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A gave Americana L: A Comprehensive Review on Ethno medicinal Uses and Pharmacological Properties

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Abstract: *Agave americana* L., a perennial succulent of the Asparagaceae family, is widely recognized for its ethnomedicinal, nutritional, and industrial significance. Traditionally, it has been used externally for wound healing, burns, skin infections, and joint pain, and internally for digestive disorders, diuretic purposes, respiratory problems, and liver protection. The plant is rich in bioactive compounds including steroidal saponins (hecogenin, tigogenin), flavonoids (quercetin, kaempferol), phenolic acids (caffeic, ferulic acid), agavins, alkaloids, and tannins, which confer antioxidant, anti-inflammatory, antimicrobial, and hepatoprotective activities. Nutritionally, agave serves as a source of natural sweeteners, prebiotic fibers, and edible plant parts, while its fibers are used for ropes, mats, and household tools. This review highlights the phytochemistry, pharmacological significance, traditional uses, and commercial applications of *Agave americana*, emphasizing its potential in modern nutraceutical and pharmaceutical development.

Keywords: A gave americana L., Phytochemicals, Pharmacological activity, Medicinal plant,

1. INTRODUCTION

1.1 HERBAL MEDICINE

Herbal medicine, also known as phytotherapy, is the use of plants and plant extracts for the prevention and treatment of diseases [(1)]. It is one of the oldest systems of healthcare, practiced by ancient civilizations such as those in India, China, Egypt, and Greece. In India, herbal medicine forms the basis of traditional systems like Ayurveda, while in China it is a key component of Traditional Chinese Medicine. These systems rely on natural plant materials such as leaves, roots, stems, bark, flowers, and seeds to prepare medicines. Herbal medicines contain bioactive compounds like alkaloids, glycosides, tannins, flavonoids, and essential oils, which produce therapeutic effects [(2)]. They are used to treat a wide range of conditions including fever, digestive disorders, respiratory problems, skin diseases, and chronic illnesses. Compared to synthetic drugs, herbal medicines are often considered safer and more affordable, especially in rural and developing areas. However, their safety and effectiveness depend on proper identification, preparation, dosage, and quality control. In modern times, herbal medicine has gained global recognition due to increasing interest in natural and holistic

healthcare approaches. Scientific research continues to validate the pharmacological properties of many medicinal plants, integrating traditional knowledge with modern medical science [3].

1.2 AGAVE AMERICANA

Agave americana L., commonly known as the Century Plant or American aloe, is a perennial succulent belonging to the family Asparagaceae. The species is native to the arid regions of the Americas and widely cultivated globally as an ornamental and medicinal plant. Traditionally, it has been used in folk medicine to treat ailments such as inflammation, digestive problems, constipation, and wounds. Some cultures also use its sap and fibers for food, drink, and industrial purposes. [5] Agricultural interest in *Agave americana* stems from its drought tolerance, CAM photosynthesis, and high bioactive compound content. Research over the last few decades has evaluated its phytochemical profile and pharmacological potential, linking traditional uses to scientifically observed bioactivity. Medicinal plants have served as the foundation of healthcare systems across civilizations for thousands of years.

Long before the development of synthetic pharmaceuticals, human societies relied on botanical resources for the prevention and treatment of disease. Even in the modern era, plant-derived compounds continue to contribute significantly to drug discovery and therapeutic development. It is estimated that a substantial proportion of currently used pharmaceuticals have origins in natural products or were inspired by plant secondary metabolites. As interest in complementary and alternative medicine grows, the exploration of medicinal plants has gained renewed scientific importance. [6]

2. PLANT PROFILE

Agave americana L., commonly known as Century Plant or American Agave, is a perennial succulent belonging to the family Asparagaceae. It is native to Mexico and the southern United States but is now widely cultivated in tropical and subtropical regions around the world. The plant is characterized by large, thick, fleshy gray-green leaves with sharp marginal and terminal spines, a tall branched flowering stalk that appears once in the plant's lifetime, fibrous roots, and small seed capsules.[7]

