
Ethno-Medicinal and Therapeutic Potentialities and Update of Different Species of Aloe –A Miraculous and Wonderful Ancient Medicinal Herb

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Abstract:

The term ethno-medicine is the medical practices for the treatment of ethnic or aborigine people for their health care and myriad uses in traditional therapeutics. Perhaps, genus Aloe has the longest recorded history of traditional therapeutic usage, beauty, skin care and is amongst the most widely used as alternative medicinal plants through worldwide. This indigenous medicinal herb are used for treatment of skin disorders like burns, cuts, eczemas, insect bites, wound etc. in dermatology and digestive protective properties due its anti-inflammatory, anti-microbial, anti-cancerous action, anti-neoplastic activity, analgesic, anti-tumours and wound – healing for its antiseptic properties and pharmacological or therapeutic properties. Almost 75 potentially active components includes enzymes, essential amino acids, vitamins, lignins and steriods, minerals, carbohydrate, saponin, salicylic acids, phenolics etc. and rich in bioactive ingredients like aloe- emodin (anti-diabetic, cardio-protective, skin and bone protection, anti-cancer and anti-microbial activities etc.), aloin or barbaloin (anti-diabetic, skin and bone protection, anti-cancer activities), aloesin (skin and anti-cancer properties), acemannan (digestive protection, skin care, anti-microbial properties), alprogen (anti-allergic and anti-inflammatory activity) etc. have been isolated from different aloe species and most of them have therapeutic uses due to their analgesic, emollient, anti-oxidant, anti-helminthic, anti-arthritic, anti-diabetic, purgative, anti-fungal, antiseptic, aphrodisiac, antimicrobial and antiviral activities. This review provides an update overview of medicinal and therapeutic possibilities or potentialities of aloe plant products or their active phytochemicals in the treatment of several health hazards or their innumerable therapeutic use.

Keywords: *Aloe species, ethno-medicinal, therapeutics, bioactive compounds and potentialities.*

4.1 Introduction:

Aloe Vera is a succulent plant grown in arid and subtropical regions and best known herbal medicinal wonder plant that is most widely used for their healing and therapeutic properties in Ayurvedic, homeopathic and allopathic streams of medicines. The word ‘Aloe’ comes from the Arabic word ‘**Alloeh**’ meaning ‘**shinning bitter substances**’ and ‘Vera’ is a Latin

word meaning ‘true’. Aloe vera is regarded as ‘**universal panacea**’ by Greek and as ‘**the plant of immortality**’ by Egyptian. In Sanskrit, Aloe vera is also called **Ghrithkumari** meaning “**Young girl**” which gives woman youth and femininity. At present about 580 species of aloe have been identified out of which nearly 160 species are indigenous to South Africa and among them *Aloe barbadensis* Miller belongs to Asphodelaceae (Liliaceae) family and this miller variety is best known beneficial for therapeutic use, skin ailments and usually mentioned as edible one.

Aloe vera is specifically refers to the *Aloe barbadensis* Miller and it is most commonly used in commercially as Aloe-based products (latex, cream, lotion, gel etc.) in many cosmetic industries for its healing as well as nourishing properties. Aloe gel obtained from the parenchymatous cells in the inner leaves and latex obtained from pericyclic cells in the leaf margins that mainly used for its laxative purpose. Aloe vera has also been recommended for relieve during constipation and gastrointestinal disorders and to improve health and to boost up immune system. It also used to prevent several diseases. *Aloe Vera*, *Aloe ferox*, *Aloe barbadensis*, *Aloe perryi*, *Aloe arborescens* are well investigated and most widely aloe species used as herbal medicinal industries and also therapeutic purposes. Among these, only two species viz. *Aloe barbadensis* Miller and *Aloe arborescens* are grown commercially. In this present article, an overall focuses may have to be represented on the details bioactive compositions isolated and identified from different parts of *Aloe vera* and their medicinal uses due to their pharmacological activities as well as therapeutic properties.

