International Journal of Humanities Social Science and Management (IJHSSM)
Volume 3, Issue 2, Mar.-Apr. 2023, pp: 317-326 www.ijhssm.org

Phytochemistry,Pharmacologyandbotanicalaspectso fazadirachtaindicathesearchformoleculeswith Bioactivepotential

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Date of Submission: 07-03-2023 Date of Acceptance: 19-03-2023

Abstract
Since ancient times, the Indian subcontinent has referred to the tropical, large sized,evergreen plant Azadirachta indica(Neem) as the "wonder tree." In India, it is regarded as the "Village Dispensary" as a result of the indigenous medicalsystem'susageofallofitscomponentstotreatav arietyofillnesses.Accordingtotheclassicalmedicallite rature,ithasalonghistoryofhavingtherapeuticeffects.T heIndian medicalsystemshaveemployedeachandeverycompon ent. Duetothediversity ofmedical purposes it has today, it has grown in significance on a global scale. Neem is used to treat a numberofillnesses,includingdermatitiseczema,acne,b acterialandfungalinfections,aswellasotherskinconditi ons.Itisbeingutilised in the production of modern medications, cosmetics, toiletries, and pharmaceuticals. The tree's many sectionshave demonstrated a range of biological and pharmacological properties. In an effort to better understand the medicinalvalue of the tree in UnaniMedicine (Tibb-e-Unani) and other conventional systems of medicine, Review the literaturethat is accessible on the medicinal applications, phytochemicals, and ethnopharmacological characteristics of its varioussections.Unanimedicine,azadirachta indica,andneem.

Keywords:
AzadirachtaIndica,Neem,UnaniMedicine

I. Introduction

Fig1Neem

Mahogany's botanical cousin is neem, also known as margosa. It is a member of theMeliaceae family. Azadirachtaindicaisthenameofneeminlatin. It isatranslationofthePersianword"Azad."Darakht-e-Hindi'Asadmeans"free"anddarakhtmeans"tree"inHi ndi.Literally,thisrefersto"TheFreeTreeofIndia"(Ana ndetal.,2010)[4].Becauseall

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of the plant's parts are used to treat a variety of maladies in the country's traditional medical system, it is known as the"VillageDispensary"in India(ChatterjeeandPakrashi,1991).Accordingtoclassicalmedicalliterature,theNeemtreehasalonghistoryofusingitsmedicinalbenefits.Everycomponenthasbeen utilisedintheIndianAyurvedicandUnanimedical systems, and is currently utilised inthe andiscurrently employedintheproductionofcontemporarymedications, cosmetics, toiletries, and health care products. In the Indian subcontinent, the neemtree has long beenreferredtoas the "wonder tree."Currently,neemissignificanton aglobalscaledueto its numerousmedicalapplications. Neem is used to treat a variety of illnesses, including eczema, acne, bacterial, and fungal infections andmany skin conditions. According to Bhowmik et al. (2010) [13] and other sources, several extracts from differentportions of the tree exhibitpropertiessuchas hypoglycemic,anti-bacterial,anti-fungal,andanti-viraleffects.According to Agarwal (1986) [1], the tree is believed to lessen both chemical and particle pollutionin the air. With thecapacity to produce more than 83,000 tonnes of neem oil and 3,30,000 tonnes of neem cake, India is thought to haveover 1,38,000,000 neem trees.neem seeds, 4,13,000 tonnes, were used.production of contemporary medications,cosmetics, and toiletries. For millennia, the Indian subcontinent has referred to the neem tree as the "wonder tree."Due of its numerous medical applications, neem has gained significance in today's worldwide setting.Neem is used totreat a wide range of conditions, including dermatitis, eczema, acne, bacterialand fungal infections, and other skinailments. Different types of extracts from various tree components exhibit properties such as hypoglycemic, anti-bacterial,anti-fungal,andanti-viraleffects(Bhowmiketal.,2010)[13]etc.Thetreeisintendedtolessenbothparticleandchemicalcontaminants intheair(Agarwal,1986)[1].

Distribution

India is the tree's original home. (Anonymous, 2000; Nadkarni, 1982) [10, 36] cultivated almost everywhere in India(Agarwal, 1986; Khare, 2007; Nadkarni, 1982; Prajapati et al., 2003) [1, 27, 36] and in Burma (Nadkarni, 1982) [36],including village shrubberies., Burma (Khare, 2007) [27] and Sri Lanka(Anonymous, 2000) [10]. Additionally, it growsuntamedinforestsinotherregions,includingthesub-Himalayantract(ChatterjeeandPakrashi,1991).In thedryareasofthe Irawadi valley, the tree is wild. In addition, it is rare west of the Sutlej and is grown and naturalised in the Punjab upto the Jhelum (Kirtikar and Basu, 1991) [28].Today, the tree can also be found in other tropical places like Indonesia,Australia, and western Africa (Anonymous, 2000) [10], South and Central America, southern Florida, California, theUnited States, the Caribbean, Puerto Rico, and Haiti (Anonymous, 2007) [7]. biggest known Nearly 50,000 trees havebeenplantedinSaudiArabia's ArafatPlainsontheroutetoMeccatooffershadetoHajpilgrims(Ahmed,1988)[2].