Phytochemically, *Agave americana* contains saponins (such as hecogenin and tigogenin), flavonoids, phenolic compounds, agavins (fructan-type carbohydrates), tannins, and alkaloids, which contribute to its wide range of medicinal and nutritional properties. Traditionally, the plant has been used for wound healing, burns, anti-inflammatory purposes, digestive disorders, diuretic effects, respiratory problems, and liver protection. Nutritionally, it serves as a source of natural sweeteners like agave syrup and provides edible flower stalks and hearts after cooking. Its strong leaf fibers are utilized for ropes, mats, baskets, and household tools, while the plant also holds cultural significance in rituals, handicrafts, and protective plantings.[8]

Common Names: Century plant, American aloe, Maguey

Botanical Name: Agave Americana L

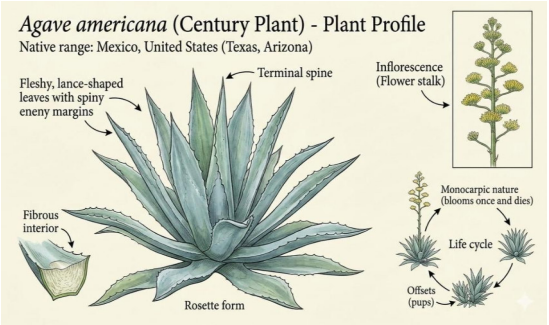

Fig 1: Plant Profile of Agave Americana

2.1 Table 1: (taxonomical classification)

RANK	CLASSIFICATION
Kingdom	Plantae
Subkingdom	Tracheobionta (Vascular plants)
Superdivision	Spermatophyta (Seed plants)
Division	Magnoliophyta (Angiosperms)
Class	Liliopsida (Monocotyledons)
Order	Asparagales
Family	Asparagaceae
Subfamily	Agavoideae
Genus	*Agave*
Species	*Agave americana* L.

2.2 DIAGNOSTIC FEATURES

Large rosette of thick, spiny leaves
Prominent terminal spine

Tall flowering stalk (often called a "century bloom")
Monocarpic nature (flowers once, then dies)
Drought-resistant and adapted to arid climates.

2.3 Table 2: (morphological characteristics)

PLANT PART	DESCRIPTION
Habit	Perennial, succulent, xerophytic herb forming large basal rosettes
Height	1–2 m (vegetative stage); flowering stalk up to 8–10 m tall
Root System	Fibrous, shallow but extensive root system
Stem	Very short, thick, mostly underground (acaulescent appearance)
Leaves	Thick, fleshy, lanceolate, arranged in rosette; bluish-green or variegated; 1–2 m long
Leaf Margin	Sharp marginal spines with a strong terminal spine (2–5 cm long)
Inflorescence	Large terminal panicle borne on tall flowering stalk (monocarpic plant)
Flowers	Greenish-yellow, tubular, bisexual
Fruit	Capsule containing numerous black, flat seeds
Propagation	By seeds, suckers, and bulbils

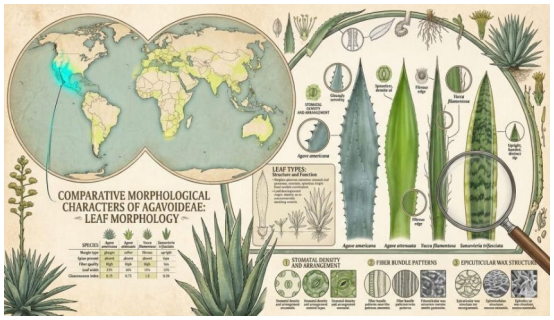

Fig 2: Morphological Characteristic

2.4 DISTRIBUTION & HABITAT

The species Agave Americana is native to the southern USA and Mexico but has been introduced widely in tropical and subtropical regions [9]. It thrives in dry, well-drained soils and is valued as a xerophytic landscape plant. *Agave americana* L., commonly known as the century plant, is a hardy perennial succulent native to Central America, particularly Mexico. Over centuries, it has been widely introduced and naturalized in many parts of the world due to its adaptability, ornamental appeal, and economic importance [10]. Today, the species is distributed across tropical, subtropical, and warm temperate regions, thriving in environments characterized by low rainfall, high temperatures, and well-drained soils.

