelling of Legs and Ankles (Child Birth	Cameroon	(60)
	Odunkun	Leaves	Decoction, Drink	Malaria	Nigeria	(61)
	Mouké	Leaves	Crushed, Topical	Hair Care	Cameroon	(62)
	Kamote tops	Leaves Stem	Decoction, Eaten	UTI & High Blood Pressure	Philippines	(63)
	Boled	Leaf bud and tuber	Decoction, Eaten	Abcess, Gastritis	Indonesia	(64)
	Kwaeyo	Leaves	Crushed, Poultice	Skin Fungal Infections	Bolivia & Peru	(65)
	Bime Mabi	Leaves	Decoction, Topical	Cuts and Hemorrhage	Nicaragua	(66)
	Ahshu’	Tuber	Grated and Mixed with Water, Bath	Fever	Peru	(67)
	Lumonde	Leaves	Infusion, Bath	Relaxation of pelvis region for child birth	Uganda	(68)
	Btata hlowa	Fruit	Raw, Eaten	Rheumatoid Arthritis Inflammation	Morocco	(69)
	Sakkaravalli kilangu	Tuberous Root	Cooked, Drink	Renal, Calculi, Diabetes & General weakness	India	(70)
	Amanyabwari	Leaves	Infusion, Drink Extract	Hookworms in the Gut	Kenya	(71)
	Sakarkand	Tuberous Root	Raw, Eaten	Diabetes	India	(72)
	Ubi tanah	Tuber	Cooked, Eaten	Diabetes mellitus	Indonesia	(73)
	Batata-doce	Leaves	Decoction, Topical	Tooth Infection, Wound Healing	Brazil	(74)
	Batata-doce	Tuber	Infusion, Poured to the affected area	Pityriasis versicolor	Brazil	(75)
	Kamote	Leaves	Cooked, Eaten	Anemia, Fever	Philippines	(76)
	Kandolo	Leaves	Decoction, Drink	Gonorrhoea	Zambia	(77)
	Kawl-ba-hra	Young Shoot	Raw, Eaten	Digestion	India	(78)
	Feuilles de patate	Leaves	Infusion, Eaten	Wound Healing & Antiulcer	Cameroon	(79)
	Feuilles de patate	Leaves, Stem	Decoction, Eaten	Treatment of Hemorrhoid	Cameroon	(80)
	Mbooli	Leaves	Decoction, Bath	Skin rash, Herpes zoster	Uganda	(81)
	Kamote tops	Leaves	Decoction, Drink	Measles	Philippines	(82)
	Kangkong	Young Leaves and Stem	Crushed, Poultice	Fever with delirium, constipation, headache, and insomnia	Philippines	(83)