DescriptioninUnani

Classical Unani literatures provide a detailed description of the tree. Neem trees arewidely distributed in India. ItscomponentsareallTastesbitter.Itisgrownbothinternallyandinvariousregionsof India.Thetreeisatleast40-50feettall.Smallandstraight,about6to9feetindiameter, isitstrunk.Itsshortbrachesbearpetiolesthatare9to15incheslong.Petioles have nine to thirteen pairs of leaves (Ghani, 2011). Its leaves are more serrated and have thinner, more delicatebordersthpomegranateleaves.Thefruitsareyellow,tiny,spherical,andsomewhatelongatedwithfragrantblooms.Thefruits have a bitter flavour with a light sweetness. SanjadKarkhi is the name given to the tree in Isfahan and In somecities,itisknownas"Darakht-e-Toz"(Kareem, YNM).

Vernaculars

The plant is known by different vernacular names in different language, areas and traditions: Nimba, Nimbaka, Arishta,Arishtaphala,Pichumarda,Pichumanda,Pichumandaka,Tiktaka,Sutiktak,Paaribhadra(Ayurveda); Nim,Nimb,Nimgachh(Bengali);Nim,Balnimb(Bombay);Tamabin,Ta-marbin,Kamakha,Bawtamaka,Kamaka,Thamaka,Thin,Thinborotamakha(Burma);Bevinamara,Kahibevu,Bemu,B evina, Bevu, Kaybevu, Kaypebevu,Nimba,Ollebevu(Canarese);Nim (Deccan); Neem or Margosa tree, Indian Lilac (English); Agem Lilas, Azadiraed'Inde, Margousier, Arbre saint, Azadirac de I'Inde, Lilas de chine, Margosier (French); Indiseher Zedrach, Gemeiner,Grossblaettiger Zedrach(German);Limba,Danujhada, Kohumba, Limbado, Limbra (Gujrati); Nim, Nimb, Nimgachh,Balnimb, Ninb(Hindi);Bevu,Turakabevu,Huccabevu,Cikkabevu(Kannada);Nim,Bevarooku (Konkani); Vepa,Veppu,Aryaveppu,Arytikta,Nimbam,Rajavep

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pu(Malayalam);Balantanimba,Kadukhajur,Limbachajhada,Nimbay, Limba(Marathi);Azaddarachtehindi,Neeb,Neem(Persian);Bakam,Nim,Bukhain,Drekh,Mahanim(Punjab);Arishta,Ravipriya,VranashodhakariNimba,Prabhadra,Arkapadapa,Chhardana,Kitaka,Malaka,Shita,Subhadra,Yavaneshta(Sanskrit);Nim(Santal);Nimuri(Sindh);

Kohumba,Nimbu,Nimbagah,(Sinhalese);Vepa,Veppu,Vembu,Veppan,Arulundi,Vempu(Tamil);Vepa,Kondavepa,Turakavepa,Nimbamu,Vemu,Yapa(Telgu); Aazaad-Darakht-e-Hindi(Unani)andNeem(Urdu)(ChatterjeeandPakrashi,1991;Khare,2007;KirtikarandBasu,1991;Kurian,1998;Nadkarni,1982;Prajapatietal.,2003)[27,36,28] Vernaculars The plant is referred to by a variety of vernacular names invarious languages,regions,andtraditions,includingNimba,Nimbaka,Arishta,Arishtaphala,Pichumarda,Pichumanda,Pichumandaka,Tiktaka,Sutiktak, Paaribhadra (Ayurveda); Nim, Nimb, Nimgach,(Bengali);Nim,Balnimb(Bombay);Tamabin, Tamarbin,Kamakha,Bawtamaka,Kamaka,Thamaka, Thin,Thinborotamakhav Arishta, Ravipriya, Vranashodhakari, Nimba, Prabhadra,Arkapadapa, Chhardana, Kitaka, Malaka,Shita,Subhadra,andYavaneshtaareallfromPunjab.(Sanskrit);Nim(Santal);Nimuri(Sindh);Kohumba,Nimbu,Nimbagaha(Sinhalese);Vepa,Veppu,Vembu,Veppan,Arulundi,Vempu(Tamil);Vepa,Kondavepa,Turakavepa,Nimbamu,Vemu,Yapa(Telgu);Aazaad-D[27,36,28].