2.5 NATIVE RANGE

The primary center of origin of *A. Americana* is Mexico and parts of the south-western United States [11]. In its native habitat, the plant grows in semi-arid and arid ecosystems, including rocky hillsides, desert margins, open scrublands, and dry grasslands. These regions typically experience prolonged dry seasons, intense sunlight, and limited water availability. The plant's morphological and physiological adaptations enable it to survive and reproduce under such harsh environmental conditions.

2.6 GLOBAL DISTRIBUTION

Due to its resilience and multipurpose utility, *A. Americana* has been introduced to numerous countries across the globe [12]. It is now commonly found in Mediterranean regions of Europe, including Spain, Italy, and Greece, where the warm climate resembles its native habitat. In Africa, it has been established in both northern and southern regions, often used as fencing, erosion control, or ornamental planting. The species has also spread to parts of Asia, including India, China, and the Middle East, where it grows successfully in dry plains and hilly terrains. [13]

Fig 3: Global Distribution

CLIMATIC REQUIREMENTS

Agave americana is well adapted to xerophytic conditions. It tolerates high temperatures exceeding 40°C and can withstand prolonged drought [13]. The plant follows Crassulacean Acid Metabolism (CAM), a photosynthetic adaptation that reduces water loss by opening stomata at night rather than during the day. This mechanism significantly enhances water-use efficiency. Although primarily associated with warm climates, *A. americana* also shows moderate tolerance to cold and light frost, particularly mature plants. However, extended freezing temperatures may damage leaf tissues. Optimal growth occurs in areas with annual rainfall ranging from 250 to 600 mm, though the plant can survive in lower precipitation zones if drainage is adequate [14].

SOIL PREFERENCES AND HABITAT CHARACTERISTICS

The species prefers well-drained, sandy, or rocky soils with low organic matter content [15]. It does not tolerate waterlogged conditions, as excessive moisture can cause root rot. In natural habitats, *A. americana* often grows on slopes, cliffs, and marginal lands where soil fertility is limited. Its extensive but shallow root system efficiently absorbs available moisture from brief rainfall events. The plant is commonly observed in disturbed habitats, roadsides, abandoned fields, and coastal regions. It plays a role in preventing soil erosion due to its strong root network and dense leaf rosette structure.

ECOLOGICAL SIGNIFICANCE

In its native range, *A. americana* contributes to ecosystem stability and supports pollinators such as bats and insects during its flowering phase [16]. The tall inflorescence provides a temporary but significant nectar source in arid landscapes. Overall, the broad distribution and habitat adaptability of *Agave americana* reflect its ecological resilience and evolutionary success. Its capacity to thrive in marginal environments underscores its importance as both a medicinal and economically valuable plant species.

PHYTOCHEMISTRY

Agave americana, commonly known as the century plant, is a xerophytic perennial belonging to the family Asparagaceae and is widely recognized for its rich and diverse phytochemical profile [17]. The plant is an abundant source of bioactive secondary metabolites that contribute to its traditional medicinal uses and pharmacological potential. In addition to saponins, *A. americana* contains flavonoids including quercetin and kaempferol derivatives, which possess strong antioxidant and free radical scavenging properties. [18]Simple sugars, polysaccharides, and mucilage components enhance its nutritional and functional value. Alkaloids, terpenoids, phytosterols, and glycosides have also been reported in various parts of the plant, including leaves, roots, and sap. The latex of *Agave americana* contains bioactive compounds that are associated with wound healing and anti-microbial properties. [19]

Table 3: (PHYTOCHEMISTRY OF *AGAVE AMERICANA* L.)

