

Phytomedical Research Studies on Albizia julibrissin (PubMed)  
(full reference citations and abstracts)

**Prog Neuropsychopharmacol Biol Psychiatry. 2013 Jul 1;44:184-92. doi: 10.1016/j.pnpbp.2013.02.012. Epub 2013 Feb 26.**

Anxiolytic effects of Julibroside C1 isolated from Albizzia julibrissin in mice.

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Julibroside C1 is a saponin-containing compound isolated from Albizzia julibrissin Durazz. In this study, we investigated the putative anxiolytic effects of Julibroside C1 using the elevated plus maze (EPM) in mice. Julibroside C1 at doses of 0.5 and 1 mg/kg significantly increased the time spent in the open arms and the number of entries into the open arms of the EPM compared to the control group. Moreover, the anxiolytic-like effects of Julibroside C1 (0.5 mg/kg) were blocked by WAY-100635 (5-HT<sub>1A</sub> receptor antagonist), bicuculline (GABA(A) receptor antagonist), and flumazenil (antagonist of the GABA(A) receptor benzodiazepine site). However, Julibroside C1 did not change locomotor activity or induce myorelaxant effects. We used quantitative receptor autoradiography to investigate the effects of Julibroside C1 on alterations in mouse brain receptors. After acute treatment with Julibroside C1 (0.5 mg/kg), [(3)H]-8-OH-DPAT binding was significantly decreased in the CA1 region of the hippocampus and [(3)H]-flunitrazepam binding was decreased remarkably in the cingulate cortex region. However, [(3)H]-muscimol binding did not show a significant change in any brain region. Taken together, our findings suggest that Julibroside C1 shows anxiolytic-like effects, which might be mediated by the 5-HT<sub>1A</sub> and GABA(A)-benzodiazepine receptor systems.

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**CNS Drugs. 2013 Mar;27(3):207-19. doi: 10.1007/s40263-013-0044-3.**

Plant-based medicines for anxiety disorders, Part 1: a review of preclinical studies.

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Research in the area of herbal psychopharmacology has revealed a variety of

promising medicines that may provide benefit in the treatment of general anxiety and specific anxiety disorders. However, a comprehensive review of plant-based anxiolytics has been absent to date. This article (part 1) reviews herbal medicines for which only preclinical investigations for anxiolytic activity have been performed. In part 2, we review herbal medicines for which there have been clinical investigations for anxiolytic activity. An open-ended, language-restricted (English) search of MEDLINE (PubMed), CINAHL, Scopus and the Cochrane Library databases was conducted (up to 28 October 2012) using specific search criteria to identify herbal medicines that have been investigated for anxiolytic activity. This search of the literature revealed 1,525 papers, from which 53 herbal medicines were included in the full review (having at least one study using the whole plant extract). Of these plants, 21 had human clinical trial evidence (reviewed in part 2), with another 32 having solely preclinical studies (reviewed here in part 1). Preclinical evidence of anxiolytic activity (without human clinical trials) was found for *Albizia julibrissin*, *Sonchus oleraceus*, *Uncaria rhynchophylla*, *Stachys lavandulifolia*, *Cecropia glazioui*, *Magnolia* spp., *Eschscholzia californica*, *Erythrina* spp., *Annona* spp., *Rubus brasiliensis*, *Apocynum venetum*, *Nauclea latifolia*, *Equisetum arvense*, *Tilia* spp., *Securidaca longepedunculata*, *Achillea millefolium*, *Leea indica*, *Juncus effusus*, *Coriandrum sativum*, *Eurycoma longifolia*, *Turnera diffusa*, *Euphorbia hirta*, *Justicia* spp., *Crocus sativus*, *Aloysia polystachya*, *Albies pindrow*, *Casimiroa edulis*, *Davilla rugosa*, *Gastrodia elata*, *Sphaerathus indicus*, *Zizyphus jujuba* and *Panax ginseng*. Common mechanisms of action for the majority of botanicals reviewed primarily involve GABA, either via direct receptor binding or ionic channel or cell membrane modulation; GABA transaminase or glutamic acid decarboxylase inhibition; a range of monoaminergic effects; and potential cannabinoid receptor modulation. Future research should focus on conducting human clinical trials on the plants reviewed with promising anxiolytic activity.