EtanobotanicalDescription

The deciduous Azadirachta indica tree is medium to large in size and grows to a height of 15-20 m (Anonymous, 2000)[10].witharoundtoovalcrownformedbywidespreadingbranchesandglabroustwigs,andwithaclearbole measuring7 metres long (Prajapati et al., 2003) [9]. The bark is buff on the inside with a fibrousfracture, and it is grayish-brown incolourwithexteriorfissures(Anonymous,2000; Anonymous, 2007). [10, 9].The leaves are alternately arranged,pinnatelycompound,up to 40 cm long, composed of 8–18 short-petiolate narrowovate,pointed, curved toothed leaflets(Anonymous,2007)[10].Theleafletsare5-15innumber,opposite,subopposiiteoralternatelyarranged;lanceolate,serrateordentate(ChatterjeeandPakrashi,1991),3.5-8cmlong,darkgreenaboveandpalerbeneath(Anonymous,1992),serrate,acuminateandglabrous(Anonymous,1992;ChatterjeeandPakrashi,1991).Theleavesarecomposedof8–18short-petiolatenarrow–ovate,pointed, curvedtoothed leaflets and are alternately arranged. They can be up to 40 cm long (Anonymous,2007)[10].5–15leafletstotal,opposingandsubopposite3.5–8cmlong,darkgreenaboveandpalerbeneath(Anonymous,1992),serrate,acuminate,andglabrous(Anonymous,1992;ChatterjeeandPakrashi,1991),lanceolate,serrate,ordentate(ChatterjeeandPakrashi,1991).Theflowersareabundant,white, honey-scented, hermaphrodite, and in axillary panicles (Chatterjeeand Pakrashi, 1991). The petals are 5, and thecalyx has five lobes.surpass the calyx,are free, and are imbricate; disc zero. Anthers are located inside the staminal tubeoppositetoandshorterthanthelobes.Thestaminaltubeisslightlyshorterthanthepetals,cylindric,widening above,andhas 9–10 lobes. The ovary has three cells, an elongated, slender style, a small, three-lobed cylindric stigma, and twocollateralovulespercell(KirtikarandBasu,1991)[28].AccordingtoAnonymous(1998),ChatterjeeandPakrashi(1991),Kirtikar and Basu (1991), Prajapati et al. (2003), andothers, the fruit is a 1-seeded drupe with a woody endocarp. [28],ovoid-oblong,smooth(Anonymous,1992),1.5cmlong,containingthinpulpenclosingtheseed,andyellowwhenmature(Anonymous, 1992; Chatterjee and Pakrashi, 1991).The seeds have thick meaty and oily cotyledons that are ellipsoid inshape(Anonymous,1998;KirtikarandBasu,1991;Prajapatietal.,2003)[28].(Anonymous,1998;Prajapatietal.,2003)[10,7]aswellascordateatthebaseandasuperiorradicle(KirtikarandBasu,1991)[28].

Afa'al(Action)

The many effects of the herb Neem (Azadirachta indica) have been thoroughly detailed in classical Unani literature.Allparts of Neem are mohallil (resolvent) (Ghani, 2011; Kareem, YNM; Kabiruddin, YNM; Khan, 1313H); mulattif(demulscent),muqatte,mulaiyin(laxative)(Kabiruddin, YNM;Khan,1313H); munzij (concoctive) (Ghani, 2011;Kabiruddin, YNM; Khan, 1313H); dafe safra wabad wa balgham, dafe fasad chahar khilt, qabiz (astringent), rade(repellent) (Khan,1313H); hazim (Digestive) (Ghani, 2011); munzij-e-aaza-ur-ras (Kareem, YNM); musaffi-ekhoon(bloodpurifier),daf-e-bukhar(antipyretic),daf-etaffun(antiseptic),qatil-e-jaraseem,qatil-e-kirm-e-shikam(anthelmintic)andmunaqqui-e-

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qurooh(Kabiruddin,YNM).Decoctionofitsflowerism uqawwi-e-dandanwalissah.Theflowers are daf-e-safra (Antibilious) often used with Tamarind and red sugar. The flowers oil is muqavvi, daf-ezaher(Antidote), muqavvi-e-baah (Aphrodisiac) and mushtahi (Appetizer) (Ghani, 2011). All Neem components are mulattif(demulscent),muqatte,andmulaiyin(laxative) (Ghani,2011;Kareem,YNM;Kabiruddin,YNM;Khan ,1313H);andtheyare all mohallil (resolvent) YNM; Khan,1313H); munzij (concoctive) (Ghani, 2011; Kabiruddin, YNM; Khan, 1313H);dafesafra wa bad wa balgham, dafe fasad chahar khilt, qabiz (astringent), and rade (repellent) (Khan, 1313H); hazim(Digestive) (Ghani (Kabiruddin, YNM). Its blossom is used to make muqawwi-e-dandan wa lissah, a decoction. Daf-e-safra(Antibilious)flowersarefrequentlyusedwithtamarindandredsugar.Thefloraloilhasthepropertiesofanantidote,aphrodisiac,muqavvi-e-baah,andmushtahi(Ghani,2011).Additionally,thefruithasqualitiessimilartothoseofdaf-e-juzam(Kareem,YNM),mulaiyin-e-shikam,andhabis-e-ishal[atadoseof1misqal(4.5g)](Kareem,YNM;Khan, 1313H).When appliedlocallyasapaste,theleaveshavethesameeffects asmunzij, mufajjir-e-awram,andmumbit-e-lahm.Thewordforleafdecoctionismusakkin-e-dard-e-gosh.Sheera-e-bargneemisacombinationofqatil-ekirmandamraz-e-jild.Musakkinandmuslehjarahatarefreshleaveswater withorwithouthoney(Khan, 1313H). Additionally,barg-e-neemhasantiseptic,mohallil(resolvent),andmusaffi-e-dam(bloodpurifier)qualities(Anonymous,1992;Khan ,1313H)[8].Whenapplied locally as a paste with NaCl, its fruit (Kareem, YNM) andleaves (Khan, 1313H) both function as munaqqi-e-qurooh-e-khabisaandakkal. GudandAkkal-e-juroohwaQurooh(Jaggery).Mudir-e-haizisthedecoctionofpost-e-beekh (neemrootbark),whichistaken in doses of 2 to 10 misqal (9 to 45g).The immature root, bar-e -kham, is mushy. It is qabiz and dafe tap to saymaghz-e-tukhm-e-neem.Qatil-e-kirm-e-Shikam,Munaqqui-e-Qurooh,MufattehSudad-e-JigarwaTehal,andDafeDardmake up its roghan (oil) (Khan, 1313H). Muharrik- e-daurane khoon and muqawwi make up its gum (Ghani, 2011).Chob-e-(neemneem'swood)tila israde(Khan,1313H).

