Review Article

A REVIEW ON THE RESTORATIVE IMPACT OF *ACACIA ARABICA*

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Article Received on: 03/12/21 Approved for publication: 17/01/22

DOI: 10.7897/2230-8407.1212173

ABSTRACT

From ancients, herbal medicines are used in the management and cure of various physiological abnormalities. In this 21st century, a huge part of the world's population still depends mostly on the conventional system of medicine as these medicines are economical, easily available, and have minimal side effects. *Acacia arabica* commonly known as Babool, indigenously found in India possessed a variety of pharmacological effects when used in different traditional formulations. There are about 1350 *Acacia* species available worldwide. In India, *Acacia arabica* is widely spread in Jammu, Himachal Pradesh, Uttar Pradesh, Punjab, Madhya Pradesh, Orissa Bihar, and Andhra Pradesh. The use of *Acacia arabica* in the traditional formulation is popularized due to its diverse pharmacological activity. Recent research on *Acacia arabica* revealed that the plant is rich in antioxidants such as catechin, ellagic acid, epigallocatechin, kaempferol, gallic acid and is used in the treatment of inflammation, pain, diabetes, allergy, asthma, bronchitis, amoebiasis, dermatitis, and cardiovascular diseases like hypertension, atherosclerosis, and myocardial infarction. *Acacia arabica* is also found to be efficient in infection caused by bacterial, fungus, and protozoa. In this present review, our sincere efforts have been given to summarize the various biological active ingredients of *Acacia arabica* and their pharmacological effects reported by different researchers.

Keywords: *Acacia arabica*; herbal medicine; antioxidants; babool; traditional formulations.

INTRODUCTION

Herbal-based medicines date backside numerous centuries to the Rig-Veda, the set of Hindu revered verses is the source of a physical condition system known as Ayurvedic medicine¹. The individual helpful plant that has moved toward from Ayurvedic tradition is *Acacia arabica*². The antique report points out that, all parts of the global citizen revealed and developed medicinal uses of neighboring plants. When skill progressed, a dichotomy in medication developed between practitioners of herbal medicine and usual physician³. The majority of the herbal-based remedies had a resonance scientific basis and a few became functional prescriptions drugs. Now a day's medicinal plants still supply appreciably to prescription drugs and 35% of prescriptions printed in the U.S. include plant-derived vigorous ingredients⁴. Significance in medicinal plants has to pay attention to native people in various parts of the world. There are about 1350 *Acacia* species available worldwide⁵. In India, one of the acacia species, commonly known as *Acacia Catechu* is widely spread in Jammu, Himachal Pradesh, Uttar Pradesh, Punjab, Madhya Pradesh, Orissa Bihar, and Andhra Pradesh⁶. Different parts of the *Acacia* plant such as bark, flowers, leaves, seeds, roots, and pods are used by traditional healers for the treatment of many ailments by many cultures⁷⁻⁸. It has an extensive division in Africa and Asia, it is insidious and capable to adjust the unreliable environmental situation and major parts of the plant have been used to care for diverse ailments. Further often studied on acacia in the ancient world include *Acacia confusa*, *Acacia nilotica*, and *Acacia catechu*. Amongst African acacias, *Acacia aroma* is a mainly investigated species due to its cost-effective significance

as a foundation of strong tannins⁹⁻¹⁰. This chapter offers a recent and complete review of *acacia* species, covering their taxonomical, ethnomedicinal, chemical, and pharmacological features.

Taxonomy

The acacia is a large genus of 1350 species, the second largest among the *Fabaceae*¹¹. The name *Acacia* originated from an African species. This name comes from the Greek word "akakia" which means "thorn" as varieties of the African *Acacia* species contain thorn. *Acacia* is one of the largest genera with two subgenera, *Acacia aculeiferum* and *Acacia phyllodineae*. Both subgenera were crops at the genus level, but the reclassification of this plant has not been largely determined due to insufficient supporting data. Recently, molecular evidence suggested five genera of *Acacia*¹².

African haunted species original kind of *Acacia Acacia* Thus, if *Acacia* was dividing into five genera along with the original African type, then whole 960 Australian species have required to converted innovative name. Therefore, Orchard and Maslin anticipated that the forms of *Acacia* be converted from American species (*Acacia catechu*) to an African species (*Acacia penninervis*)¹³. And remaining 500 species (mainly in America and Africa) would require a name alter. In 2004, this contentious offer concerning the name of *Acacia* was official at the 107 International Botanical Congress¹⁴. On the other hand, as the immense greater part of the journalism, first and foremost relating

to phytochemistry, treats *Acacia* as of the major genus, i.e. this move toward is also used in this manuscript.