Ipomoea batatas (L.) Lam	K'umar	Leaves	Decoction, Eaten	Ulcer	Bolivia	(84)
	Ubi jalak	Leaves	Crushed, Poultice	Swellings	Indonesia	(85)
	Batata-doce	Leaves	Infusion, Topical	Wound Healing	Brazil	(86)
	Batata-doce	Leaves	Infusion, Gargle	Mouth Infections, Gingivitis, Toothache,	Brazil	(87)
	Ubhatata	Leaves	Decoction, Drink	Gonorrhea	South Africa	(88)
	Amôngha	Leaves	Decoction, Drink	Breast Cancer, Cervical Cancer	Gabon	(89)
	Camote tahua	Roots	Infusion, Eaten	Vermifuge, stomachache, fracture, dysentery, diarrhea	Mexico	(90)
	Batata-doce	Leaves	Decoction, Drink	Diabetes, hypercholesterolemia	Brazil	(91)
	Kamote (pula)	Roots	Poultice, Topical	Burns	Philippines	(92)
	Kamote (pula)	Leaves	Cooked, Eaten	Anemia, Milk Production	Philippines	(93)
	Ji-oyibo	Whole Plant	Infusion, Drink	Diabetes	Nigeria	(94)
	Akarandura	Rhizome	Decoction, Eaten	Anti-Plasmodial	Uganda	(95)
	Batata-doce	Sprout & Leaves	Infusion, Eaten	Toothache, Inflammation, Oral Infections	Brazil	(96)
Ipomoea biflora (L.) Pers.	Areuy	Roots	Decoction, Drink	Arhtritis, Pain Over Body	Indonesia	(97)
Ipomoea cairica (L.) Sweet	Thechar	Whole Plant	Decoction, Drink	Rheumatism, Inflammation of the Heart	Nepal	(98)
	Forokofarka ba	Leaves	Decoction, Drink	Malaria	Mali	(99)
	Kalandarugo	Whole Plant	Concoction and Decoction, Drink	UTI and Thypoid	Tanzania	(100)
	Morning glory vine	Leaves	Crushed, Topical	Rheumatism and inflammation	Philippines	(101)
	Kalanda lugo	Leaves	Infusion, Bath	Vaginal Fungal Infection, Dizziness & Laziness in Pregnant Women	Uganda	(102)
	Kalanda lugo	Leaves	Infusion, Drink	Febrile convulsions	Uganda	(103)
	Akarandarugo	Leaves	Infusion, Drink	Cervical cancer	Uganda	(104)
Ipomoea carnea Jacq.	Behaya	Whole Plant	Extract, Topical	Wound	Nepal	(105)
	Behaya	Whole Plant	Extract Latex, Topical	Cuts/Wounds, Leucoderma, Other Skin Diseases	Nepal	(106)
	Behaya	Whole Plant	Crushed, Topical	Relieves joint pain	Nepal	(107)
	Beshram	Leaves	Cooked, Poultice	Cuts and Wounds	India	(108)
	Dhol kolmi	Leaves	Crushed, Eaten	Diabetes	India	(109)
	Dhol kolmi	Leaves	Decoction, Topical	Antifungal Lotion	India	(110)
	Jungli bakhi	Leaves	Crushed, Topical	Athlete's Foot	Pakistan	(111)
	bilaitti Aak	Leaves	Crushed, Poultice	Joint Pain	India	(112)
	Amari	Leaf & root	Crushed, Eaten	Rheumatism	India	(113)

Ipomoea carnea subsp. fistulosa (Mart. ex Choisy) D.F. Austin	Ipoma	Stem, Leaf, Flower, and Root	Crushed, Drink	Contraceptive	India	(114)
	Tararaqui	Flower	Infusion, Eaten	Inflammation	Bolivia	(115)
	Bilaitti Aak	Leaves	Leaves soaked in hot mustard oil, Topical	abscess and joints to relieve pain	India	(116)
	Bilaitti Aak	Leaves	Leaves Soaked in hot mustard oil, Topical	Abscess and Joints to relieve pain	India	(117)
	Lawu-k'os	Leaves	Decoction, Bath	Rheumatism	Argentina	(118)
	Dhool-kolme	Stem, Gum	Crushed, Eaten	Antidote for Poison	Bangladesh	(119)
	Dhol-kolmi	Leaves	Crushed, Topical	Swell due to fracture	Bangladesh	(120)
	Sat gullo	Leaves, Shoot	Crushed, Topical	Wound Healing, Pain Killer, Blood Clotting	Pakistan	(121)
	Linda mañana	Leaves	Decoction, Bath	Accelerate Child birth	Mexico	(122)
Ipomoea cheirophylla O'Donell	Sinäj-chänis	Tuber	Raw, Topical	Chloasma	Argentina	(123)
Ipomoea congesta R.Br.	Fue'aepuaka	Leaves	Infusion, Drink	Filariasis	Tonga	(124)
	Fue'aepuaka	Roots	Infusion, Drink	Aperient	Tonga	(125)
Ipomoea consimilis Schulze-Menz	Murugia	Roots	Decoction, Drink	stomache ache, constipation in childhood	Mozambique	(126)
Ipomoea crassipes Hook.	N/A	Ground plant parts	Crushed, Topical	Sores	South Africa	(127)
Ipomoea eriocarpa R.Br.	Lagaco cozinho	Leaves, Roots	Extract, Drink	Menstrual Pain	Pakistan	(128)
Ipomoea hildebrandtii Vatke	Bingirebityo	Leaves	Decoction, Drink	Ulcers & bed sores	Uganda	(129)
Ipomoea indica (Burm.) Merr.	Ananda	Whole Plant (Not indicated)	Decoction, Eaten	Malaria	DR Congo	(130)
	Musigui	Leaves	Cooked, Eaten	Laxative	Panama	(131)
	Nagawul	Whole Plant	Extract, Drink	Cough	Vanuatu	(132)
	Nagawul	Latex	Infusion, Drink	Laxative, Food Poisoning	Vanuatu	(133)
	Nagawul	Flower	Infusion, Drink	Fascilitates Child Birth	Vanuatu	(134)
	Nagawul	Latex	Raw, Topical	Wound Healing	Vanuatu	(135)
	Guerit vite	Leaves	Crushed, Topical	Wound Healing	Mauritius	(136)
	Guerit vite	Leaves	Infusion, Drink	Cardiovascular Disease	Mauritius	(137)
Ipomoea involucrata P.Beauv.	Fifilori	Leaves	Infusion, Eaten	Malaria, rheumatism	Nigeria	(138)
	Fifilori	Leaves and stem	Decoction, Eaten	Asthma	Nigeria	(139)
	Mkpafiafian	Roots	Decoction, Drink	Mental Illness	Nigeria	(140)
	-	Leaves	Infusion, Eaten	Facilitation of Delivery	Cameroon	(141)