4.2 Botanical and Anatomical Depiction:

Aloe vera is a shrubby arborescent, perennial, xerophytic and succulent plant that depicted by stem less, thick and fleshy triangular leaves with serrated edges and spiny margin. Leaves contain saps or juices that are yellow in colour with bitter in taste due to presence of anthraquinone and glycosides and leaf pulp is the innermost portion of the leaf that contains colorless aloe gel (mucilage) obtained from parenchymatous leaf cells [Bruneton, 1995]. The aloe gel from innermost layer of leaf contains water up to 99% along with 1% of glucomannans, amino acids, lipids, vitamins and sterol etc. [Reynolds and Dweck, 1999; Brown, 1980]. Plant bears yellow tubular flowers and fruits that contain large number of seeds.

4.3 Phytochemical Composition of Aloe and Their Properties:

Several physiologically bioactive compounds have been isolated and well-identified from different species of *Aloe vera* which have different pharmacological activities and therapeutic properties. The composition of these photochemical may varies with the fluctuation of weather and climate and variation with the soil, growing regions, age of the plant etc. [Eshun and He, 2004; Boudreau and Beland, 2006]. *Aloe vera* contains more than 75 various bioactive substances identified and isolated mostly from leaves in the form of gel or latex that includes sugars (mannose, glucomannans); minerals (Zn, Cu, Se and Ca), enzymes (aliase, amylase, alkaline phosphate, cellulose, catalase, kinase, carboxypeptidase, peroxidase, and lipase etc.); vitamins (A, C, E and B12), anthraquinones with laxative actions (aloin, emodin), fatty acids (lupeol, campesterol), hormones (auxins and gibberellins with anti-inflammatory activity) and some other phytochemicals like

salicylic acid, amino acids, lignin and saponins etc. [Surjushe et. al., 2008; Malik and Zarnigar, 2003 and Mann et. al., 2018; Atherton, 1998; Shelton, 1991 and Atherton, 1997; Rodríguez et. al., 2005]. According to Rabe and Staden (1997), various phytoactive substances isolated from Aloe vera act as antiseptic, anti-inflammatory, anti-bacterial, anti-oxidant, antoi-diabetic and anti-cancer etc. as these bioactive constituents are used in the treatment of stomach ailments, gastrointestinal disorders, skin ailments, wound healing, burns and diarrhea etc.

Table 4.1: Major phyto-active substances identified and isolated from *Aloe vera* and their properties.

Major active compounds	Active bio-components	Properties and activities
Enzymes	Amylase, alkaline phosphate, lactate dehydrogenase, lipase [Hayes, 1999], aliase, catalase, kinase, carboxypeptidase, peroxidase, cellulose and lipase oxidase, cyclooxidase etc.	Catalytic breakdown in sugars, proteins and fat and reduces excessive inflammation.
Amino acids	Essential amino acids: Lysine, leucine, isoleucine, valine, threonine,phenylalanine and methionine. Non-essential amino acids: Histidine, proline, glycine, tyrosin, alanine, hydroxyl proline, arginine, aspartic acid, glutamic acid etc.	Basic building blocks of proteins and muscles tissue.
Minerals	Zn, Cu, Se, Cr, Fe, K, Cl, Mg,P, Na, Mn and Ca etc. Al, B, Ca, Fe, Mg, Na, P and Si etc. [Yamaguchi et. al.,1998; Femenia et. al., 1999 and Choi et. al., 2001].	Activating various enzymes indifferent metabolic activities and some of them act as anti- oxidants.
Vitamins	A, C, E and B1, B2, B6 and B12, folic acid and choline etc.	Act as anti-oxidants and protect the body by neutralizing free radicals
Hormones	Auxins and gibberellins.	Wound healing with anti-inflammatory activity.
Anthraquinones, chromones	Aloin, barbaloin, emodin[Hayes, 1999], aloetic acid, alovin, anthracine, anthranol, isobarbaloin, ester of cinnamic acid.	Act as laxatives; analgesic, antiviral and antibacterial. These quinines and chromones have also anti-cancer, anti-inflammatory andevacuating activities [Choi et.al. 2001].