Istemal(Uses)

Theentiretreeisgoodformakingamraz-e-badi,balgham,khooni,safravi,basoor(pustules),andjarab.Amraz-e-saudavi,bahaque safeedwasiyah,kalafwa namash,andjameeamraz-e-jildiyawaghairjildiya,amongothers.Indiansthinkthatitsshadeshieldsthemfromillnesses.Additionally, ithelpsin thetreatmentofkharish,zyadti-e-abedahen,tishnagi,mandgi,jarahat, and tap-e-garm. The most effective treatmentfor qurooh-e-usrul indemal is neem (Khan, 1313H; Ghani, 2011).According to Nabiin 1920, it removes riyah from all organs and heals juzam (leprosy) and bars (vitiligo) (Khan, 1313H;Ghani, 2011; Nabi, 1920). According to Shamsuddin (1314H), leaf decoction and paste are effective treatments forawram (inflammations), damameel, riyah, and qarha-e-majari-e-bol. The benefits of leaf decoction in Qurooh, Saqta,Zarba,Dard-e-Gosh,andBawaseer-e-Raddiya. Ramad makesuseofwaterfromBarg-e-NarmknownasKonpal.Internally, kharish, josh- e-khoon, basoor, and bars can be cured with barg-e-sheera. neem's It is also effectivefor jarab,qooba, and amraz-e-damvi. For jarab, kharish, and bayaz, eyes are treatedwith ground-up burnt leaves and lemon water.Applicationofhotleavesbelowtheumbilicusdecreases Menstrualpain,sexualdiscomfort,orpuerperium pain.Forhookordard-e-pehlu,thepowderedleavesandbranchesareswallowed withwater. waterwithcrushedleaveswhengarglingThree days of honey help with dard-e-gelo(throat pain). In nasoor, qurooh-e khabeesa, afoonat, and ghosht-e-fasid,localapplicationofdryleafpowderandlimewithgreenleafjuiceisproventobeeffective, andregeneratesghosgt-e swaleh in a few days. In suda and jarahat, fresh leaves water, with or without honey, is beneficial. Khanazeer andsurkhbada benefitfrom the application (zimad) of leaves, whether they are combined with salt or not. Purane bukhar,tishnagi,andyarqan benefitfrominner tothickbark;itshamool(pessary)eliminatesbadbu-e-farj.Barkandmakosteaminhalation cures warm-e-khunaque. Decoction of bark in a dose of 8–10 g is helpful for boils, amraz-e–lissah,debilityfollowingfever,andbothcontinuousand intermittentfevers.Iteliminatesstomachworms(Ghani ,2011).Kirm(worms)are removed from wounds by applying oil (Nabi, 1920). Fever is treated with samag-e-neem, and its oil isbeneficial fordamameel, basoor, kharish, amraz-e-jildiya, and bawaseer. Nawaseer,sudad-e-jigar wa tehal, dard-e-mafasil, qurooh-e-gosh,andkirmeshikam(Khan,1313H).Aneffectivetreatmentforjuzam,atishak,andamraz-e-jild(skinillnesses)isab-e-darakht-e-neem(Khan,1313H;Ghani,2011;Nabi,1920).Neemmi

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swak(atreebranchusedasatoothbrush)andChob-e-neem (wood) tala (application) are both effective treatments for amraz-e-dahen (Ghani, 2011). When given internallyin a dose of 2, the powder of fruit, flower, bark, and leaves are all consumed in equalportions and combined. Bars andbahaquesbenefitfromto6masha(g).In amraz-e-barida,qurooh,quroohusr-ul-indemal,andotherformulations,varioustreesectionsareeffective.nawaseer-e-raddiya(Khan,1313H)(Khan,1313H).

PharmacologicalAction

(As described in Ethnobotanical and traditional literature) Azadirachta indica, the plant, is described in length inScientific literature, ethnobotanical literature, and a variety of acts have all been claimed to be possessed by it. Here areafewexamples of pharmacologicaleffectsandtherapeuticapplications: Azadirachtaindicaisatree withanti-inflammatory and antipyretic qualities (Anonymous, 2000). It is known asmunzij (concoctive), resolvent, and bloodpurifier in unani medicine (Nadkarni, 1982) [36]. According to Chatterjee and Pakrashi (1991), the leaves are anodyne,antifungal, antiviral, antiperiodic, and antiseptic (Agarwal (1986); Chatterjee and Pakrashi (1991); Nadkarni (1982). [1,36] Antimicrobial, antipyretic, antimalarial, larvicidal against mosquitoes, anti-inflammatory, spermicidal, antifertility(Khare, 2007) [27]; anthelmintic, insecticidal (Khare, 2007; Kirtikar and Basu, 1991; Nadkarni, 1982; Prajapati et al.,2003);bitter,acrid,astringent,depurative,ophthalmic,appetiser,demulcent,refrigerant(Prajapatietal.,2003);alexetericCarminative,expectorant,aphrodisiac,maturant,andresolvent[27,36,28].(KirtikarandBasu,1991;Prajapatietal.,