Ipomoea involucrata P.Beauv.	Mkpafiafian	Leaves	Infusion, Drink	Leucorrhoea, urethritis	Nigeria	(142)
Ipomoea kituiensis Vatke	Obinju	Leaves	Decoction, Eaten	Cough	Kenya	(143)
Ipomoea littoralis Blume	Nerauwul	Leaves	Infusion, Drink	Cough/Bornchitis	Vanuatu	(144)
Ipomoea marmorata Britten & Rendle	Gumna-kul	Tuberous Root	Raw, Eaten	Internal Cancer	Ethiopia	(145)
Ipomoea mauritania Jacq.	Mgba-ala	Roots	Decoction, Eaten	Asthma	Nigeria	(146)
	Atewogba	Leaves	Cooked, Eaten	Anti-Aging	Nigeria	(147)
	Vhui-cumra	Roots	Crushed, Eaten	Increases Lactation	Bangladesh	(148)
	-	Tubercule	Decoction, Eaten	Diabetes	South Africa	(149)
	Tewogbojo	Leaves	Decoction, Drink	Malaria	Nigeria	(150)
	Taiga paw	Leaves	Decoction, Poultice	Side Effects of Snakebite	Nicaragua	(151)
	Bhuinkakharu	Rhizome	Raw, Eaten	Blood Dysentry & Astringent	India	(152)
Ipomoea nil (L.) Roth	Khat Katia	Seeds	Infusion, Drink	Laxative, Arrest Dysentry	India	(153)
	Makenchangnaro	Flower and leaves	Crushed, Topical	Burns	India	(154)
	Siyunri	Whole Plant	Extract, Drink	Blood Vomiting	Nepal	(155)
	Siyunri	Leaves	Decoction, Drink	Bronchitis, Jaundice, Diarrhoea, and Hemorrhoids	Nepal	(156)
	Makenchangnaro	Flower & Leaf	Crushed, Poultice	Burns	India	(157)
	Qianniu	Fruit	Decoction, Eaten	Worms/other parasites, Constipation	China	(158)
	Arila	Leaves	Decoction, Bath	Hair Shining, Anti Dandruff,	Pakistan	(159)
	Makenchangnaro	Flower & Leaves	Crushed, Topical	Burns	India	(160)
Ipomoea oblongata E.Mey. ex Choisy	Ubhoqo	Roots	Infusion, Topical	Swollen Limbs	South Africa	(161)
Ipomoea obscura (L.) Ker Gawl	Ipamiledje	Whole Plant	Decoction, Eaten	Asthma	Comoros	(162)
	Sungucate	Roots	Decoction, Eaten	Insomia	Mozambique	(163)
	Assab	Leaves	Crushed, Topical	Fungal Mouth Infection	Yemen	(164)
	Thalikkeerai	Leaves	Crushed, Topical	Premature Ejactulation	India	(165)
Ipomoea pes-caprae (L.) R. Br.	Poubou	Whole Plant	Decoction, Eaten	Malaria	Comoros	(166)
	Nerre	Leaves	Cooked, Poultice	Boils	Vanuatu	(167)
	Nerre	Stem	Raw, Eaten	Severe abdominal pain during pregnancy caused by spirits	Vanuatu	(168)
	Beach Morning Glory	Leaves	Decoction, Eaten	Fever, Purgative & Laxative	Nicaragua	(169)