ACACIA AS ETHNOMEDICINE

Plants have given treatment in customary pharmaceutical frameworks for a long time prior sometime recently the starting of modern pharmaceuticals and more than 70% of people in all of the nation still depend upon conventional medication frameworks¹⁵. The current assessment recommended that quite a lot of 1000 plant species in various civilizations have been utilized as medicine, in a simple form of raw materials plants. By tradition, outstanding to their adaptability and accessibility *Acacia* has a very long historic period¹⁶. It is reported that antique Egyptian development used enormous forms of *Acacia* species (e.g., *Acacia bivenosa*) to treat various diseases like cancer, asthma, fungal infections, diabetes, and skin diseases. Approximately 80% of *Acacia* species are native to the U.S.¹⁷⁻¹⁹. The present review showed that in the region of 60% of *Acacia* commonly used in America and Asia Table -1 summarizes the majority of significant applications of *Acacia* in ethnomedicine. The bark of *Acacia salicina* is used by local Australian civilization as Antiallergic medicine, to stop bleeding after childbirth, and as a pesticide for poisoning fish. While, in Tunisia, fresh and dried leaves of *Acacia arabica* plants are used in the

healing of cancer, inflammation, and infertility. A different example is the *Acacia nilotica* evergreen plants which immerse a top position in established medicine in lots of countries. It is extensively found in America, from Senegal to Africa and in Asia²⁰. Although *Acacia nilotica* has only some frequent traditional uses (in the treatment of diabetes, malaria, wound healing, and cough) in different cultures, *Acacia nilotica* is utilized commonly against jungle fever in Africa, but ordinarily, it isn't broad in Asia²¹. *Acacia nilotica* is utilized commonly against intestinal sickness in Africa, but expectedly it isn't broad in Asia. Out of the 360 species of acacia found in Australia, a little number of *Acacia* species have been utilized by unique Australians in their conventional pharmaceutical as of now. *Acacia* was for the foremost portion utilized as a food and flavor enhancer²². There are reports on the use of *Acacia* species (e.g. *Acacia farnesiana*, *Acacia mellifera*, *Acacia bivenosa*, *Acacia multispinosa*, *Acacia raddiana*, *Acacia nigrescens*, *Acacia ixiophylla*, *Acacia melanoxylon*, *Acacia gerrardii*, *Acacia suma*, *Acacia pyrifolia*, *Acacia aroma*, *Acacia nilotica*) has been used for treating fever, cold, diarrhea, dysentery and wound healing. Other species such as *Acacia aroma*, *Acacia catechu*, and *Acacia indurifolia* have been reported for their use in the treatment of CVS disease, leprosy, rheumatism, stomach disorder, asthma, cancer, and diabetes²³⁻²⁵.