2003) The fragile young leaves are astringent. [28]; leaf oil acts as a local emmenagogue and stimulant (Nadkarni, 1982)[36]. According to Kirtikar and Basu (1991), the juvenile branches are antihelmintic[28]. The twigs have digestive,carminative, and antipyorrheal properties (Chatterjeeand Pakrashi, 1991). blossoms are Nadkarni, 1982; Chatterjee andPakrashi, 1991; Agarwal, 1986) [1] ; stimulant (Kirtikar and Basu, 1991; Nadkarni, 1982) [36, 28] ;tonic (Nadkarni,1982; Chatterjee and Pakrashi, 1991); stomachic (Kirtikar and Basu, 1991; Nadkarni, 1982; Chatterjee and Pakrashi,1991;AgarNutoilhasantibacterialandlocalstimulatingproperties(Agarwal,1986;Nadkarni,1982)[1, 36]Insecticide(Nadkarni, 1982) [36]; anthelmintic and alterative (Kirtikar and Basu, 1991) [28]; Pakrashi, 1991; Nadkarni, 1982) [1,36]. Neem oil and oil of margosa both have antifungal, antibacterial, antiseptic, and antifertility effects(Chatterjee andPakrashi,1991).Root-barkhasbeenshowntohaveastringent,tonic,antiperiodic,andalterativeproperties(ChatterjeeandPakrashi, 1991; Nadkarni, 1982) [36]. Bark is antibacterial, antiviral, and antifungal. (Khare, 2007; Prajapati etal., 2003)Antipyretic, antimalarial, mosquito larvicidal, anti-inflammatory, antifertility, spermicidal, and insecticidal [27], acrid,vermifuge(Nadkarni,1982)[36], bitter(Agarwal,1986;KirtikarandBasu,1991;Nadkarni,1982;Prajapatietal.,2003)[36, 1, 28], vulnerary, demulcent, liver tonic, expectorant, urinary astringent (Prajapati et al., 2003; Kirtikar and Basu,1991) [28], refrigerant (Prajapatiet al., 2003) In addition to being astringent (Agarwal, 1986; Kirtikar and Basu, 1991;ChatterjeeandPakrashi,1991;Nadkarni,1982;Prajapatietal.,2003)[1,36,28]andanthelmintic(ChatterjeeandPakrashi,1991; Khare, 2007; Kirtikar and Basu, 1991;Prajapati et al., 2003) [27, 28], these substances are also antiperi Agarwal,1986; Chatterjee and Pakrashi, 1991; Kirtikar and Basu, 1991; Nadkarni, 1982; Prajapati et al., 2003) [1, 36], pectoral,maturant, aphrodisiac, resolvent (Kirtikar and Basu, 1991) [28], hypoglycemic (Chatterjee and Pakrashi, 1991; Khare,2007) [27] and togum produced by the bark Tonic, demulcent, and stimulant (Chatterjee and Pakrashi,1991; Nadkarni,1982;Agarwal,1986)(ChatterjeeandPakrashi,1991;Nadkarni, 1982)[1,36]Thefruitispurgative,anthelmintic,andemollient(Agarwal,1986;ChatterjeeandPakrashi,1991;Nadkarni,1982; Kirtikar and Basu, 1991), accordingto these studies: [1, 36] [1, 36, 28]; the young fruit is tonic and antiperiodic(Chatterjee and Pakrashi, 1991; Nadkarni, 1982); it is also astringent (Chatterjee andPakrashi, 1991; Kirtikar and Basu,1991; Nadkarni, 1982) [36]. [36, 28] \s. The cocktail (a drink made of spirits with hot water and sugar) is really anemmenagogue, antispirochaetal, alterative tonic, and refrigerant (Nadkarni, 1982) [36]. The sap from the stem tip iscooling, nourishing, and tonic (Chatterjee and Pakrashi, 1991). Bark, fruits, flowers, leaves, roots, gum, and oil haveantihelmintic,febrifuge,antiseptic,healing,andantidoteproperties(Anonymous,1984).

