References on Picão Preto (*Bidens pilosa*) from Part 3 of

Fighting Cancer with Plants from the Rainforest by Leslie Taylor

The published research referenced in the book which is shown below includes the initials **HS**, **IVT**, **IVA**, **REV**, **INS**, and **NEW**. HS refers to research conducted in humans; IVT refers to *in vitro* research conducted inside of test tubes; IVA refers to *in vivo* research conducted in animals; REV refers to a review article that evaluated and summarizes multiple studies on the subject; INS refers to *in silico* research (newer computer modeling including molecular docking studies) and NEW refers new biological research methods which determine genes and signaling pathways, and molecular pathways of actions which were developed during and after the Human Genome Project discussed in chapter 5.

This research below was last updated in August 2025. To view research published after that time, follow this links to the National Institute of Health's National Library of Medicine on **Picão Preto**.

Cancer Research:

Reviews:

Rodríguez-Mesa, X. "Immunomodulatory properties of natural extracts and compounds derived from *Bidens pilosa* L.: Literature Review." *Pharmaceutics*. 2023 May; 15(5): 1491. [**Free Article**] (**REV**)

Xie, Q., et al. "Polyacetylenes in herbal medicine: A comprehensive review of its occurrence, pharmacology, toxicology, and pharmacokinetics (2014-2021)." *Phytochemistry*. 2022 Sep; 201: 113288, (**REV**)

Bartolome, A., et al. "*Bidens pilosa* L. (Asteraceae): Botanical properties, traditional uses, phytochemistry, and pharmacology." *Evid. Based Complement. Alternat. Med*. 2013; 2013: 340215. [**Free Article**] (**REV**)

Xuan, T., et al. "Chemistry and pharmacology of *Bidens pilosa*: an overview." *J. Pharm. Investig.* 2016; 46(2): 91-132. [**Free Article**] (**REV**)

Silva, F., et al. "Compilation of secondary metabolites from *Bidens pilosa* L." *Molecules*. 2011 Jan; 16(2): 1070-102. [**Free Article**] (**REV**)

Human Clinical Trials with Picão Preto:

Pereira C., et al. "Oral mucositis management with photobiomodulation, *Bidens pilosa* L. (Asteraceae) and *Curcuma longa* L. (Zingiberaceae), the FITOPROT herbal medicine, and its influence on inflammatory cytokine levels: a randomized clinical trial." *Support Care Cancer*. 2024 Sep; 32(9): 628. (**HS**)

Martins, A., et al. "Effects of a mucoadhesive phytomedicine (*Curcuma longa* L. and *Bidens pilosa* L.) on radiotherapy-induced oral mucositis and quality of life of patients undergoing head

