Antimicrobial Actions of
Pau d'arco (*Tabebuia impetiginosa*)

Actions against fungi, yeast, bacteria, and viruses:

Various extracts of pau d'arco inner bark have demonstrated antimicrobial actions against numerous disease-causing microbes in many studies. Antimicrobial properties of many of pau d'arco's actives phytochemicals (including polyphenol chemicals) were demonstrated in many laboratory studies over many years, in which they exhibited strong *in vitro* activity against bacteria, fungi, yeast, and viruses. Pau d'arco contains a plant chemical named lapachol which has been documented with antiseptic, antibacterial, fungicidal, and antiviral actions as well as antimalarial, insecticidal, pesticidal, schistosomicidal, and termiticidal actions. Another chemical in the bark, beta-lapachone, has demonstrated in laboratory studies to have antibacterial, antifungal, and antiviral actions as well.

- Pau d'arco bark has shown strong actions against numerous bacteria including, *Staphylococcus, Streptococcus, Helicobacter pylori, Brucella*, tuberculosis, bacterial and mycoplasma pneumonia, and dysentery-causing bacteria.
- Pau d'arco bark has shown to have strong activity against 11 fungal and yeast strains including *Candida, Aspergillus, Cryptococcus, and Blastomyces*.
- Pau d'arco and its chemicals also have demonstrated *in vitro* antiviral properties against various viruses including: Herpes I and II, influenza, COVID-19 virus, polio virus, respiratory syncytial virus (RSV), and vesicular stomatitis virus.

Published Research:

Aziz, S., et al. "Exploring natural compounds and synthetic derivatives as potential inhibitors of SARS-CoV-2 PLpro: a computational approach with enzyme inhibition and cytotoxicity assessment." *J. Biomol. Struct. Dyn.* 2025 Feb: 1-21.

Lima, R., et al. "Determination of photosensitizing potential of lapachol for photodynamic inactivation of bacteria." *Molecules*. 2024 Nov; 29(21): 5184.

Cardona-Trujillo, M., et al. "*In vitro* anti-toxoplasma activity of extracts obtained from *Tabebuia rosea* and *Tabebuia chrysantha*: The role of β-amyrin." *Molecules*. 2024 Feb; 29(5): 920.

de Moraes, D., et al. "Antifungal activity of β-lapachone against a fluconazole-resistant *Candida auris* strain." *Braz. J. Microbiol.* 2024 Sep; 55(3): 2593-2601.

Mir, M., et al. "Antibacterial and antibiofilm activities of β-lapachone by modulating the catalase enzyme." *Antibiotics* (Basel). 2023 Mar; 12(3): 576.

Ramata-Stunda, A., et al. “Synergistic effect of polyphenol-rich complex of plant and green propolis extracts with antibiotics against respiratory infections causing bacteria. *Antibiotics.* (Basel). 2022 Jan; 11(2): 160.
Clemente de Moraes, D., et al. “Effects of β-lapachone and β-nor-lapachone on multidrug efflux transporters and biofilms of *Candida glabrata*.” *Bioorg. Med. Chem.* 2022 Jun; 63: 116749.
Ramos-Milaré, Á., et al. “The anti-Leishmania potential of bioactive compounds derived from naphthoquinones and their possible applications. A systematic review of animal studies.” *Parasitol. Res.* 2022 May; 121(5): 1247-1280.
Junior, N., et al. “In silico evaluation of lapachol derivatives binding to the Nsp9 of SARS-CoV-2.” *J. Biomol. Struct. Dyn*. 2022 Aug; 40(13): 5917-5931.
Snoussie, M., et al. “Lapachol and (α/β)-lapachone as inhibitors of SARS-CoV-2 Main Protease (Mpro) and hACE-2: ADME properties, docking and dynamic simulation approaches.” *Pharmacog. Mag.* 2023;18(79): 773-782.
Stepczyńska, M., et al. “Evaluation of the mechanical and biocidal properties of lapacho from tabebuia plant as a biocomposite material.” *Materials* (Basel). 2021 Jul; 14(15): 4241.
Ieque, A., et al. “Antituberculosis activities of lapachol and β-lapachone in combination with other drugs in acidic pH.” *Microb. Drug. Resist.* 2021 Jul; 27(7): 924-932.
Yamashita, M., et al. “Structure-activity relationship studies of antimicrobial naphthoquinones derived from constituents of *Tabebuia avellanedae*.” *Chem. Pharm. Bull.* (Tokyo). 2021; 69(7): 661-673.
Ortiz-Pérez, E., et al. “Natural and synthetic naphthoquinones as potential anti-infective agents.” *Curr. Top. Med. Chem.* 2021; 21(22): 2046-2069.
Figueredo, F., et al. “Inhibition of *Staphylococcus aureus* TetK and MsrA efflux pumps by hydroxyamines derived from lapachol and norlapachol.” *J. Bioenerg. Biomembr.* 2021 Apr; 53(2): 149-156.
Moraes, D., et al. “Synergistic interactions between β-lapachone and fluconazole in the inhibition of CaCdr2p and CaMdr1p in *Candida albicans*.” *Rev. Iberoam. Micol.* 2020 Jul-Oct; 37(3-4): 104-106.
da Silva, C., et al. “Antifungal activity of β-lapachone against azole-resistant *Candida spp*. and its aspects upon biofilm formation.” *Future Microbiol*. 2020 Oct; 15: 1543-1554.
Linzner, N., et al. “The plant-derived naphthoquinone lapachol causes an oxidative stress response in *Staphylococcus aureus*.” *Free Radic. Biol. Med.* 2020 Oct; 158: 126-136.
Figueredo, F., et al. “In silico evaluation of the antibacterial and modulatory activity of lapachol and nor-lapachol derivates.” *Microb. Pathog.* 2020 Jul; 144: 104181.
Fernandes, A., et al. “Anti-biofilm effect of β-lapachone and lapachol oxime against isolates of *Staphylococcus aureus*.” *Curr. Microbiol.* 2020 Feb; 77(2): 204-209.