Table 1: Ethnomedicinal uses of Acacia Species

Species	Parts Used	Region	Traditional Uses
<i>Acacia adsurgens</i>	Pods, Bark	Rumania	Gastroprotective, used in ophthalmic preparations ²⁶
<i>Acacia albida</i> Delile	Gum	Kenya	The bark is used in the healing of resting conditions of cattle malaria and is helpful to prevent difficult delivery ²⁷⁻²⁸ .
<i>Acacia aneura</i> Benth.	Roots	Africa	Antipyretic action, anthelmintic, is also used in cough and cold ²⁹ .
<i>Acacia arabica</i>	Leaf	India	Astringent, diarrhea, and dysentery ³⁰ .
<i>Acacia aroma</i> Gillis	Stem, bark	Australia	Stem and bark showing the activity against arthritis, diuretics use. Also used in the treatment of wound healing, GIT disorders, and antiseptic ³¹ .
<i>Acacia asak</i>	Stem cortex	Yemen	Peptic ulcer, antifungal, and skin diseases ³² .
<i>Acacia bivenosa</i>	Pods	Brazil	Antidysentery, used in treatment for gastric distresses ³³ .
<i>Acacia catechu</i>	Stem, pods	Pakistan, India	Treatment against fungal infections, dentifrices ³⁴ .
<i>Acacia caesia</i> Willd.	Gum, root, leaf	India	Treatment of hyperglycemia and externally for allergic reactions ³⁵ .
<i>Acacia colei</i> Maslin	Stem	Afghanistan	Used as antidandruff, astringent ³⁶ .
<i>Acacia concinna</i>	Gum, stem	Brazil, U.S	Stem concoction is taken orally for the treatment of cough and used as antimalarial ³⁷ .
<i>Acacia confuse</i>	Leaf	Taiwan	The fluid of leaf extract used for wound healing ³⁸ .
<i>Acacia cornigera</i>	Bark	Central America	Percolation, infusions, decoction, Baths, are used for anti-inflammatory effect ³⁹ .
<i>Acacia cuthbertsonii</i>	Seeds	Philippines	Treatment of cold, cough, fever and used as mouthwashes ⁴⁰ .
<i>Acacia decurrens</i>	Bark	China	Bark has been utilized for the treatment of dysentery ⁴¹ .
<i>Acacia dictyophleba</i>	Pods	Srilanka	Used in the treatment of diarrhea, antifungal ⁴² .
<i>Acacia Karroo</i> Hayne	Stem, root, bark	Southern Africa	Used for cough and cold wound healing, treatment of syphilis ⁴³ .
<i>Acacia leucophloea</i>	Bark	Bangladesh, Burma, India, Pakistan, Sri-Lanka, Thailand	The bark is used as anthelmintic, antidiarrhea, expectorant, ulcer healing, heavy bleeding, antiamoebic, treat snake poison, antiallergic ⁴⁴ .
<i>Acacia mellifera</i>	Bark	Africa	Used for the treatment of asthma, cardiotoxic, malaria sterility ⁴⁵ .
<i>Acacia oxyphylla</i>	Bark	India	The blend of stem barks is used to treat anthelmintic ⁴⁶ .
<i>Acacia pematula</i>	Pods	Pakistan	Treat against cardiovascular diseases such as stroke, cardiac arrest ⁴⁷ .
<i>Acacia pennivenia</i>	Leaf	Yemen	A semi-solid form of leaf is used for women with mastitis ⁴⁸ .
<i>Acacia pruinocarpa</i>	Bark	Africa	The bark is used against migraine ⁴⁹ .
<i>Acacia suma</i>	Bark, leaf	India	A dried branch of bark is used for the treatment of cold cough and uterine complaints Juice of leaves is also cures diabetic wound healing ⁵⁰ .
<i>Acacia tenuissima</i>	Leaf	Australia	These plants of the leaf are useful to clean skin for general complains ⁵¹ .