and neck cancer treatment: randomized clinical trial." *Support Care Cancer*. 2023 Aug; 31(9): 517. (**HS**)
Arantes, D., et al. "Safety and efficacy of a mucoadhesive phytomedication containing curcuminoids and *Bidens pilosa* L. extract in the prevention and treatment of radiochemotherapy-induced oral mucositis: Triple-blind, randomized, placebo-controlled, clinical trial." *Head Neck.* 2021 Dec; 43(12): 3922-3934. (**HS**)
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Zeng, G., et al. "Inhibition of DNA Topoisomerase I by flavonoids and polyacetylenes Isolated from *Bidens pilosa* L." *Molecules*. 2024 Jul; 29(15): 3547. (**IVT**)
Zahara, K., et al. "Isolation and Identification of bioactive compounds from *Bidens spp*. using HPLC-DAD and GC-MS analysis and their biological activity as anticancer molecules." *Molecules*. 2022 Mar; 27(6): 1927. (**IVT**)
Xin, Y., et al. "Iso okanin inhibits PGE2-mediated angiogenesis by inducing cell arrest through inhibiting the phosphorylation of ERK1/2 and CREB in HMEC-1 cells." *Int. J. Mol. Sci.* 2021; 22: 6466. (**IVT, NEW**)
Khanal, D., et al. "Phytochemical screening, biological studies and GC-MS analysis of extract of *Biden pilosa* L." *J. Manm. Mem. Inst. Health Sci.* 2019; 5(1): 79-93. (**IVT**)
Almosnid, M., et al. "Evaluation of extracts prepared from 16 plants used in Yao ethnomedicine as potential anticancer agents." *J. Ethnopharmacol*. 2018 Jan; 211: 224-234. (**IVT**)
Shen, Y., et al. "Anticancer effect of petroleum ether extract from *Bidens pilosa* L and its constituent's analysis by GC-MS." *J. Ethnopharmacol.* 2018 May 10; 217: 126-133. (**IVT, NEW**)
Wu, J., et al. "Investigation of the extracts from *Bidens pilosa* Linn. var. radiata Sch. Bip. for antioxidant activities and cytotoxicity against human tumor cells." *J. Nat. Med.* 2013 Jan; 67(1): 17-26. (**IVA**, **IVT**)
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Sundararajan, P., et al. "Studies of anticancer and antipyretic activity of *Bidens pilosa* whole plant." *Afr. Health Sci.* 2006 Mar; 6(1): 27-30. (**IVT**)
Wu, L., et al. "Polyacetylenes function as anti–angiogenic agent." *Pharm. Res* 2004; 21: 2112–2119. (**IVT**)

Chang, J., et al. "Antileukemic activity of *Bidens pilosa* L. var. minor (Blume) Sherff and *Houttuynia cordata* Thunb." *Am. J. Chin. Med.* 2001; 29(2): 303-12. (**IVT**)
Wang, J., et al. "Inhibition of 5 compounds from *Bidens bipinnata* on leukemia cells *in vitro*." *Zhong Yao Cai.* 1997; 20(5): 247-9. (**IVT**)
Gupta, M., et al. "Screening of Panamanian medicinal plants for brine shrimp toxicity, crown gall tumor inhibition, cytotoxicity and DNA intercalation." *Int. J. Pharmacog.* 1996; 34(1): 19-27. (**IVT**)
Alvarez, L., et al. "Bioactive polyacetylenes from *Bidens pilosa*." *Planta Med*. 1996; 62(4): 355-57. (**IVT**)
Wat, C., et al. "Ultraviolet-mediated cytotoxic activity of phenylheptatriyne from *Bidens pilosa* L." *J. Nat. Prod.* 1979; 42(1): 103-11. (**IVT**)

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Ong, P., et al. “The anticancer effect of protein-extract from *Bidens alba* in human colorectal carcinoma SW480 cells via the reactive oxidative species- and glutathione depletion-dependent apoptosis.” *Food Chem. Toxicol.* 2008 May; 46(5): 1535-47. (**IVT, NEW**)

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Chia, W., et al. “Okanin inhibits cell growth and induces apoptosis and pyroptosis in oral cancer.” *Cancers* (Basel). 2024 Sep; 16(18): 3195. (**IVT, IVA, NEW**)

Mirvish, S., et al. “Test of catechol; tannic acid; *Bidens pilosa*; croton oil; and phorbol for cocarcinogenesis of esophageal tumors induced in rats by methyl-n-amylnitrosamine.” *J. Natl. Cancer Inst.* 1985; 74: 1283–1290. (**IVA)**

Mirvish, S., et al. “Studies on the esophagus. II. Enhancement of [3 H] thymidine incorporation in the rat esophagus by *Bidens pilosa* (a plant eaten in South Africa) and by croton oil.” *Cancer Lett*. 1979; 6: 159–165. (**IVA)**

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Nakama, S., et al. “Anti-adult T-cell leukemia effects of *Bidens pilosa*.” *Int. J. Oncol.* 2011 Apr; 38(4): 1163-73. (**IVA, IVT**)

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Zhang, L., et al. “N-butanol fraction of *Entada phaseoloides* ethanol extract inhibits hepatocellular carcinoma HepG2 cell proliferation by inducing apoptosis.” *J. BUON.* 2014 Apr-Jun; 19(2): 406-11. (**IVT**)

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Shen, Y., et al. “Anticancer effect of petroleum ether extract from *Bidens pilosa* L and its constituent's analysis by GC-MS.” *J. Ethnopharmacol.* 2018 May; 217: 126-133. (**IVT, IVA, NEW**)

Fleisher, A. “Preparation comprising as active ingredients an extract derived from plants of Bidens species or phenylpheptatriyne (natural or synthetic).” *Israeli I.* 1980; 1: 47780.