UsesforMedicine

In folk medicine, the herb neem (Azadirachta

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indica) was used to treat a variety of diseases and was described as ninflammatory and feverish illnesses, including malaria, have been mentioned in detail in ethnobotanical literature andused in a number of ways, albeit this is unproven (Anonymous, 2000). The tree is beneficial to health when planted as amalariapreventative.Tokeepthesystemingoodshapeandtomaintainfreshbreathandasweettasteinthemouth,tendertreetwigsareusedastoothbrushes(Nadkarni,1982)[36].Neemisusedtomakeanointmentfordermatologicalpurposes.Neemcreamcanalsobeusedasaflyor mosquitorepellent(Anonymous,2004).Theleavesareusedforboils,gingivitis,periodontitis,sores,spleenenlargement,feverduringlabour,measles,headscald,andothercutaneousdisorders(Khare,2007)[27];Malariafever (Khare,2007;Prajapatietal.,2003;Anonymous,2004); (Khare,2007;Nadkarni,1982; Agarwal, 1986; Prajapati et al., 2003;ChatterjeeandPakrashi,1991)[1,27][27];chickenpox(Khare,2007;Nadkarni,1982)[27,36];swollenglands,bruises,andsprains[36];ulcersandskinconditions[Nadkarni,1982;ChatterjeeandPakrashi,1991;Prajapatietal.,2003;Kirtikarand Basu,1991][36,28];heaps (KirtikarandBasu,1991;Nadkarni, 1982) Leucoderma, [36, 28], Leprosy, ophthalmopathy, sporadic fevers (Nadkarni, 1982; Prajapati et al., 2003; Kirtikarand Basu, 1991) [28], eczema (Prajapati et al., 2003;Burning, itching, intestinal worms, dyspepsia, and TB (Chatterjeeand Pakrashi, 1991); biliousness, lumbago, inflammations, earache, syphilitic sores, blood impurities, and rheumatoidarthritis (Kirtikar and Basu, 1991) [28]. boiled leaves, pulp or paste (ointment and liniment), poultice, or leaves in otherformslikeasalepmadeofgroundhoneythatcanbeappliedtounhealthypustulesasanantiseptic.Itissaidthatatabletmadeofleaves(1tolainweight),camphor,andasafetida(2grainseach),mixedwith3drachmofjiggery,shouldbe takenbefore night to prevent epidemics. With sweet oil for worms, honey for jaundice, and chebulic myrabolan for skinconditions like prurigo, eczema, and urticaria, among others, leaf juice is administered. Smallpox sufferers apply leafpaste externallyandcovertheirbedswithit.usedonsmallpoxsufferersanditsfans.Followingdiarrhoea,neemleafsoupis given to aid with recovery. Leaf decoction is helpful in challenging With hepatic congestion (Nadkarni, 1982) [36], itis also used as a galactogogue to start milk production in nursing mothers and is advised for individuals with diabetesmellitus,nonketonic diabetes, and insulin sensitivity. For persistent malaria, tablets and injections are currently beingdeveloped. Additionally suggested for use as an external local anaesthetic is a neem leaf mixture. (2004) (Anonymous).Theleavesareusedasapoulticeinthetreatmentofabscess, adenitis,andallformsofanorexia(ChatterjeeandPakrashi,1991).amixtureusedasAccordingtoKirtikarandBasu(1991),anerrhinereducesnoseproblems,healswounds,and works well as a gargle for stomatitis and poor gums [28]. After fevers, dried flowers are employed as a tonic(Nadkarni,1982). According to Kirtikar and Basu (1991), the flowers eliminate "kapha" and biliousness, which can be helpful insome atonic conditions. overall weakness and dyspepsia (Kirtikar and Basu, 1991; Nadkarni, 1982) [28]. The fruit isbeneficialforintestinalworms, bronchitis,leprosy, chronicfevers(Nadkarni,1982),piles, urinarydiseases(KirtikarandBasu,1991;ChatterjeeandPakrashi,1991;Nadkarni,1982)[28];skindiseases(KirtikarandBasu,1991;ChatterjeeandPakrashi, 1991) [28]; abdominal lumps, worms, polyuria (Kirtikar and Basu, 1991) [28]. The plants are used for killingpediculi and the powdered kernel for washing hairs. Dry seeds possess the same properties as theoil when bruised andmixedwithwaterandsomeotherfluidandappliedtoitchetc(Nadkarni, 1982).Theseedsaregoodforleprosyandoilisforskindiseases(KirtikarandBasu,1991)[28].Incasesofnausea, intermittentfevers,andlumbago,thebarkisusedasa powder, fluid extract, or decoction (Nadkarni, 1982; Prajapati et al., 2003; Kirtikar and Basu, Anorexia (Nadkarni,1982; Prajapati et al., 2003; Chatterjee and Pakrashi, 1991), general weakness, thirst (Kirtikar and Basu, 1991) [28],malarialfevers,skindiseases(Nadkarni,1982;Prajapatietal.,2003;Anonymous,1984);cough,inflammations,leprosy,otalgia, ulcers, wounds, syphilis (Prajapati et al., 2003; Kirtikar and Basu, 1991) Hepatitis (Prajapati et al., 2003;Chatterjee and Other paroxysmal fevers and nausea (Pakrashi, 1991). Rheumatismcane treated with a decoction madefrom 1drachmofbarkand2drachmoflongpepper.themixtureofneemandEqualamountsofbabulabarkareeffectiveagainst leucorrhoea (Nadkarni, 1982). Infusions made from the bark tincture are used to treat fevers (Agarwal, 1986;Nadkarni, 1982) [1]. It helps with vitiated disorders of the pitta, hyperdipsia, eczema pruritus,burning,tumours,and tubercular glands.Colic ,sprue ,andpyresis(Chatterjee and Pakrashi, 1991); dyspepsia, intestinal worms, bronchitis,urorrhoea,anddiabetes(Prajapatietal.,2003);burningsensationneartheheart,foultasteSyphilis,complainsofbleeding,urinating blood, and urine discharges (Kirtikar andBasu,1991)[28].Thegum

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International Journal of Humanities Social Science and Management (IJHSSM)
Volume 3, Issue 2, Mar.-Apr. 2023, pp: 317-326 www.ijhssm.org