S.No	PHYTOCHEMICAL CLASS	MAJOR CONSTITUENTS	REPORTED BIOLOGICAL ACTIVITIES
1	Saponins (Steroidal)	Hecogenin, Tigogenin, Cantalasaponin	Anti-inflammatory, antimicrobial, wound healing
2	Flavonoids	Quercetin, Kaempferol, Luteolin	Antioxidant, anti-inflammatory, hepatoprotective
3	Phenolic Compounds	Caffeic acid, Ferulic acid, Gallic acid	Antioxidant, antimicrobial, wound healing
4	Carbohydrates / Fructans	Agavins (fructan-type polysaccharides)	Prebiotic, digestive aid, hypoglycemic effects
5	Alkaloids	Unspecified alkaloids	Antimicrobial, analgesic
6	Tannins	Condensed tannins	Antioxidant, antimicrobial, astringent

7	Sterols	β-sitosterol	Anti-inflammatory, immunomodulatory
8	Glycosides	Various steroidal glycosides	Anti-inflammatory, wound healing

TRADITIONAL USES OF AGAVE AMERICANA

Agave americana, commonly known as the century plant, has been widely used in traditional medicine by indigenous communities of Mexico and other regions where it is naturalized [(20)]. The fresh leaf pulp is traditionally applied externally to treat cuts, wounds, burns, boils, and ulcers due to its soothing and healing properties. The juice or sap of the plant is used internally in small quantities as a mild laxative to relieve constipation and indigestion. In folk medicine, warmed leaf poultices are applied to swollen joints and painful areas to reduce inflammation associated with arthritis and rheumatism. The plant sap is also used as a diuretic to manage urinary disorders and is sometimes administered in traditional remedies for jaundice and other liver-related ailments. Additionally, preparations of the leaf juice have been used to relieve cough and bronchitis [(21)]. Beyond medicinal applications, the plant has traditional importance for its strong leaf fibers, which are used in making ropes, mats, and baskets, and it is often planted around homes as a protective fence due to its sharp spines.

MEDICINAL USES OF AGAVE AMERICANA L.

(A) WOUND HEALING

Agave americana has been traditionally used for the treatment of wounds, burns, and skin infections. The leaf extract and sap possess antimicrobial, antioxidant, and anti-inflammatory properties that promote faster tissue regeneration and wound closure. Phytochemicals such as flavonoids, saponins, and phenolic compounds present in the plant help stimulate epithelialization and increase tensile strength of healing tissues. Experimental studies have shown that topical application of *Agave americana* extract accelerates wound contraction and reduces healing time due to its antibacterial and antioxidant effects. [(22)]

(B) ANTI-INFLAMMATORY ACTIVITY

The plant exhibits significant anti-inflammatory activity mainly due to the presence of steroidal saponins, flavonoids, and phenolic compounds [(23)]. These compounds help reduce swelling, pain, and inflammatory responses in various conditions. Because of these properties, *Agave americana* extracts have been investigated for treating inflammatory diseases and gastrointestinal inflammation.

(C) DIGESTIVE DISORDERS

Agave americana is also used in traditional medicine for managing digestive problems such as dyspepsia, indigestion, constipation, and gastric irritation [(24)]. The plant contains agavins (fructan-type carbohydrates), flavonoids, and phenolic acids that support digestive health and may act as mild laxatives. Some compounds in the leaves inhibit enzymes like α-amylase, which may help regulate carbohydrate digestion and improve metabolic balance. Additionally, certain saponins exhibit gastro protective effects that help protect the gastric mucosa and reduce ulcer formation.

(D) DIURETIC ACTIVITY

The leaves and sap of Agave americana have been reported to possess diuretic properties, promoting increased urine production and aiding in the elimination of excess fluids and toxins from the body [(25)]. Due to this effect, the plant has been traditionally used in the treatment of urinary tract infections, kidney problems, and edema. The diuretic activity may be related to the presence of saponins, phenolic compounds, and other secondary metabolites that influence renal function and fluid balance.