PMID: 23436255 [PubMed - indexed for MEDLINE]

**Evid Based Complement Alternat Med. 2012;2012:983023. doi: 10.1155/2012/983023. Epub 2012 May 23.**

Selected Extracts of Chinese Herbal Medicines: Their Effect on NF- $\kappa$ B, PPAR $\alpha$  and PPAR $\gamma$  and the Respective Bioactive Compounds.

Rozema E(1), Atanasov AG, Fakhrudin N, Singhuber J, Namduang U, Heiss EH, Reznicek G, Huck CW, Bonn GK, Dirsch VM, Kopp B.

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Chinese herbal medicinal (CHM) extracts from fourteen plants were investigated in cell-based in vitro assays for their effect on nuclear factor  $\kappa$ B (NF- $\kappa$ B), a key regulator of inflammation, as well as on peroxisome proliferator-activated receptors (PPARs) being key regulators of genes involved in lipid and glucose metabolism. 43% of the investigated CHMs showed NF- $\kappa$ B inhibitory and 50% PPAR $\alpha$  and PPAR $\gamma$  activating effects. Apolar extracts from cortex and flos of *Albizia*

julibrissin Durazz. and processed rhizomes of *Arisaema* sp. and *Pinellia ternata* (Thunb.) Breit. that effectively inhibited TNF- $\alpha$ -induced NF- $\kappa$ B activation and dose-dependently activated PPAR $\alpha$  and PPAR $\gamma$  were further investigated. Bioassay-guided fractionation and analysis by GC-MS led to the identification of fatty acids as PPAR agonists, including linoleic and palmitic acid.

PMCID: PMC3366346

PMID: 22675394 [PubMed]

**Chem Pharm Bull (Tokyo). 2012;60(1):129-36.**

Flavonol acylglycosides from flower of *Albizia julibrissin* and their inhibitory effects on lipid accumulation in 3T3-L1 cells.

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Obesity is a serious health problem worldwide. We investigated the anti-obesity effect of the flower of *Albizia julibrissin* DURAZZ. (Leguminosae). A 90% EtOH extract of the flower inhibited adipogenesis in 3T3-L1 preadipocytes, as well as the activity of glycerol-3-phosphate dehydrogenase (GPDH) activity. New flavonol acylglycosides (1-4) and eighteen known compounds (5-22) were isolated by bioassay-directed fractionation. These new glycosides were elucidated to be 3''-(E)-p-coumaroylquercitrin (1), 3''-(E)-feruloylquercitrin (2), 3''-(E)-cinnamoylquercitrin (3), and 2''-(E)-cinnamoylquercitrin (4) on the basis of spectroscopic and chemical analysis. These compounds inhibited adipogenesis in 3T3-L1 preadipocytes. In particular, 2 exhibited potent inhibitory effects on triglyceride accumulation. Furthermore, GPDH activity was inhibited by 2. Additionally, 2 inhibited glucose uptake in 3T3-L1 adipocytes. These results indicate that the 90% EtOH extract and compounds isolated from the flower of *A. julibrissin* inhibit adipogenesis in 3T3-L1 preadipocytes and may have anti-obesity effect through the inhibition of preadipocyte differentiation.

PMID: 22223384 [PubMed - indexed for MEDLINE]

**Phytomedicine. 2009 Aug;16(8):703-11. doi: 10.1016/j.phymed.2009.01.002. Epub 2009 May 6.**

Anti-angiogenic activity of julibroside J8, a natural product isolated from *Albizia julibrissin*.

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**PURPOSE:** The purpose of this study was to investigate the anti-angiogenic properties of julibroside J(8), a triterpenoid saponin isolated from *Albizia julibrissin*.

**METHODS:** In the presence of julibroside J(8), the growth of human microvascular endothelial cells (HMEC-1), four human tumor cell lines, and a normal cell line (MRC-5) was evaluated by MTT assay. The *in vivo* anti-angiogenic effect of julibroside J(8) was evaluated on a chorioallantoic membrane (CAM) and in transplanted colon carcinoma cells in a nude mice neovascularisation model.