hasbeenshowntobeeffectiveintreatingcatarrh(Agarwal,1986;ChatterjeeandPakrashi,1991; KirtikarandBasu,1991; Nadkarni,1982)[28,1],other affections (Agarwal, 1986; Kirtikar and Basu, 1991; Nadkarni, 1982) [1, 28], severe debility (Kirtikar and Basu, 1991)[28], and splenic en. The"Margosa oil" is beneficial for treating skin conditions, leprosy, ulcers, rheumatism, andheadaches (Chatterjee and Pakrashi, 1991; Nadkarni, 1982). Application of it isFavorite in cases of tetanus, urticaria,eczema, erysipelas, scrofula, and skin conditions like pemphigus, ringworm, and scabies. The sodium and potassiummargosates made from the oil's margosic acid are helpful for treating a variety of skin conditions. When a differenttreatmentisneededforchronic malaria,syphilis,etc.,itisusedasaninsecticidetokilllice .Itisadministeredindosesof1–2 drachmsas an anthelmintic (Nadkarni, 1982) [36]. Oil is employed as an intravaginalcontraception, a therapy forInfectionsofthevagina as well asa mosquitodeterrent(Khare,2007)[27].Asanexternalapplication,ithelpswithsprainsthat are common.Gum, tooth, and ear issues are all relieved by warm oil. Neem oil hair products stophair greying andbalding (Chatterjee and Pakrashi, 1991). The tree's toddy, or fermented sap, has medicinal value for treating chronicleprosy, atonic dyspepsia, general debility, and other skin conditions (Nadkarni, 1982) [36]. Fruits, vegetables,flowers,leaves,roots,gum,andoilsareutilisedasremedies andpoison-removalagents(Anonymous,1984).

Phyto-Chemistry

Thereareabout100chemicals,chieflytriterpenoidsofli monoidsorproto-meliacins.ortetranortriterpenoids),ringCseco-tetranortriterpenoidsandringCseco-tetranortriterpenoid—hydroxybutenolides,pentanortriterpenoids,ahexanortriterpenoids, as well as a few nontriterpenoids constituents, have been identified from various portions of thetree (Chatterjee and Pakrashi, 1991). The plant has yielded the diterpenoids margolone, nimbonone, nimbolone, andnimbolinin(Anonymous,2004).Azadirachtin,anisomerofepoxyazadiradione,azadirachtol,azadirachnol,deacetylazadirachtinol, azadiradione, 17-epi- and 17- hydroxyazadiradione, azadirone, gedunin, and 7-hydroxygeduninare all present in the fruits (Chatterjee and Pakrashi, 1991; Rastogi and Mehrotra Hydroxygedunin, melianone, nimbiol,nimboeinol(7-acetoxy-7-hydroxy-azadiradione), nimolinone,nimocin,7-deacetoxy-nimolicinol, nimbochalcin,andnimbocetin,aswellas21,23,24,25-diepoxytirucall-7-en-21-olsalannin(ChatterjeeandIsolatednimolicinolfromyoung,ripe fruit (Rastogi and Mehrotra, 1993). The oil (Oil of Margosa) is produced by the kernels, which also includesignificant amounts of tocopherol, arachidic, linoleic, margosic, myristic, oleic, palmitic, and stearic acids.azadirone,azadiradione, and epoxyazadiradione (nimbinin), notwithstanding the significant differences in their specific rotation,nimbin, nimbidin, nimbidiol, nimbidic acid, salannin, 3-desacetylsalannin, desacetylgedunin, meldenin, meliatriolThekernels, which also contain sizeable amounts of tocopherol, arachidic, linoleic,margosic, myristic, oleic, palmitic, andstearic acids,generate the oil (Oilof Margosa).Despite the majorchanges in theirspecific rotation, azadirone,azadiradione, and epoxyazadiradione (nimbinin), as well as salannin, 3-desacetylsalannin, desacetylgedunin, meldenin,and meliatriol Azadirone, azadiradione, epoxyazadiradione, 2-dihydroepoxyazadiradione, 1-, 2-diepoxyazairadione, and7- desacetyl-7-benzoyl derivatives of the C-23 epimer (isovepaol) Salanic (nimbidic) acid (seeds), desacetyl-7-benzoyl-gedunin,acetylneotrichilenone,nimbidinin,andnimbidin(ChatterjeeandPakrashi,1991).RastogiandMehrotra(1991) isolatedandcharacterisednimbidinin,anoveltetranortriterpene derivedfromtheamorphousbittercomponent(nimbin)

of seeds. Seven-acetylneotrichilenone, 1-methoxy-1,2- dihydro-epoxyazadiradione, 1-, 2-: 14-, 15-diepoxyazadiradion,andthreeC-7benzoatesoftetranortriterpenoids(I,II,III)aresixnoveltetranortriterpenoidsthatwereisolatedfromseeds(Rastogi and Mehrotra, 1993). Arachidic, behenic, linoleic,oleic, palmitic, and stearic acids, as well as azadirachtin andmargosene, areallpresentintheflowers(ChatterjeeandPakrashi,1991;RastogiandMehrotra,1991);kaemferolandits3-glucoside,quercetin-3-galactoside,andmyricetin-3-L-arabinoside.Theleavescontainnimbin,nimbocinolide, isonimbocinolide, nimbolide, and nimbocinolide, as well as azadirachtin, azadirachtanin, azadirone, azadiradione, andepoxyazadiradione.isonimocinolide,nimocinone, 2',3'-dehydrosalannol,kaempferol-3-O-glucoside,myricetinandits3'-Larabinoside(melictrin),3-O-L-rhamnoside,and3-O-rutinoside,quercetinandits3-galactiside,3-O-L-

rhamnoside,and3-O-rutinoside(Chatterjeeand Pakrashi,1991),nimbandiol,nimbinene, and 6-desacetylnimbinene(ChatterjeeandPakrashi, 1991), -sitosterol and its -Dglucoside, -carotene, and n-hexacosanol (Chatterjee and Pakrashi, 1991; RastogiandMehrotra, 1991),RastogiandMehrotra,1993;Pakrashi,1991).Inaddditiontobeingfoundinleaves, researchershavealso isolatedmeldenindiolfromgreen leaves,meldenin and isomeldenin from yellow leaves that have fallen, andhyperoside,quercetin,andrutinfromeitherkindofleaf'sglycosides.Additionally,the4, 6-dihydroxy-A-homoazadirone (IV) tetranortritrpenoidisidentified(RastogiandMehrotra,1993).Avolatileoilandtanninsarealsopresentintheleaves(Anonymous, 2000).