(E) RESPIRATORY PROBLEMS

In traditional herbal medicine, Agave americana has been used for managing respiratory disorders such as cough, bronchitis, and asthma [(26)]. The plant's anti-inflammatory and antimicrobial constituents help reduce airway inflammation and inhibit microbial

growth responsible for respiratory infections. The sap and leaf extracts are believed to act as expectorants, helping to clear mucus from the respiratory tract and improving breathing in respiratory ailments.

(F) LIVER DISORDERS

Agave americana also demonstrates hepatoprotective activity and has been used for the treatment of liver diseases [(27)]. Studies on experimental animals have shown that methanolic extracts of the leaves can protect the liver from toxin-induced damage by reducing elevated liver enzymes and improving liver function markers. This protective effect is mainly attributed to phytochemicals such as flavonoids, tannins, saponins, and alkaloids, which possess antioxidant properties that help prevent oxidative stress and liver cell injury.

Fig 4: Medicinal Uses of *Agave Americana* L.

EXTERNAL APPLICATIONS

Agave americana has been widely used in traditional medicine for various **external applications** due to its antimicrobial, anti-inflammatory, and healing properties. The fresh leaf pulp, sap, or juice of the plant is commonly applied directly to the skin to treat wounds, cuts, burns, and ulcers. The gel-like substance obtained from the leaves helps promote faster healing by reducing infection and supporting tissue regeneration. In many traditional practices, crushed leaves are applied as a poultice on swollen areas to relieve pain, inflammation, and insect bites. [(28)] The plant extract is also used for treating skin conditions such as rashes, boils, and fungal infections because of its antiseptic and soothing effects. Additionally, the sap of *Agave americana* has been used externally to reduce joint pain and muscular swelling, making it useful in the management of sprains and minor injuries. These traditional external uses highlight the importance of *Agave americana* in folk medicine for skin care and wound management.[(29)]

Fig 5: External Applications

NUTRITIONAL AND FOOD USES OF *AGAVE AMERICANA*

Agave americana has important **nutritional and food applications** in many traditional cultures. The plant is mainly valued for its **sap and carbohydrate-rich components**, which are used as natural sweeteners and food ingredients. The sap extracted from the agave plant is processed to produce **agave syrup (agave nectar)**, a natural sweetener widely used as a substitute for sugar or honey in beverages, desserts, and baked foods. This syrup contains a high amount of **fructose and fructans (agavins)**, which provide energy and may act as dietary fiber that supports digestive health. [(30)]The **young flower stalks, leaves, and hearts (piña)** of the agave plant are also consumed after cooking or roasting in some traditional cuisines. When cooked, these parts become soft and sweet due to the breakdown of complex carbohydrates into simple sugars. In addition, agave contains small amounts of **vitamins, minerals, and antioxidant compounds**, which contribute to its nutritional value. Agave-derived products are also used in the preparation of beverages, including traditional fermented drinks and health drinks. Because of its natural sweetness and plant-based origin, agave is increasingly used in modern food products and health-conscious diets. [(31)]

Fig 6: Nutritional and Food Uses

FIBER AND HOUSEHOLD USES OF *AGAVE AMERICANA*

Agave americana is widely utilized for its strong and durable fibers, which are obtained from the leaves of the plant. These fibers are tough, flexible, and resistant to wear, making them suitable for various traditional and domestic purposes. The extracted fibers are commonly used in the manufacture of ropes, cords, mats, carpets, baskets, and fishing nets. In rural areas, the fibers are also used to produce brushes, twine, and coarse textiles due to their strength and long- lasting nature. [32]In addition to fiber production, *Agave americana* has several household uses. The dried leaves and plant parts are sometimes used as fuel in cooking. The sharp spines present at the tips of the leaves have traditionally been used as natural needles or pins for sewing and small household tasks. The plant is also cultivated as a natural fence or boundary plant because its thick, spiny leaves help protect agricultural fields and homes from animals and intruders. Thus, *Agave americana* plays an important role in traditional communities by providing useful materials for both fiber production and daily household needs.[33]