**RESULTS:** Treatment with 0.5-4 microg/ml julibroside J(8) resulted in dose-dependent inhibition of growth, migration, and tube formation in HMEC-1 cells; julibroside J(8) also inhibited the formation of microvessels on CAM at a concentration of 10-50 microg/egg and reduced vessel density within tumor at a concentration of 0.5-3mg/kg.

**CONCLUSIONS:** Julibroside J(8) may be a potent anti-angiogenetic and cytotoxic drug; further investigation is warranted.

PMID: 19423313 [PubMed - indexed for MEDLINE]

**Evid Based Complement Alternat Med. 2011;2011:236341. doi: 10.1093/ecam/nep018. Epub 2010 Oct 20.**

Prescriptions of Chinese Herbal Medicines for Insomnia in Taiwan during 2002.

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Chinese herbal medicine (CHM) has been commonly used for treating insomnia in Asian countries for centuries. The aim of this study was to conduct a large-scale pharmaco-epidemiologic study and evaluate the frequency and patterns of CHM use in treating insomnia. We obtained the traditional Chinese medicine (TCM) outpatient claims from the National Health Insurance in Taiwan for the year 2002. Patients with insomnia were identified from the diagnostic code of International Classification of Disease among claimed visiting files. Corresponding prescription files were analyzed, and an association rule was applied to evaluate the co-prescription of CHM. Results showed that there were 16 134 subjects who visited TCM clinics for insomnia in Taiwan during 2002 and received a total of 29 801 CHM prescriptions. Subjects between 40 and 49 years of age comprised the largest number of those treated (25.3%). In addition, female subjects used CHMs for insomnia more frequently than male subjects (female : male = 1.94 : 1). There was an average of 4.8 items prescribed in the form of either an individual Chinese herb or formula in a single CHM prescription for insomnia. Shou-wu-teng (*Polygonum multiflorum*) was the most commonly prescribed single Chinese herb, while Suan-zao-ren-tang was the most commonly prescribed Chinese herbal formula. According to the association rule, the most commonly prescribed CHM drug combination was Suan-zao-ren-tang plus Long-dan-xie-gan-tang, while the most commonly prescribed triple drug combination was Suan-zao-ren-tang, *Albizia julibrissin*, and *P. multiflorum*. Nevertheless, further clinical trials are needed

to evaluate the efficacy and safety of these CHMs for treating insomnia.

PMCID: PMC3095483

PMID: 19339485 [PubMed]

**Glycoconj J. 2008 Feb;25(2):157-66. Epub 2007 Aug 16.**

Synthesis of a tetra- and a trisaccharide related to an anti-tumor saponin "Julibroside J28" from *Albizia julibrissin*.

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Simple and convergent synthesis of a tetra- and a trisaccharide portions of an antitumor compound Julibroside J(28), isolated from *Albizia julibrissin*, that showed significant in vitro antitumor activity against HeLa, Bel-7402 and PC-3M-1E8 cancer cell lines is reported. The tetrasaccharide has been synthesized as its p-methoxyphenyl glycoside starting from commercially available D-glucose, L-rhamnose and L-arabinose. The trisaccharide part has been synthesized from commercially available N-acetyl D-glucosamine, D-fucose and D-xylose using simple protecting group manipulations. Sulfuric acid immobilized on silica has been used successfully as a Brønsted acid catalyst for the crucial glycosylation steps.

PMID: 17701454 [PubMed - indexed for MEDLINE]

**J Agric Food Chem. 2007 Jun 13;55(12):4704-9. Epub 2007 May 12.**

Effect of *Albizia julibrissin* water extracts on low-density lipoprotein oxidation.

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High-value phytochemicals could be extracted from biomass prior to the current cellulosic pretreatment technologies (i.e., lime, ammonia, dilute acid, or pressurized hot water treatments) provided that the extraction is performed with a solvent that is compatible with the pretreatment. This work reports on the extraction of flavonoids from *Albizia julibrissin* biomass. While extracting *A. julibrissin* foliage with 50 degrees C water, 2.227 mg/g of hyperoside and 8.134 mg/g quercitrin were obtained, which is in the realm of what was obtained with 60% methanol. *A. julibrissin* foliage, flower, and whole plant extracts were tested in terms of their potential to inhibit low-density lipoprotein (LDL) oxidation. The highest inhibition was obtained with foliage water extracts,

which were standardized at 2.5 microM of flavonoids. Also, the 2.5 microM foliage water extract resulted in a reduction from 43% to only 1% of the observed monocyte adherence. To have commercial application, *A. julibrissin* water extracts should be devoid of toxicity. The *A. julibrissin* foliage, flower, and whole plant water extracts were not toxic to Vero 76 cells. In summary, *A. julibrissin* biomass can be extracted with 50 degrees C water to yield an antioxidant stream, showing that it may be possible to couple extraction of valuable phytochemicals to the cellulosic pretreatment step.