According to Chatterjee and Pakrashi (1991), the heartwood includes tannin, bakalactone, 4, 14-dimethyl-5-ergosta-8,24(28)-dien-3-ol, 4, methyl-5-ergosta- 8,24(28)-dien-3-ol, nimatone, nimbinene, 6, desacetyl nimbinene, -sitosteroland itsglucoside, (Chatterjee and Pakrashi, 1991; Rastogi and Mehrotra, 1991) Methylene-cycloartenol According toChatterjee and Pakrashi (1991), the stem bark includes vanillic acid, catechol, stigmasterol, sitosterol, -amyrin, lupeol,nimbin, nimbidin, nimbinin, sugiol, and 6-hydroxy-4-stigmasten-3-one and 6-hydroxy-4-campesten-3-one. One of thesecompounds is methylkulonate, which is also known as kulinone, kulactone, kulolactone, and 1991). Two similararabinofucoglucans, Gla and Glb, were isolated from bark and both include side chains of -L-arabinofuranosyl units inadditiontoamain chainofrepeating(1–4)linkedglucopyranosylunits.aprocedureforobtainingaglucose,fructose,andotherpolysaccharideanti-inflammatoryBark containsarabinoseandfucoseina1:1:1molarratio(RastogiandMehrotra,1993). Three novel tricyclic diterpenoids, nimbosodione, nimbisonol, and methylgrevillate, aswellas two isomericditerpenoids called nimbonone and nimbonolone andmethylnimbionol, nimbionone (C18H24O4, p 78-79o), nimbinone(C10H9O2,p124-25o),andnimbionol(C18H24O4,p102-03o)areallphenols.Isonimbinolide(C30H36O11,mp172-73o), c-seco-tetranortriterpenoid, and two fatty acid derivatives (polyacetates), margosinone and margosinolone. Thestem bark has also yielded the pentacyclic nortriterpenoids 6-desacetylnimbinen, nimbiol, and nimbinen. Additionally,gedunin is present in the bark's methanolic extract (Anonymous, 2004). A volatile oil and tannin are also present in thebark (Anonymous, 2000). A glycoprotein extracted from neem gum that contains mannose, glucosamine, arabinose,galactose, fucose, xylose, and proteins in a 19:81ratio 4:3:3:2:2:1:1 molar ratio of glucose (Rastogi and Mehrotra, 1993).Margosinolide,isomargosinolide,desacetylnimbinolide, anddesacetylisonimbinolidearepresentinthetwigs(Chatterjeeand Pakrashi, 1991). Gedunin, 7-deacetoxy-7-oxogedunin, fraxinellone, nimbolin A, cycloeucalenone, melianin A, andmelianin B are all present in the wood. Cycloeucalenol is present in the wood oil, 24 Methylene cycloartenol, beta-sitosterol,andazadaricacid(ChatterjeeandPakrashi, 1991;RastogiandMehrotra, 1991)(RastogiandMehrotra,1991).Nimbosterol, nimbiol, and sugiol are found in the trunk wood and nimbolins A andB are found in the trunk bark(ChatterjeeandPakrashi,1991).Therootcontains4-campesten-3-one,4-stigmasten-3-one,trans-cinnamic,24-methylene-cycloartenol, 24-methylene-cycloartenone, cycloeucalenol, and cycloeucalenone. The bark includes nimbinand nimbidin as well as vanillic acids (Chatterjee and Pakrashi, 1991). From root bark, the diterpenoid nimbidiol(C17H22O3) has been extracted. The rootbark has been used to isolate the tricyclicditerpenoids margosin, margocinin,margocillin,andnimolinin,aswell asa tetranortriterpenoidcallednimbilin(Anonymous,2004).Aesculetin,campesterol,6-hydroxy-7-methoxy-coumarin, 4-, 6-dihydroxy-A-homoazadirone, isomeldenin, meldenindiol, 17-acetoxy-meliacin,6-O-acetylnimbandiol, desacetylnimbin, nimocinol, isonimolicinolide, and nimolinolic acid are all found in variousregions ofthe(1991;Chatterjee andPakrashi).

Conclusion

Since the beginning of time, Azadirachta indica (Neem) has been used to treat a variety of conditions. Numerousexperimental, clinical, and phytochemical studies have been conducted on it. Experimental studies have shown that ithasavariety of beneficial effects,includingthosethatareanalgesic,antiandrogenic,antianxiety/anxiolytic,anti-atherosclerotic, anti-bacterial, anticandidal, antifeedant,anti-fungal, antihepatotoxic, anti-inflammatory, antilesihmanial,antimalarial,antimicrobial,antinociceptive,anti-plasmodial,antipyretic,antitumor,Themajorityoftraditionalmedicine'sclaimshavebeenvalidatedbyscientificresearch.However,inordertoestablishAzadirachtaindicaasaconventional medication,additional,thoroughclinicalstudytoexamine the completetherapeuticpotentialofdifferentAzadir

achta
indicasectionsisworthwhile.

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