Fig 7: Fiber and Household Use

CULTURAL USES OF *AGAVE AMERICANA*

Agave americana holds important cultural significance in many traditional societies, particularly in regions where the plant grows naturally. It has been cultivated for centuries not only for its practical benefits but also for its symbolic and cultural value. In some cultures, the plant is considered a symbol of strength, protection, and sustainability because of its ability to survive in harsh environmental conditions. It is often planted around homes, farms, and temples as a protective plant or natural boundary.[34]

Traditionally, different parts of *Agave americana* have been used in cultural practices and local crafts. The strong fibers obtained from the leaves are used to make traditional ropes, mats, baskets, and handicrafts that are important in rural lifestyles and cultural heritage. In some communities, agave plants are also associated with traditional festivals and rituals related to agriculture and harvest. Additionally, agave-derived beverages have historically played a role in social gatherings and cultural celebrations in certain regions. Therefore, *Agave americana* is not only valued for its medicinal and economic importance but also for its role in preserving traditional culture and community practices. [35]

PHARMACOLOGICAL ACTIVITY OF AGAVE AMERICANA

Agave americana exhibits a wide range of pharmacological activities due to the presence of bioactive compounds such as steroidal saponins, flavonoids, phenolic compounds, and fructans. Scientific investigations have validated many of its traditional uses through experimental studies. The plant demonstrates significant anti-inflammatory activity, where leaf extracts have been shown to reduce edema and inflammation in animal models, possibly by inhibiting inflammatory mediators such as prostaglandins and cytokines. Its antioxidant activity is attributed to flavonoids and phenolic constituents that neutralize free radicals and reduce oxidative stress.[36]The plant also possesses notable antimicrobial properties, as extracts from the leaves have shown inhibitory effects against several Gram-positive and Gram-negative bacteria. This supports its traditional use in treating wounds and skin infections. In addition, Agave americana has demonstrated hepatoprotective activity, where methanolic extracts protected liver tissues against chemically induced toxicity, likely due to antioxidant and membrane-stabilizing mechanisms. Studies further indicate wound healing potential, as topical application of leaf extract enhances tissue regeneration and reduces infection risk. Some experimental models have reported aphrodisiac activity, with increased testosterone levels and improved reproductive behaviour observed in treated animals. The plant also shows diuretic and laxative effects, correlating with its

ethnomedicinal use in managing urinary disorders and constipation. [37]

ANTI-INFLAMMATORY ACTIVITY:

- Mediated by steroidal saponins, flavonoids, and phenolic compounds.
- Reduces swelling, pain, and inflammatory mediator activity.

APHRODISIAC AND REPRODUCTIVE EFFECTS:

- Enhances sexual behaviour and reproductive organ health in traditional and experimental studies.
- Supports fertility and reproductive function.

ANTIMICROBIAL EFFECTS:

- Exhibits antibacterial, antifungal, and antiviral activities.
- Effective in treating wounds and infections.

HEPATOPROTECTIVE ACTIVITY:

- Protects liver from toxin-induced damage.
- Lowers liver enzymes and oxidative stress.

ANTIOXIDANT PROPERTIES:

- Flavonoids and phenolic compounds neutralize free radicals.
- Reduces oxidative stress and protects cells from damage.

INSECTICIDAL PROPERTIES:

- Leaf extracts and saponins act as natural bio pesticides.
- Useful for controlling agricultural pests.