PMID: 17497875 [PubMed - indexed for MEDLINE]

**Pharmacol Biochem Behav. 2007 May;87(1):41-7. Epub 2007 Apr 6.**

Antidepressant-like effects of *Albizia julibrissin* in mice: involvement of the 5-HT<sub>1A</sub> receptor system.

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The present study was undertaken to investigate the antidepressant-like effects of the methylene chloride fraction of *Albizia julibrissin* (MCAJ) using a tail suspension test in mice. MCAJ was orally administered at 50, 100, or 200 mg/kg to mice, 1 h before the tail suspension test. Acute treatment with MCAJ at 200 mg/kg significantly reduced the immobility time compared with the control group, and thus showed an antidepressant-like effect. This effect was comparable to that of imipramine at 10 mg/kg. This antidepressant-like effect was reversed by treatment with WAY-100635 (a 5-HT<sub>1A</sub> receptor antagonist) or pindolol (a 5-HT<sub>1A/1B</sub> receptor antagonist). However, the antidepressant effect of MCAJ was not effected by treatment with GR55562 (a 5-HT<sub>1B</sub> receptor antagonist) or ketanserin (a 5-HT<sub>2A</sub> receptor antagonist). Therefore, our findings suggest that MCAJ exerts its antidepressant-like effect via the 5-HT<sub>1A</sub> receptor system.

PMID: 17477962 [PubMed - indexed for MEDLINE]

**Chem Pharm Bull (Tokyo). 2006 Aug;54(8):1211-2.**

A cytotoxic saponin from *Albizia julibrissin*.

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A new triterpenoidal saponin (1: Julibroside J(21)) with a xylopyranosyl moiety

located at its C-21 side chain was isolated from *Albizia julibrissin* DURAZZ. (Leguminosae), and its structure was determined on the basis of comprehensive spectroscopic analyses. Compound 1 showed marked inhibitory action against Bel-7402 cancer cell line at 10 microg/ml.

PMID: 16880673 [PubMed - indexed for MEDLINE]

**Bioorg Med Chem Lett. 2006 May 15;16(10):2765-8. Epub 2006 Feb 28.**

Three anti-tumor saponins from *Albizia julibrissin*.

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Three new triterpenoid saponins, julibroside J(29) (1), julibroside J(30) (2), and julibroside J(31) (3), were isolated from the stem bark of *Albizia julibrissin* Durazz. (Leguminosae) by using chromatographic method. Their structures were established by spectroscopic methods. Compounds 1, 2, and 3 displayed significant anti-tumor activities in vitro against PC-3M-1E8, HeLa, and MDA-MB-435 cancer cell lines at 10microM assayed by SRB and MTT methods.

PMID: 16504508 [PubMed - indexed for MEDLINE]

**Bioorg Med Chem Lett. 2005 Oct 15;15(20):4493-5.**

An antitumor compound julibroside J28 from *Albizia julibrissin*.

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A new triterpenoid saponin, julibroside J(28) (1), was isolated from the stem bark of *Albizia julibrissin* Durazz (Leguminosae) by using chromatographic method. The structure of 1 was established by spectroscopic methods. 1 displayed significant antitumor activity in vitro against PC-3M-1E8, Bel-7402, and HeLa cancer cell lines at 10 microM assayed by SRB method.

PMID: 16112860 [PubMed - indexed for MEDLINE]

**Life Sci. 2004 Oct 22;75(23):2787-95.**

Anxiolytic-like effects of extracts from *Albizia julibrissin* bark in the elevated plus-maze in rats.