Table 2: Compounds present in *Acacia* species

Species	Chemical constituents	Method of detection	Pharmacological activities
<i>Acacia farnesiana</i>	Gallic acid	MS, UV	Antidiarrhoeal, antifungal
<i>Acacia mellifera</i>	Atranorine	NMR	Analgesic
<i>Acacia catechu</i>	(+) Catechin	HPLC-DAD	Antileprotic, antiasthmatic, antioxidant, antimicrobial
<i>Acacia nilotica</i>	(+)(-) catechin	UV, GC	Ophthalmic, antidiabetic, Antiasthmatic
<i>Acacia bivenosa</i>	Albiziine	PC	Antidermatitis, antiallergic
<i>Acacia molissima</i>	Gallic acid	HPLC, GC	Anti-inflammatory, antiseptic
<i>Acacia raddiana</i>	1,3-Di-O-galloyl-1-4, 6(-)-	NMR, MS	Antioxidant
<i>Acacia nigrescence</i>	3,4- Dihydroxybenzoic acid	NMR	Antifungal, anti-inflammatory, antiseptic
<i>Acacia ixiophylla</i>	Catechin	PC	Analgesic, antibacterial
<i>Acacia melanoxylon</i>	α -Amino- β -acetylamio propionic acid	PC, NMR	Antiarrthritic, antioxidant
<i>Acacia gerrardii</i>	Catechin-3'-O-gallate	NMR, MALDI	Antibacterial
<i>Acacia suma</i>	Gallactocatechin-4,8' epicatechin	NMR	Antibacterial, Antifluenza
<i>Acacia aroma</i>	Hexadecanoic acid(Palmitic acid)	IR, HPLC, GC	Antiinflammatory, antibacterial
<i>Acacia galpinii</i>	Melacacidine	PMR	Astringent, antifungal
<i>Acacia caffra</i>	Oleic, linoleic, stearic acid	NMR	Antiseptic, Antidermatitis
<i>Acacia Senegal</i>	Apigenine-6,8 bis c- β -Glucopyranoside	PMR	Antidiarrhoeal, antibacterial, ophthalmic
<i>Acacia confuse</i>	3,4-Dihydroxybenzoic acid	MS/MS	Antibacterial, antidiabetic
<i>Acacia deccurens</i>	Linolic acid	PC, NMR	Antiamoebic
<i>Acacia auriculiformis</i>	7,3',5'-trihydroxy-4'-methoxyflavan-3'-glucoside	IR, NMR, UV	Antidiabetic
<i>Acacia mearnsii</i>	(+) Pinitol	TOF, MS	Antiarrthritic, antioxidant
<i>Acacia pycnantha</i>	Myricetin-galloyl-rhamnose	HPLC DAD	Antidiabetic, neuroprotective
<i>Acacia deanoi</i>	D-Gallactopyranose	PMR	Antihypertensive
<i>Acacia doratoxylon</i>	L- rhamnose	MALDI	Antibacterial, Antiallergic
<i>Acacia implexa</i>	B-D-glycoside	MS/MS	Analgesic
<i>Acacia verniciflua</i>	Linoleic acid, oleic acid	IR, NMR	Antiasthmatic, antioxidant
<i>Acacia modesta</i>	L. arabinose	PMR	Antihyperglycemic

Fig. 1: Different chemical structures in *Acacia arabica* plant

PHYTOCHEMISTRY

This plant makes raised a variety of auxiliary metabolites. *Acacia* species are an affluent asset of bioactive compounds counting greasy acids, phenol, alkaloids, polysaccharides, terpenoids, saponins, nonprotein amines, and different natural acids. Current propels in the chromatographic division have revolutionized phytochemical tests for novel bioactive compounds⁵². The determination of phytoconstituents was from paper, thin-layer chromatography, and high-performance column chromatography, e.g. (HPLC) execution fluid chromatography and (GC) Gas chromatography, has worthy a more exact and total examination of plant extracts. Online spectroscopic methods combining chromatographic procedures such as photodiode cluster location (PDA) and mass spectroscopy (MS) with high-performance chromatography have produced an opulence of static information that has allowed less demanding acknowledgment of Phytochemical. Combination of the high-resolution quadrupole time of flight (Q-TOF) mass spectrometer with HPLC opens the phenomenal potential for the assurance of phytochemical constituents in plant extracts⁵³⁻⁵⁴.

Plant phenols

The main bioactive constituents of plant phenols represent the major group of secondary plant metabolites with worldwide occurrence in the plant kingdom. Though “polyphenols” most frequently term used to explain plant phenols in the literature, the prefix “poly” gives an incorrect thought and seems to prohibit many uncomplicated phenols. Hence, the term “Biophenols” seems to be a more accurate and inclusive explanation of this class of plant secondary metabolites. An assortment of phenolic subclasses that have been recognized in *Acacia* is phenolic acids, flavonoids, and tannins⁴⁸.

Phenolic acids

Phenolic acids are once in a while reported in their complementary and conjugated shapes in *Acacia*. Hydroxyl derivative of cinnamic acids (e.g., ferulic acid) and hydroxyl benzoic acids [e.g., Gallic and syringic acid] both have been acknowledged in these plants. *Acacia* presents highly phenolic acids were found to be Gallic acid derivatives. The majority of phenol acids have been distinguished within the cases. Amazingly a little sum of phenolic acids was found in leaf or bark. Gallic acid was measured as it were in pods and the concentration wellspring to be extended from 44 to 105 mg/g dry weight of Gallic corrosive in cases. This was various times higher than for seeds⁵⁵.