Fig 8: Pharmacological Activity

MARKETED PRODUCT OF AGAVE AMERICANA

Agave americana is utilized in various traditional and commercial products, although it is less industrially exploited compared to other Agave species. One of the commonly available marketed preparations is Agave americana mother tincture, widely sold in herbal and homeopathic medicine stores for digestive complaints, skin disorders, and mild inflammatory conditions. Dried leaf extracts and powdered formulations are also marketed as herbal supplements, primarily for their antioxidant and anti-inflammatory properties. [38]

In some regions, the plant sap is processed and sold in small-scale traditional markets as a natural remedy for constipation and liver-related ailments. Additionally, the strong leaf fibers are commercially used in the manufacture of ropes, mats, baskets, and handicrafts, contributing to cottage industries. Although commercial agave syrup is more commonly derived from species like Agave tequilana, Agave americana is sometimes locally processed for sweet sap and fermented beverages. Overall, the marketed products of Agave americana are mainly found in herbal medicine, traditional remedies, and fiber-based household goods rather than large- scale pharmaceutical industries. [39]

Fig 9: Marketed Product

1. AGAVE NECTAR / AGAVE SYRUP PRODUCTS

Agave nectar (or agave syrup) is a natural sweetener extracted from the sap of agave plants and commonly used as a substitute for sugar or honey. It is widely used in beverages, bakery products, and health foods. [40]

EXAMPLES OF MARKETED PRODUCTS:

- **Nectavé Organic Blue Agave Nectar** – natural sweetener used in drinks and foods.
- **Madhava Organic Agave Nectar** – organic sweetener used in cooking and baking.
- **Wholesome Organic Blue Agave Syrup** – commonly used in beverages and desserts.

- **NOW Foods Organic Agave Nectar** – plant-based sugar substitute.
- **Nature's Agave Syrup (Clear, Amber, Raw)** – natural agave sweetener products.

2. AGAVE-BASED ALCOHOLIC BEVERAGES

Agave plants are widely used to produce distilled alcoholic drinks.

EXAMPLES OF MARKETED PRODUCTS:

- Tres Agaves Tequila (Blanco, Reposado, Añejo) – tequila made from 100% blue agave.
- 1519 Tequila – certified organic tequila derived from agave.
- DesmondJi Agave Spirit (India) – India's first agave-based liquor produced from agave plants grown on the Deccan Plateau.
- Tijuana Sweet Heat – tequila-based liqueur containing agave nectar.

3. AGAVE-SWEETENED BEVERAGES

Agave-sweetened beverages are drinks in which **agave nectar or agave syrup** is used as a natural sweetening agent instead of refined sugar. Agave nectar is obtained from the sap of the agave plant and contains mainly fructose, giving it a high sweetness level with a lower glycemic index compared to regular sugar. Because of this property, it is often used in health drinks, soft drinks, flavored waters, smoothies, and energy beverages. The use of agave syrup in beverages provides a mild flavor, good solubility, and a natural sweet taste, making it suitable for both hot and cold drinks. Some commercial beverages such as agave-sweetened sodas and organic drinks use agave nectar as a healthier alternative to artificial sweeteners. Additionally, agave- based beverages are popular among consumers who prefer natural and plant-based ingredients in their diets.

Additionally, agave-sweetened drinks may contain small amounts of bioactive compounds such as saponins and polyphenols that contribute to antioxidant activity. Because of these properties, beverages sweetened with agave have gained popularity in health-conscious markets and are increasingly utilized in functional and herbal beverage formulations.

In traditional cultures, agave sap has long been used to prepare fermented beverages. Indigenous communities in Mexico have historically extracted the sap from mature agave plants and allowed it to ferment naturally to produce beverages with mild alcoholic content. One well-known traditional drink is pulque, which is prepared by fermenting the fresh sap of agave plants. Although pulque is typically associated with other agave species, the tradition of producing fermented drinks from agave sap reflects the cultural significance of the plant. These traditional beverages demonstrate how agave has served as both a nutritional and social resource for centuries.

EXAMPLE:

- **Oogavé Organic Sodas** – agave-sweetened soft drinks with flavors like grapefruit, cola, ginger ale, and lemonade.