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The purpose of this study was to characterize the putative anxiolytic-like effects of the aqueous extract of *Albizzia julibrissin* stem bark using the elevated plus maze (EPM) in rats. The water extract of *Albizzia julibrissin* was orally administered at 10, 50, 100 or 200 mg/kg to adult male SD rats, 1 h before behavioral evaluation in an EPM, respectively. Control rats were treated with an equal volume of saline, and positive control rats buspirone (1 mg/kg). Single or repeated treatment (for 7 days) of the water extract of *Albizzia julibrissin* (at 100 or 200 mg/kg) significantly increased time-spent and arm entries into the open arms of the EPM, and decreased time-spent and arm entries in the closed arms of the EPM versus saline controls ( $P < 0.05$ ). However, no changes in the locomotor activity and myorelaxant effect were seen in any group versus the saline control. In addition, the anxiolytic-like effects of *Albizzia julibrissin* extract were abolished by pindolol (10 mg/kg, i.p), a 5-HT(1A/1B) receptor antagonist. These results suggest that *Albizzia julibrissin* might proved to be an effective anxiolytic agent, and that it acts via the serotonergic nervous system.

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PMID: 15464830 [PubMed - indexed for MEDLINE]

**Pharmacol Biochem Behav. 2001 Jul-Aug;69(3-4):439-44.**

Nootropic and anxiolytic activity of saponins of *Albizzia lebbeck* leaves.

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The effect of saponin containing, n-butanolic fraction (BF), extracted from dried leaves of *Albizzia lebbeck*, was studied on cognitive behavior and anxiety in albino mice. The elevated plus maze was used for assessment of both nootropic and anxiolytic activity. The nootropic activity was evaluated by recording the effect of BF (0, 10, 25, and 50 mg/kg) on the transfer latency, whereas anxiolytic activity was assessed by studying its effect on the duration of occupancy in the closed arm. Results showed significant improvement in the retention ability of the normal and amnesic mice as compared to their respective controls. Animals treated with BF (25 mg/kg) spent more time in the open arm in a dose-dependent manner. The BF was without any significant effect on motor coordination. However, it significantly inhibited passivity and hypothermia induced by baclofen (10 mg/kg), a GABA(B) agonist. The data emanated in the present study suggests involvement of gamma-aminobutyric acid (GABA) in the nootropic and anxiolytic



activity of saponins obtained from *A. lebbeck*.

PMID: 11509202 [PubMed - indexed for MEDLINE]

**J Ethnopharmacol. 2000 Jul;71(1-2):321-3.**

Sedative activity of two flavonol glycosides isolated from the flowers of *Albizzia julibrissin* Durazz.

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The flowers of *Albizzia julibrissin* are used as a sedative in oriental traditional medicine. The phytochemical study of this plant allowed the isolation of two flavonol glycosides, quercitrin (1) and isoquercitrin (2). The sedative activity of these compounds was evaluated, and both compounds 1 and 2 increased pentobarbital-induced sleeping time in dose-dependent manner in mice. These results support the use of the flowers of this plant as a sedative agent.

PMID: 10904180 [PubMed - indexed for MEDLINE]

**J Nat Prod. 1997 Feb;60(2):102-7.**

Cytotoxic glycosides from *Albizia julibrissin*.

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During the course of a study of leguminous plants, cytotoxicity was demonstrated by the crude saponin fraction of *Albizia julibrissin*. Following chromatographic purification, the structures of three novel saponins, julibrosides I-III (1-3), inclusive of a cytotoxic principle, were elucidated. A comparison of the cytotoxicity of julibrosides (1-3) and their prosapogenins (4-15) prepared by alkaline hydrolysis clearly indicated that both an  $\alpha$ -L-arabinofuranosyl-(1 $\rightarrow$ 4)-[ $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 3)]- $\alpha$ -L-rhamnopyranosyl-(1 $\rightarrow$ 2)- $\beta$ -D-glucopyranosyl ester unit and a monoterpene-quinovopyranosyl moiety are crucial substituents for cytotoxicity among this class of compounds. The hydroxy group at C-16 of aglycon may play an important role in mediating cytotoxicity, and the N-acetyl-glucosamine moiety at C-3 seems to enhance activity because 3 showed the strongest cytotoxicity.

PMID: 9051910 [PubMed - indexed for MEDLINE]