Tannins

Acacia species are the along these lines most bountiful compounds after flavonoids additionally hydrolyzable and condensed tannins (proanthocyanadins). They have been recognized and disconnected from assorted parts of several species. Proanthocyanadins are the most self-evident sort of tannins in *Acacia*. Proanthocyanadins dimmers are standard in Australian species with 6,20,50-trihydroxy substitution is most common but the 6,7,40- trihydroxy-teracacidin bunch is extraordinary in Australian species [56]. Bark extricate of *Acacia mearnsii* is the world's most extreme yielding source of elevated quality condensed tannins. Due to its tannin constituent and this species of bark may be a significant renewable industrialized source of normal polymers for cement fabricating. It is one of the foremost worldwide tannins make species in Brazil. The extracts comprise catechin, epigallocatechin, oleic, linoleic, stearic acid severed from *Acacia caffra*, *Acacia suma* bark extricate contains

condensed tannin gallactocatechin-4,8'-epicatechin⁵⁸. *Acacia galpinii* and *Acacia caffra* contain 1,3-Di-O-galloyl-1-4,6(-)-oxidisable. Condensed tannins were also recognized in *Acacia F. verniciflua*⁵⁹.

Amines and alkaloids

These are found in leaves, pods, flower, bark, and roots of *Acacia*. α -Amino- β -acetyl amino propionic acid both been reported in subgenus *Acacia melanoxylon* (e.g., *Acacia caesia* *N*-methyltyramine was also reported in the *Phyllodineae* which is possibly the most deliberate species in subgenus *Acacia melanoxylon* contains amines such as tyramine *N*-methyltyramine *N*-methyl-*b*-phenethylamine hordenine and alkaloids including amphetamine methamphetamine nicotine and nor-nicotine⁶⁰.

PHARMACOLOGY

Current and established approaches to healthcare often continue living side by side, in a harmonizing technique. Ethno curative practices have become renowned tools in the look for new pharmaceuticals. In recent times, there has been rehabilitated attention in evaluating plant constituents for their pharmacological activity and to monitoring for successful and safe Phytochemical⁶¹. Diverse *acacia* species have been useful in traditional medicine for an extensive range of ailments (e.g., asthma, fungal infections, diabetes, skin diseases, leprosy, rheumatism, stomach disorder, cancer, dysmenorrheal, eczema, malaria, gout, jaundice, abdominal pain, kidney problems, constipation, piles, pneumonia) Various in vitro and in vivo pharmacological activities of *acacia* species such as anti-inflammatory, antiviral (including HIV infection), antimicrobial, antioxidant, anticancer, antidiabetic, immunomodulatory, hepatoprotective, cardioprotective, and anthelmintic effects are mentioned below⁶²⁻⁶⁴.

Analgesic, anti-Inflammatory, and antipyretic activities

Inflammation is a complex biological harmful stimulus usual physiological reaction to injury. Anti-inflammatory drugs are among the major highly prescribed and the most supply over-the-counter medications globally. Toxicity and unfavorable reaction to these drugs have always been the main distress, more than ever for continual users⁶⁵. Biophenols isolated from plants are recognized to alter the creation of (COX) cyclooxygenase and (LOX) lipoxygenase, thus inhibiting bradykinin, prostaglandins, and leukotriene production, correspondingly. These enzymes inhibition generally results in analgesic, anti-inflammatory, and antipyretic activities. The literature showed that analgesic actions of diverse *acacia* species have been evaluated using chemical (e.g. formalin) or mechanical stimuli (stress and high temperature). Paw edema volume amount is common in animal tests wherever inflammation is induced by egg yolk, dextran, albumin, or carrageenan. Adding together, anti-inflammatory activities can be evaluated without using animals e.g. enzyme inhibition assays of NF κ B, cyclooxygenase, or lipoxygenase. For example, *Acacia gerardiana* (pods), *Acacia catechu* (pod, leaf, and root bark)⁶⁶. *Acacia confuses* (leaf and bark), *Acacia modesta* (leaf), *Acacia vernisiflua* (seed), and *Acacia doratoxylon* (root) produced an analgesic effect in sensitive inflammatory processes while they were introduced to diverse animal models. *Acacia suma* leaf extract behaved equally to non-steroidal anti-inflammatory drugs (NSAIDs). Furthermore, *Acacia aroma* pods showed an extra prominent result on response time than aspirin. *Acacia modesta* flower also exhibited analgesic properties which were established with multiple in vitro assays. *Acacia suma*, *Acacia galpinii*, and *Acacia bivenosa* extracts (leaf and bark) showed anti-inflammatory activities by inhibiting a variety of