Table 4: (Marketed Products and Key Ingredients)

Sl. No.	PRODUCT NAME	MAJOR INGREDIENT(S)
1	Wholesome Organic Blue Agave Syrup	Blue Agave Nectar
2	NOW Foods Organic Agave Nectar	Organic Blue Agave Syrup
3	Urban Platter Mexican Agave Syrup	Agave Syrup (Agave plant extract)
4	Groovy Food Co. Organic Agave Nectar	Organic Agave Nectar
5	Fructo 100% Blue Agave Syrup	Blue Agave Syrup
6	Treeannsea Agave Cactus Desert Ampoule	Agave Extract, Hyaluronic Acid
7	Skybottle Blue Agave Body Butter	Agave Extract, Shea Butter
8	Agave Cooling Hydrogel Face Mask	Agave Extract, Glycerin
9	T'else Blue Agave Moisturizing Face Cream	Blue Agave Extract, Ceramides
10	Biore Blue Agave Deep Cleansing Pore Strips	Blue Agave Extract, Charcoal

ETHNOMEDICAL USES OF *AGAVE AMERICANA*

Agave americana has been widely used in ethnomedicine by various indigenous and rural communities for the treatment of different

ailments. Traditionally, different parts of the plant such as leaves, sap, roots, and juice are used in herbal remedies. The fresh leaf juice is commonly applied to wounds, cuts, burns, and skin infections because of its antiseptic and healing properties. In many traditional practices, the sap of the plant is used as a remedy for digestive problems, constipation, and stomach disorders. The plant is also used as a diuretic to promote urination and help treat urinary tract problems. In some cultures, *Agave americana* preparations are used to relieve cough, bronchitis, and other respiratory conditions due to their anti-inflammatory and expectorant effects. Additionally, traditional healers have used the plant for treating liver disorders, joint pain, and inflammation.[41]

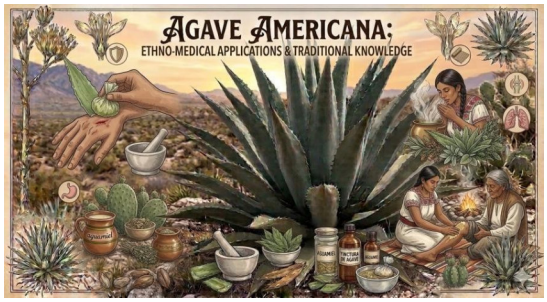

Fig 10: Ethnomedical Uses

Table 5: (Ethnomedical Uses)

S. No	Plant Part Used	Traditional Use	Method of Application
1	Leaves	Wound healing	Fresh leaf pulp applied on wounds and cuts
2	Leaf juice	Burns and skin infections	Juice applied externally on affected area
3	Sap	Digestive disorders	Sap taken in small amounts for indigestion and constipation
4	Leaves	Anti-inflammatory	Crushed leaves used as poultice on swelling
5	Sap	Diuretic	Consumed traditionally to increase urine output
6	Leaf extract	Respiratory problems	Used in traditional remedies for cough and bronchitis
7	Roots	Liver disorders	Root decoction used in folk medicine
8	Leaves	Joint pain	Leaf paste applied on painful joints
9	Sap	Fever	Small doses used in traditional treatment
10	Leaf gel	Insect bites and rashes	Gel applied on affected skin

CONCLUSION

Agave americana is a medicinally and economically valuable succulent with a long history of traditional use. The plant is rich in bioactive constituents such as steroidal saponins (hecogenin, tigogenin), flavonoids, phenolic compounds, and fructans, which contribute to its diverse pharmacological activities. Scientific studies support its anti-inflammatory, antimicrobial, antioxidant, hepatoprotective, wound healing, and diuretic properties, validating many of its ethno medicinal applications. In addition to its therapeutic potential, Agave americana has ecological and industrial significance due to its drought tolerance, fiber production, and use in traditional preparations. However, further research including standardization of extracts, toxicity evaluation, and clinical trials is necessary to establish its safety and efficacy for modern medicinal use.

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