Ipomoea pes-caprae (L.) R. Br.	Laliane batatran	Leaves	Decoction, Bath	Scabies	Mauritius	(170)
	Lambayong	Leaves	Decoction, Drink	Stomach pains and cramps, headache and rheumatism	Philippines	(171)
	Camote de playa	Leaves and Seeds	Decoction, Eaten	Side Effects of Snakebite	Nicaragua	(172)
	Adappukodi	Leaves	Crushed, Poured to the affected area	Cataract	India	(173)
Ipomoea pes-caprae (L.) R.Br. ssp. brasiliensis (L.)	-	Roots	Cooked, Poultice	Syphilis	Madagascar	(174)
Ipomoea pes-tigridis L.	Ya yom teen ma	Stem	Decoction, Eaten	Cancer	Thailand	(175)
	Panja Bel	Leaves	Crushed, Topical	Acne	India	(176)
Ipomoea pileata Roxb.	Suraccudzi	Roots	Infusion, Drink	Stomach Ache	Mozambique	(177)
Ipomoea purpurea (L.) Roth	Tlancuaya	Whole Plant	Cooked, Poultice	Soothe Colics	Mexico	(178)
	Syudelaharo	Leaves	Decoction, Drink	Bronchitis, Jaundice, Diarrhoea	Nepal	(179)
	Syudelaharo	Flower	Crushed, Topical	Syphilis	Nepal	(180)
Ipomoea quamoclit L.	Kpulibo	Leaves	Crushed, Poultice	Boil, Wound	Nigeria	(181)
	-	Roots	Crushed, Eaten	Passing of semen with urine	Bangladesh	(182)
Ipomoea sagittifolia Burm.f.	Lob lob	whole plant	Decoction, Drink	Gastritis, Abscesses	Thailand	(183)
	Mukutti Chedi	Leaves	Crushed, Topical	Headache	India	(184)
Ipomoea setifera Poir.	Tutuk	Leaves	Decoction and Poultice	Antidote for Snakebites	Nicaragua	(185)
Ipomoea simplex Thunb.	Igontsi	Leaves	Crushed, Topical	Hair Loss	South Africa	(186)
	Igontsi	Leaves	Decoction, Bath	Clean Skin	South Africa	(187)
	Igontsi	Tuber	Crushed, Topical	Protect Facial Skin	South Africa	(188)
Ipomoea stans Cav.	Tumba Vaquero	Plant (Aerial)	Infusion, Eaten	Diabetes	Mexico	(189)
	Galuza	Whole Plant	Infusion, Eaten	Coughs, Snake Bites, Headaches, Bone Aches, Dizziness	Mexico	(190)
Ipomoea tenuirostris Choisy	-	Whole Plant	Infusion, Eaten	Facilitation of Delivery	Cameroon	(191)
Ipomoea triloba L.	Luvuentahi	Roots	Raw, Apply to the affected area	Internal Problems	Indonesia	(192)
Ipomoea verbascoidea Choisy	Litalala	Roots	Decoction, Drink	Gonorrhea	Zambia	(193)
Ipomoea wightii (Wall.) Choisy	Ekihububa	Leaves	Decoction, Drink	Breast Cancer, Cough, Leprosy, Stomach Ache	Uganda	(194)

Table 4. Bioactive Compounds of genus *Ipomoea* its Medicinal Properties. (195-297)