Fernandez, A., et al. "*Tabebuia impetiginosa* (Mart. Ex DC. Mattos) bark extracts inhibit the growth gastrointestinal bacterial pathogens and potentiate the activity of some conventional antibiotics." *Pharmacogn. Commun.* 2020; 10: 75–82.
Apud, G., et al. "Antifungal activity of Bignoniaceae plants on *Aspergillus carbonarius* and *Aspergillus niger*." *Nat. Prod. Res.* 2020 Sep; 34(18): 2656-2659.
Bleve, G., et al. "*In vitro* activity of antimicrobial compounds against *Xylella fastidiosa*, the causal agent of the olive quick decline syndrome in Apulia (Italy)." *FEMS Microbiol. Lett.* 2018 Mar; 365(5): 29390137.
Moraes, D., et al. "ß-lapachone and a-nor-lapachone modulate *Candida albicans* viability and virulence factors." *J. Mycol. Med*. 2018 Jun; 28(2): 314-319.
Mehmood, Y., et al. "Anti-*Pseudomonas aeruginosa* drug; to evaluate bactericidal activity of *Tabebuia impetiginosa* against *Pseudomonas aeruginosa* and its synergistic effect with common anti-*Pseudomonas aeruginosa* drug." *Professional Med. J.* 2018; 25(10): 1574-1580.
Macedo, L., et al. "β-Lapachone activity in synergy with conventional antimicrobials against methicillin resistant *Staphylococcus aureus* strains." *Phytomedicine*. 2013 Dec; 21(1): 25-9.
Souza, M., et al. "The antimicrobial activity of lapachol and its thiosemicarbazone and semicarbazone derivatives." *Mem. Inst. Oswaldo Cruz.* 2013 May; 108(3).
Hofling, J., et al. "Antimicrobial potential of some plant extracts against *Candida* species." *Braz. J. Biol*. 2010 Nov; 70(4): 1065-8.
Melo e Silva, F., et al. "Evaluation of the antifungal potential of Brazilian Cerrado medicinal plants." *Mycoses.* 2009 Nov; 52(6): 511-7.
Pereira, E., et al. "*Tabebuia avellanedae* naphthoquinones: activity against methicillin-resistant staphylococcal strains, cytotoxic activity and *in vivo* dermal irritability analysis." *Ann. Clin. Microbiol. Antimicrob.* 2006 Mar; 5: 5.
Park, B., et al. "Antibacterial activity of *Tabebuia impetiginosa* Martius ex DC (Taheebo) against *Helicobacter pylori*." *J. Ethnopharmacol.* 2006 Apr; 105(1-2): 255-62.
Park, B., et al. "Selective growth-inhibiting effects of compounds identified in *Tabebuia impetiginosa* inner bark on human intestinal bacteria." *J. Agric. Food Chem*. 2005 Feb; 23;53(4): 1152-7.
Park, B., et al. "Antibacterial activity of *Tabebuia impetiginosa* Martius ex DC (Taheebo) against *Helicobacter pylori*." *J. Ethnopharmacol.* 2005 Dec;
Machado, T., et al. "*In vitro* activity of Brazilian medicinal plants, naturally occurring naphthoquinones and their analogues, against methicillin-resistant *Staphylococcus aureus*." *Int. J. Antimicrob. Agents.* 2003; 21(3): 279-84.
Portillo, A., et al. "Antifungal activity of Paraguayan plants used in traditional medicine." *J. Ethnopharmacol*. 2001; 76(1): 93-8.
Nagata, K., et al. "Antimicrobial activity of novel furanonaphthoquinone analogs." *Antimicrobial Agents Chemother*. 1998; 42(3): 700-2.

Binutu, O., et al. "Antimicrobial potentials of some plant species of the *Bignoniaceae* family." *Afr. J. Med. Sci.* 1994; 23(3): 269-73.
Giuraud, P., et al. "Comparison of antibacterial and antifungal activities of lapachol and b-lapachone." *Planta Med*. 1994; 60: 373-74.
Li, C. J., et al. "Three inhibitors of type 1 human immunodeficiency virus long terminal repeat-directed gene expression and virus replication." *Proc. Nat'l. Acad. Sci*. *USA* 1993; 90(5): 1839-42.
Anesini, C., et al. "Screening of plants used in Argentine folk medicine for antimicrobial activity." *J. Ethnopharmacol*. 1993; 39(2): 119-28.
Lagrota, M., et al. "Antiviral activity of lapachol." *Rev. Microbiol.* 1983; 14: 21-6.
Gershon, H., et al. "Fungitoxicity of 1,4-naphthoquinonoes to *Candida albicans* and *Trichophyton menta* grophytes." *Can. J. Microbiol*. 1975; 21: 1317-21.
Linhares, M., et al. "Estudo sobre of efeito de substancias antibioticas obitdas de *Streptomyces* e vegatais superiores sobre o herpesvirus hominis." *Revista Instituto Antibioticos, Recife* 1975; 15: 25-32.

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