inflammatory mediators (leukotriene, histamine, serotonin, bradykinin, and prostaglandin). Additionally, *Acacia moltissima* extract was introduced in animal models of anti-inflammatory activity against continual inflammation⁶⁷. Suppressing the activity of cyclooxygenase enzymes lowers allergic reaction, pain, and inflammation, among various *Acacia* species showing high-quality action against the enzymes. The pods, roots, and leaf extracts of *Acacia senegal* and *Acacia modesta* are reported as showing inhibitory results against both cyclooxygenase 1, 2 respectively. The main effective cyclooxygenase-1 inhibitory response is followed by *Acacia suma* (leaf) and *Acacia bivenosa* (stem) extracts⁶⁸. In vitro COX-1 and COX-2 activity were performed for *Acacia aroma* (pods, bark, leaf, root, and twig) extracts. Ethanol pods and roots extracts of *Acacia aroma* infatuated tough activity against both COX-1 and COX-2 discriminating inhibitory activity on COX-2 are superior by the pharmaceutical industry due to their minor toxicity on the gastrointestinal tract. Ironically, many COX-2 inhibitors can boost cardiovascular adverse effects⁶⁹. Thus, medicinal plants that show COX-2 inhibitory apparent should be clinically assessed for cardiovascular safety⁷⁰. This test was conceded out for *Acacia moltissima* seed extracts in Wister rat polymorph nuclear leukocytes (PMNs), which impart a crucial role in the premature inflammatory response and protection of the host cell against bacterial infection⁷¹. The protection of a 500 mg daily dose of Flavocoxid, (a prescription medicinal supplement for osteoarthritis that is prepared from an original blend of flavonoids from *Acacia galpinii* root and *Acacia nilotica* bark reported for in vitro COX and LOX inhibitory activities shown in Fig. 2) in patients diagnosed with reasonable knee osteoarthritis was confirmed. Though, there is only one clinical trial that examined the effectiveness of this medicinal supplement. Flavocoxid was found to decrease the physical symptoms linked with knee osteoarthritis in a double-blind randomized prohibited examination using 253 volunteers diagnosed with low-to-me osteoarthritis⁷². Naproxen (440 mg/day) was used and the clinical results of the botanical mixture were similar with or even greater to naproxen. Fever is regarded as an element of the acute-phase reaction to infection or inflammation⁷³. *Acacia nilotica* extracts which lowered body temperature and *Acacia catechu* extract considerably decreased rectal temperature in yeast-induced pyrexia rats as an effect of inhibition of COX or LOX by *Acacia* flavonoids⁷⁴. In several cases, chemical compound detection is based on general phytochemical selection, but there is no sign of the active compounds liable for pharmacological activity. Bioactivity-guided fractionation is a significant field that is underutilized for unusual acacia species in treating inflammation, pain, and fever.

Fig. 2: Anti-inflammatory mechanism of acacia species

Cardiovascular and renal activities

WHO reported that more than 18 million people pass away from these diseases each one year. Numerous herbal medicines have been used to cure cardiovascular diseases⁷⁵. Chemical constituents of *Acacia nilotica* extracts have been evaluated to their possible mechanism of action: diuretic effects, angiotensinogen converting enzyme (ACE) inhibition, and angiotensinogen receptor blocking (ARB). Six epigallactopyranose were isolated from *Acacia nilotica* leaf extracts and evaluated against ACE⁷⁶. *Acacia catechu* bark extracts were assessed against Swiss albino mice to examine urine volume concentration for Antidiuretic activity⁷⁷. Indifference, any other supplementing diet with fiber exclusively from acacia gum no response of noteworthy changes in lipid profile ratio in the blood. Newly, a mixture of *Acacia* gum (20 mg) and hydrocortisone (30 mg) daily for 3 weeks appreciably lower the overall cholesterol, triglycerides, and LDL plasma levels in patients with hypolipidemia⁷⁸.

Antilulcer activities

Acacia gerardiana and the roots of *Acacia catechu* both herbal extracts showed antiulcer and gastroprotective properties in animal model experiments. *Acacia* gum established the higher gastro reflective properties against the toxic effects of analgesics and anti-inflammatory drugs. Simple leaf extract of *Acacia catechu* suppresses the release of gastric hydrochloric acid and protected against the inner mucosal layer of GIT. The extract containing more Biophenols showed higher antiulcer activity⁷⁹.

