An Overview on the Medicinal Properties of *Acacia nilotica*

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Abstract
Acacia nilotica Linn. commonly known as Babul and Kikar has been used in Unani and other Indian System of Medicine for hundreds of years for the prevention and treatment of various health ailments. It is also known as the Egyptian acacia, gum Arabic tree, thorny acacia, acacia gomifera, and so on. There are total nine sub species in the *Acacia nilotica*. *Acacia nilotica* plays an important role in the prevention and management of various diseases. It can be used in future as herbal drugs with ecofriendly, non-expensive and without any side effects. This article briefly reviews the medicinal uses of *Acacia nilotica* with plant description.

Keywords: *Acacia nilotica*, Medicinal Properties

Introduction
Acacia nilotica
Acacia nilotica Linn. belongs to the kingdom Planate and family *Fabaceae* (Rather and Mohammad, 2015). It is the second-largest genus of the family *Fabaceae*, with about 1350 species. *Acacia nilotica* Linn. commonly known as Babul and Kikar has been used in Unani and other Indian System of Medicine for hundreds of years for the prevention and treatment of various health ailments (Tyagi *et al.,* 2016). There is total nine sub species in the *Acacia nilotica*. It is medium in size and thorny and has height approximately around 21-24 m and will not grow properly if suitable conditions are not given to it.

Acacia nilotica and its chief phytoconstituents play a pivotal role in several therapeutic strategies. Approximately all parts of *Acacia nilotica* such as the leaves, roots, seeds, bark, fruits, flowers, gum and immature pods act as anti-cancer, antimutagenic, spasmogenic, vasoconstrictor, anti-pyretic, anti-asthamatic, cytotoxic, anti-diabetic, anti-platelet agregatory, anti-plasmodial, molluscicidal, anti-fungal, inhibitory activity against Hepatitis C virus (HCV) and human immunodeficiency virus (HIV)-I and antioxidant activities, anti-bacterial, antihypertensive and anti-spasmodic activities, and are also engaged for the treatment of different ailments in the indigenous system of medicine.

Taxonomical Classification

Kingdom - Plantae

Subkingdom - Tracheobionta

Division - Magnoliophyta

Class - Magnoliopsida

Subclass - Rosidae

Order - Fabales

Family - Fabaceae

Genus - *Acacia*

Species - *nilotic*

Phytoconstituents

Acacia nilotica has various complex phytoconstituents including alkaloids, volatile essential oils, phenols, phenolic glycosides, resins, oleosins, steroids, tannins and terpenes. This plant is rich in phenolics, consisting of condensed tannin and phlobatannin, gallic acid, protocatechuic acid, pyrocatechol, (+) -catechin, (-) epi-gallocatechin-7-gallate and (-) epigallocatechin-5, 7-digallate. The compounds such as kaempferol-3-glucoside, iso-quercetin, catechin, kaempferol, galactose, l-arabinose, l-rhamnose, etc are also present in this plant. These types of phytoconstituents play a role in the therapeutic actions of *Acacia nilotica*. Earlier traditional description confirmed that *Acacia nilotica* has a rich amount of nutrients and contains a high therapeutic value which is capable of prevention, mitigation, and treatment of various infectious diseases and deleterious conditions (Sadiq *et al.,* 2015). It is considered a safe medicinal plant and modulates the numerous therapeutic actions without any adverse effect. The isolated bioactive constituents of *Acacia nilotica* are summarized in table 1 (Khare, 2005; Parajapati and Kumar, 2005).