Reducing Chemotherapy Side Effects:

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De Ávila, P., et al, “Mucoadhesive formulation of *Bidens pilosa* L. (Asteraceae) reduces intestinal injury from 5-fluorouracil-induced mucositis in mice.” *Toxicol. Rep.* 2015; 2: 563–573. (**IVA)**

Drug Research on Picão Preto’s Chemicals:

Mandal, A., et al. “Synthesis of friedelan triterpenoid analogs with DNA topoisomerase IIα inhibitory activity and their molecular docking studies.” *Eur. J. Med. Chem*. 2012 Aug; 54: 137-43. (**IVT, INS, NEW**)

Mechanisms of Action:

Xin, Y., et al. “Isookanin inhibits PGE2-mediated angiogenesis by inducing cell arrest through inhibiting the phosphorylation of ERK1/2 and CREB in HMEC-1 Cells.” *Int. J. Mol. Sci.* 2021 Jun; 22(12): 6466.

Links to Cancer Research on Picão Preto’s Polyphenols:

https://pubmed.ncbi.nlm.nih.gov/?term=Isoquercetin+AND+cancer
https://pubmed.ncbi.nlm.nih.gov/?term=chlorogenic+acid+and+cancer
https://pubmed.ncbi.nlm.nih.gov/?term=ellagic+acid+AND+cancer
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Huang, S., et al. “Chlorogenic acid effectively treats cancers through induction of cancer cell differentiation.” *Theranostics*. 2019 Sep; 9(23): 6745-6763. (**IVA, IVT, INS, NEW**)
Jiang, Y., et al. “Gallic Acid: A potential anti-cancer agent.” *Chin. J. Integr. Med.* 2022 Jul; 28(7): 661-671. (**REV**)
Aghababaei, F., et al. “Recent advances in potential health benefits of quercetin.” *Pharmaceuticals* 2023; 16: 1020–1020. [**Free Article**] (**REV**)
Qattan, M., et al. “Therapeutic importance of kaempferol in the treatment of cancer through the modulation of cell signalling pathways.” *Molecules*. 2022 Dec; 27(24): 8864. [**Free Article**] (**REV**)
Ghanbari-Movahed, M., et al. “Quercetin- and rutin-based nano-formulations for cancer treatment: A systematic review of improved efficacy and molecular mechanisms.” *Phytomedicine*. 2022 Mar; 97: 153909. (**REV**)
Nouri, Z., et al. “Targeting multiple signaling pathways in cancer: The rutin therapeutic approach.” *Cancers* (Basel). 2020 Aug; 12(8): 2276. [**Free Article**] (**REV**)

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Rodriguez-Mesa, X., et al. “Immunomodulatory properties of natural extracts and compounds derived from *Bidens pilosa* L.: Literature Review.” *Pharmaceutics*. 2023; 15: 1491. (**REV**)

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Singh, G., et al. "Pharmacological potential of *Bidens pilosa* L. and determination of bioactive compounds using UHPLC-QqQ(LIT)-MS/MS and GC/MS."*BMC Complement. Altern. Med*. 2017 Nov 16; 17(1): 492.

Costa, J., et al. "*In vitro* study of mutagenic potential of *Bidens pilosa* Linné and *Mikania glomerata* Sprengel using the comet and micronucleus assays." *J. Ethnopharmacol*. 2008 Jun 19; 118(1): 86-93.

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