Major active compounds	Active bio-components	Properties and activities
Steroids	Campesterol, cholesterol, β -sitosterol and lupeol.	Anti-inflammatory [Haller, 1990], and have antiseptic and analgesic properties.
Fatty acids	Linolenic acid, arachidonic acid, γ -linolenic acid, triglycerides.	Anti-inflammatory properties.
Saccharides/carbohydrates	Mannose, glucomannans, cellulose, glucose, fructose, galactogalacturan, acemanan, glucogalactomannan, galactoglucoarabinomannan, arabinogalactan, pectic substance, xylan, cellulose, L- rhamnose, and aldopentose.	Anti-viral, immune modulating activity.
Glycosides	Saponins	Cleansing and antiseptic properties.
Salicylic acids	Aspirin	Analgesic, anti-inflammatory, anti-bacterial properties. [www.healingaloe.com]

4.4 Medicinal and Therapeutic Potentialities of *Aloe Vera*:

Different aloe products like aloe gel, aloe juice, aloe leaf extracts, aloe cream and powdered extracts from leaf rind latex (laxative properties) etc. have wound healing, anti-inflammatory, antibacterial, antiviral, anti-tumours, antiseptic, analgesic, anti-proliferative, anti-diabetic, anticancer, antifungal, skin soothing and moisturizing, cooling and anti-aged properties and cosmetic and skin protection from UV and gamma radiation, laxative and immunization activities.

It has role in gerontology and rejuvenation of aged skin. It is suggested to use aloe vera products in the treatment of arthritis, asthma, diarrhea, constipation, inflammatory bowel diseases, and ulcer and provides relief from several skin ailments (skin burns, rash, insect stings, eczema and allergy etc.). This herb contains lupeol, salicylic acid, cinnamonic acid and phenols that are used as potent antiseptic agents.

The aloe gel contains a number of glycoproteins that has anti-ulcer and anti-tumour activities (Choi et. al., 2001; Yagi et.al., 1997 and 2003); gel is used in ulcerative colitis (Langmead et. al., 2004 and Thomas et. al., 1998) and for treatment in wounds, burns and skin irritations, constipation, diabetes, arthritis, coughs and ulcers (Eshun and He, 2004; Vogler and Ernst, 1999). Such gel is also used for the treatment of radiation burns and ulcers [Syed et. al., 1997] and they have been reported as protective against the radiation damage

to the skin [Sato et. al., 1990 and Rajput et. al., 2009]. The application of aloe gel also has been reported in dentistry [Wynn, 2005]. In cosmetic industry, Aloe gel is used as skin tonic as improved the skin integrity, decreased acne wrinkle appearance (anti-acne effect) and decrease erythema [West and Zhu, 2003].

The leaf pulp is used externally for the treatment of skin disorders like burns, acne etc. It has been reported that also juice is used to improve the digestive system, proper functioning of the gallbladder, liver and kidneys. Due to its detoxifying activity, it is extensive used in the treatment of arthritis, liver complaints, bronchitis, jaundice, piles, eye disease and tumours etc. Aloin (Aloe glucosides) are extensively used as drugs in many pharmaceutical industries for treating urine related problems, pimples, ulcers and used in gerontology and rejuvenation of aged skin. Aloe juice is used as stomach tonic and purgative. It's sterols like campesterol, lupeol, cholesterol and β -sitosterol etc. are used in reducing inflammation and act as natural analgesic. The different bioactive compounds in aloe vera are used in ayurvedic formulations due to its anti-helminthic and purgative properties for treatment of cough, cold, piles, asthma and jaundice [Joseph and Raj, 2010]. Due to presence of antiseptic agents in aloe vera like lupeol, salicylic acid, phenols, sulfur, cinnamonic acid, urea nitrogen etc. they exhibits different anti-fungal, anti- viral and anti-bacterial activities [Surjushe et. al., 2008; Zawahry et. al., 1973].

4.5 Conclusion and Future Scenario:

Aloe vera has proven its wide range of application in the arena of medicinal and therapeutic ailments. This plant showed importance in everyday life for skin ailments, anti-aging, wound healing, antiseptic, antioxidants, analgesic, and anti- inflammatory and also used in cosmetic and pharmaceuticals industries. The active ingredients identified as well as isolated till date already showed diversified uses in herbal medicinal treatment and hopefully many of its hidden ingredients may have immense power to treat several other diseases also. Among various bioactive compounds, major research focused on aloemodin, aloin, aloesin, amodin, acemannan etc. whereas emodin and aloin have been most studied ones and they have been well reputed for their anti-microbial, anti-diabetic, antiseptic, anti-inflammatory and skin protective properties. Basic clinical research on this plant's bimolecular compounds and their application particularly on bone protection, cardiovascular diseases, cancer and diabetics etc. is utmost essential in future. Thus, this wonder plant is in need to further research emphasizing for better utilization for human kind.

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