Scientific Name	Compounds	Medicinal Properties
Ipomoea asarifolia (Desr.) Roem. & Schult.	Tannins, Saponins	Astringent and Anti-Inflammatory (195)
	Rutin	Anti-Inflammatory (196)
Ipomeoa digitata L.	β-sitosterol & Glycoside	Muscle Relaxant (197)
Ipomoea aquatica Forssk.	Calcium, phosphorous, and oxalate	Antispasmodic activity (198)
	Aquaterins	Cytotoxic (Hepatoma) (199)
Ipomoea batatas (L.) Lam.	Acylated sophoroses	Antidiabetic (200)
	Iodine and fluorine	Lowers Cholesterol (201)
	4-*Ipomea*nol	Anticancer (137), Caries, Helminth Infection (202)
	Diaziridine, Oxazolidine, 2-ethyl -2-oxazoline, 1,2,4-Triazole	Improves Drug Medicinal Effects (203)
	3,4,5-tri-O-caffeoylquinic acid and 4,5-di-O-caffeoylquinic acid	Improves Drug Medicinal Effects (204)
	β-Carotene	Anticancer (205)
	Ellagic acid, 3,5-dicaffeoyl quinic acid	Anti-Diabetic (206)
	3-epifriedelinol & Nummularic Acid	Prostate Cancer (207)
	Carotenoids	Antioxidant (208)
	Methyl decanoate	Anti-Hyperglycemic (209)
	Ipomotaosides	Anti-Inflammatory (210)
	Caffeoylquinic acid	Antioxidant (211)
	Protocatechualdehyde, ethyl caffeate and quercetin	Antioxidant (212)
	Oleanolic acid-3-O-[b- D -galactopyranosyl(1?3)-b- D-glucuronopyranosyl]-28-O-b- D -glucopyranoside	Anti-Viral, Antioxidant, Anti-Diabetic (213)
	DLBS6747	Erythropoietin Stimulating Agent (214)
Ipomoea cairica (L.) Sweet	dibenzylbutyrolactone lignanolide, (–)-arctigenin	Anti-Viral (215)
	Lignans, Arctigenin, Trachelogenin, Matairesinol, Vanillic Acid, Stigmasterol	Rheumatism, Anti-Inflammatory (216)
	Lignan	Anti-tumor, Analgesic, and Antioxidant (217)
	Arctigenin, trans-2,3-dibenzylbutyrolactone	Cytotoxic (Prostrate Cancer & Lung Cancer) (218)
Ipomoea carnea Jacq.	Glycosides, Tannins, Flavone Glycoside, Saponin, Lrhamnose, D-fucose, D-Chinovose, Convolvulinolate, Jalapinolate	Anti-Rheumatic (219)
	Myrcene	Anti-microbial and Antioxidant (220)
	Eucalyptol (1,8-cineole)	Anti-inflammatory and Antioxidant (221)
	1,6-Octadien-3-ol, 3,7-dimethyl	Antiseptic, Anti-Neuralgic, Analgesic effect (222)
	Cyclohexene, 3-(1, 5dimethyl-4-hexenyl)-6-methylene	Antioxidant, Anticancer, Anti-microbial, Anti-convulsant, Anticancer, & Anti-inflammatory (223)
	Benzene, 1-(1,5-dimethyl-4-hexenyl)-4-methyl	Antioxidant, Anti-inflammatory, Anti-microbial, Anticancer, Anti-Convulsant, and Sedative Activity (224)
	Ethanone, 2-(2-benzothiazolylthio)-1-(3,5-dimethylpyrazolyl)	Antimicrobial (225)