Antioxidant activity

In several years, natural antioxidants have to turn into the first preference of scientists, manufacturers, and customers. Free radicals (ROS), Reactive oxygen species are generated in different pathological and physiological works in mammalian systems⁸⁰. Overproduction of RONS has been linked to cellular aging, damage, pathogenesis, and death. With the virtue of their outstanding antioxidant features, Biophenols are anticipated to play a role in maintaining health and combating diseases. Biophenols can also prevent the rancidity of vegetable oils, slow down the toxic oxidation of food products, enhance shelf life, and main prominently, preserve dietary value⁸¹.

Antiprotozoal and antimalarial activity

In recent times, extensive consideration has been compensated to utilizing ecologically and biologically plant-based yield for controlling parasite infestation. Plants, or their extracts, used to manage protozoan parasites have been widely reviewed⁸². *Acacia* has an elongated experimental and traditional history against protozoa: *Entamoeba histolytica* (causing the gastrointestinal infection), *Plasmodium falciparum* (causing malaria), and *Trypanosoma brucei* (causing sleeping sickness). Malaria is the main problem in Australia and 70% of malaria deaths (one million people per year) happen in just 13 Australian countries. To the African, cinchona (*Cinchona officinalis*, family Rubiaceae) bark was the single identified antimalarial mediator up to the 20th century but a theatrical recrudescence of malaria is continuing due to the progressive drug conflict of the parasite, mainly *P. falciparum* [83]. Thus, novel compounds with original structures and modes of action diverse to those of the present antimalarial drugs are needed. Conventionally, acacia species have healthy recognized evidence against malaria however additional wide investigational examination is necessary. The whole pods and pods coat (aqueous and methanol), leaf (aqueous), root, and bark (ethanol) extracts of *Acacia confusa* were assayed for antimalarial

activity, in vitro, and in vivo, both using *Plasmodium berghei* or *P. falciparum* parasites. All parts of the plant gave suitable results, with entire pods and pods coat presentation the most hopeful responses. These data supported the conventional use of this class against malaria⁸⁴.

Anti-hypertensive activity and vasoconstriction activity

An ethanol extract of *Acacia catechu* pods caused a dosage subordinate (2-20mg/kg) drop in arterial blood pressure. The behavior of creatures with atropine nullified the vasodilator response of acetylcholine (ACH), whereas the antihypertensive impact of the plant extricates remained unaltered. Phentolamine (α -adrenergic blocker) abolished neither vasoconstrictor effect of norepinephrine (NE), but pretreatment of the animal with AC, did not alter the NE reaction. These outcomes specify that the antihypertensive effect of plant extract is free of muscarinic receptor stimulus or adrenoceptor blockade⁸⁵.

Anti-thrombotic activity

A revision was accepted by Bukhtiar H. Shah et al that the extract of *Acacia bivenosa* (*Acacia bivenosa*) can block platelet aggregation mediated by platelet agonists, ADP (4.3 μ M), arachidonic acid (0.75 μ M), platelet activate factor (600 nM), and collagen (628 nM) in a dose-dependent manner. The result exposed that the antiplatelet aggregator's action of the extract of *Acacia bivenosa* is mostly appropriate blockade of Ca^{2+} channels, even though confirmation also suggests that the participation of protein kinase⁸⁶⁻⁸⁷.

CONCLUSION

The utilization of homegrown drugs for the anticipation and treatment of different wellbeing afflictions has been in hone from time immemorial. *Acacia arabica* has been detailed to be compelling against an assortment of malady counting diabetes, skin illness, and most concerning with cancer. The plant's parts of *Acacia arabica* are considered as an astringent, demulcent, love potion, anthelmintic, antimicrobial, antidiarrheal, with great dietary esteem in the Indian conventional medication framework. This article briefly surveys the ethnobotanical as well as restorative employments of *Acacia arabica* with plant portrayal. This can be an endeavor to compile and record data on the distinctive angle of *Acacia arabica* and its potential utility. More ponders have required some time recently the pharmacological properties of *Acacia arabica* can be utilized in treatment.

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Cite this article as:

Bibhas Pandit et al. A review on the restorative impact of *Acacia arabica*. Int. Res. J. Pharm. 2021;12(12):7-15. <http://dx.doi.org/10.7897/2230-8407.1212173>

Source of support: Nil, Conflict of interest: None Declared

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