Possible Mechanism of Action of *Acacia nilotica*

Flavonoids present in the flower, fruit, and leaves are the key constituents responsible for an anti-microbial property. The plant parts exhibit anti-microbial role through inhibition of microbial growth, inhibition of cytoplasmic membrane function, inhibition of the attachment and biofilm formation, and alteration of the membrane permeability (Hakeem and Al-Mufridat, 2002; Al-Din and Al-Mufridat, 2007; Katiyar *et al.,* 2013). *Acacia nilotica* plays an important role as free radical scavenging properties due to a rich source of antioxidants like flavonoids, phenolics, tannins, curcumin, and terpenoids. They can reduce the contact of oxidants and other toxic molecules due to their ability to scavenge oxygen-nitrogen-derived free radicals by donating hydrogen atom or an electron, chelating

metal catalysts, activating antioxidant enzymes, and inhibiting oxidases. *Acacia nilotica* ingredient shows an effective role in the management of cancer through the regulation of cell signalling pathways. It modulates the activity of various tumour suppressor genes, angiogenesis, and apoptosis (Rafeequddin and Al-Adwiya, 1985; Tariq and Al-Mufridat, 2010). *Acacia nilotica* also plays a role as an anti-inflammatory via regulation of pro-inflammatory enzyme activities including cyclooxygenase and lipoxygenase enzyme. Among the phytoconstituents found in plants like flavonoids, polysaccharides and organic acids may be mainly responsible for its pharmacological action (Al-Din and Nafeesi, 2007; Kalaivani and Mathew, 2010; Badshah and Hussain, 2011). Tannin is an active chemical responsible for its anti-diabetic activity (Chopra *et al.,* 2002; Khan and Muhit-i-Azam, 2012; Bansal and Goel, 2012).

TABLE-1: PHYTOCONSTITUENTS OF *Acacia nilotica* Linn.

Composition	Bioactive constituents	References
Alkaloids	Dimethyltryptamine, N-methyltryptamine, tryptamines	Auwal *et al.,* 2014
	Methyl gallate	Sharma *et al.,* 2014
	Ethyl gallate	Kalaivani and Mathew, 2010
Tannins	Gallic acid, Ellagic acid	Singh *et al.,* 2009(a)
	Gallocatechin-5-O-gallate, Dicatechin, Polygalloytannin	Jigam *et al.,* 2010
Proteins	Cysteine, Methionine, Threonine, Lysine, Tryptophan	Abbasian*et al.*, 2015
	D-pinitol	Chaubal*et al.,* 2005
Polysaccharides	T-Sitosterol	Sundarraj*et al.,* 2012
	Acanilol	Tindale and Roux, 1969
Terpenes	Lupenone, Lupeol, Niloticane	Ahmadu *et al.,* 2010; Jangade *et al.,* 2014; Salem *et al.,* 2011

	D-Galactose, L-Arabinose, L-Rhamnose	Anderson and Karamal, 1996
Gums/Fatty acids	6-O-(β-D-glucopyranosyluronicacid)-D-galactose	Chaubal*et al.*, 2005
	4-O-(α-D-glucopyranosyluronicacid)-D-galactose	Chaubal*et al*., 2005
	Gallic acid, Tannic acid, Cresol	Seigle, 2003; Sultana *et al.,* 2007
Flavonoids	Kaempferol kaempferol-3-glucoside, iso-quercitin, leucocyanidi, Catechin, Catechin-7-O-gallate,Quercetin, Quercetin-3-O-β-glucopyranoside, Naringenin, Naringenin-7-O-β-glucopyranoside	El-toumy *et al.,* 2011; Leela *et al.*, 2010; Singh *et al.,* 2008
	Chalconaringenin-4′-O-β-glucopyranoside	Khare, 2005; Prajapati *et al.,* 2009

Conclusion

Acacia nilotica and its chief phytoconstituents play a pivotal role in several therapeutic strategies. Approximately all its parts are used in medicinal purpose such as the leaves, roots, seeds, bark, fruits, flowers, gum and immature pods act as anti-cancer, antimutagenic, spasmogenic, vasoconstrictor, anti-pyretic, anti-asthamatic, cytotoxic, anti-diabetic, anti-platelet agregatory, anti-plasmodial, molluscicidal, anti-fungal, inhibitory activity against Hepatitis C virus (HCV) and human immunodeficiency virus (HIV)-I and antioxidant activities, anti-bacterial, antihypertensive and anti-spasmodic activities, and are also engaged for the treatment of different ailments in the indigenous system of medicine.

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