Ipomoea carnea Jacq.	Cubenol	Antimicrobial and Anti-inflammatory (226)
	Geranyl acetate and p-cymene	Antioxidant (227)
Ipomoea hederifolia L.	Phenols, Flavonoids	Antioxidant (228)
Ipomoea horsfalliae Hook.	Phytol, Gamma-sitosterol	Anticancer (229)
Ipomoea indica (Burm.) Merr.	Ipolearoside	Antispasmodic Activity (230)
Ipomoea muricata (L.) Jacq.	Lysergol or 9,10-Dihydro-6-methylergoline8-methanol	Vasoactive. Bioenhancer in antibiotic preparation not only enhances the absorption of antibiotic (231)
Ipomoea muricata (L.) Jacq.	Calonyctins E, Calonyctins J, and Muricatic acid C methyl ester	Cytotoxic Enhancer combined with vincristine (232)
Ipomoea murucoides Roem. & Schult.	Murucoidins 4	Cytotoxic against Hepatocellular Carcinoma (233)
Ipomoea oblongata E.Mey. ex Choisy	Ipobscurine-A	Anti-Angiogenic/ Anti-Tumor (234)
	Tannins and Flavonoids	Antioxidant (235)
Ipomoea ommaneyi Rendle	Ergine, Lysergol, and Clavines	Hallucinogen (236)
Ipomoea pes-caprae (L.) R.Br.	Eugenol and, 2-Methoxy-4-vinylphenol.	Anti-Inflammatory (237)
	3'-methoxy-4',5,7-trihydroxy flavone-3-glucoside	Anti-Tumor (238)
	Ipomeolide A	Anti-Cancer (239)
	Methyl salicylate	Antimicrobial and Antioxidant (240)
	N,N,N′,N′-Tetramethyl-1,3-propanediamine	Antimicrobial (241)
	Diethyl Phthalate	Antimicrobial (242)
	n-Hexadecanoic acid	Antioxidant, Pesticide, Anti-fibrinolytic (243)
	9-Octadecenoic acid, (E)	Cancer preventive, Anti-inflammatory (244)
	Cis-9-Hexadecenal	Antimicrobial (245)
	Chlorogenic acid	Anti-Inflammatory (246)
Ipomoea procumbens Mart. ex Choisy	Caffeoylquinic acids	Antioxidant and Anti-Inflammatory (247)
Ipomoea squamosa Choisy	*Ipomoea*ssin F	Anti-Cancer (Ovarian) (248)
Ipomoea staphylina Roem & Schult.	2-Propenoic acid	Anti-Inflammatory (249)
	Pentanoic acid	Hepatoprotective (250)
	Cyclopentane	Anti-Viral (251)
	Caryophyllene	Analgesic (252)
	2-Furanmethanol	Antioxidant (253)
Ipomoea tyrianthina Lindl.	Tyrianthins	Anti-Mycobacterial (254)
Ipomoea violacea L	Lysergic acid amide (Ergine)	Hallucinogenic (255)
	Ergoline Alkaloids	Hallucinogenic (256)
	Lysergol or 9,10-Dihydro-6-methylergoline8-methanol	Antibiotic Enhancer (257)

Conclusion

The current systematic study comprehensively examined the phytochemical composition and ethnobotanical characteristics of the Ipomoea genus. The extensive traditional medical usage of Ipomoea species across several cultures demonstrates their potential therapeutic value. These plants have a long history of being utilized to treat various ailments, including cancer, gastrointestinal disorders, skin illnesses, diabetes, joint problems, wound healing, inflammation, malaria, and sexually transmitted infections (STDs). Additional scientific study is required to validate the efficacy of these traditional assertions by rigorous clinical trials and pharmacological testing, given the significance of this ethnomedical knowledge.

Moreover, the research uncovered that Ipomoea species possess a diverse range of bioactive compounds with properties such as anti-inflammatory, antioxidant, antiviral, cytotoxic, anti-cancer, analgesic, anti-diabetic, and hallucinogenic activity. These compounds possess biological action, which might offer a scientific basis for the stated therapeutic advantages of traditional medicine. A thorough examination of the specific biological effects of these discovered phytochemicals has great potential for discovering novel therapeutic drugs.

This overview of *Ipomoea* sets the foundation for further inquiry. Thorough pharmacological research and isolation guided by bioactivity are necessary to find and confirm potentially beneficial pharmaceutical compounds from this species. Moreover, clinical studies are required to integrate these findings into evidence-based treatment. Cooperation with Indigenous communities and the implementation of sustainable resource management approaches are essential to guarantee responsible usage and proper respect for their expertise during this process.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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